NTP TECHNICAL REPORT

ON THE

# TOXICOLOGY AND CARCINOGENESIS

# STUDIES OF 1-CHLORO-2-PROPANOL
## (TECHNICAL GRADE)

## (CAS NO. 127-00-4)

# IN F344/N RATS AND B6C3F$_1$ MICE

## (DRINKING WATER STUDIES)

**NATIONAL TOXICOLOGY PROGRAM**
**P.O. Box 12233**
**Research Triangle Park, NC 27709**

**September 1998**

**NTP TR 477**

**NIH Publication No. 98-3967**

**U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES**
**Public Health Service**
**National Institutes of Health**

## FOREWORD

The National Toxicology Program (NTP) is made up of four charter agencies of the U.S. Department of Health and Human Services (DHHS): the National Cancer Institute (NCI), National Institutes of Health; the National Institute of Environmental Health Sciences (NIEHS), National Institutes of Health; the National Center for Toxicological Research (NCTR), Food and Drug Administration; and the National Institute for Occupational Safety and Health (NIOSH), Centers for Disease Control. In July 1981, the Carcinogenesis Bioassay Testing Program, NCI, was transferred to the NIEHS. The NTP coordinates the relevant programs, staff, and resources from these Public Health Service agencies relating to basic and applied research and to biological assay development and validation.

The NTP develops, evaluates, and disseminates scientific information about potentially toxic and hazardous chemicals. This knowledge is used for protecting the health of the American people and for the primary prevention of disease.

The studies described in this Technical Report were performed under the direction of the NIEHS and were conducted in compliance with NTP laboratory health and safety requirements and must meet or exceed all applicable federal, state, and local health and safety regulations. Animal care and use were in accordance with the Public Health Service Policy on Humane Care and Use of Animals. The prechronic and chronic studies were conducted in compliance with Food and Drug Administration (FDA) Good Laboratory Practice Regulations, and all aspects of the chronic studies were subjected to retrospective quality assurance audits before being presented for public review.

These studies are designed and conducted to characterize and evaluate the toxicologic potential, including carcinogenic activity, of selected chemicals in laboratory animals (usually two species, rats and mice). Chemicals selected for NTP toxicology and carcinogenesis studies are chosen primarily on the bases of human exposure, level of production, and chemical structure. The interpretive conclusions presented in this Technical Report are based only on the results of these NTP studies. Extrapolation of these results to other species and quantitative risk analyses for humans require wider analyses beyond the purview of these studies. Selection *per se* is not an indicator of a chemical's carcinogenic potential.

Listings of all published NTP reports and ongoing studies are available from NTP Central Data Management, NIEHS, P.O. Box 12233, MD E1-02, Research Triangle Park, NC 27709 (919-541-3419). The Abstracts and other study information for 2-year studies are also available at the NTP's World Wide Web site: http://ntp-server.niehs.nih.gov.

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# CONTRIBUTORS

## National Toxicology Program
*Evaluated and interpreted results and reported findings*

J.K. Dunnick, Ph.D., Study Scientist
D.A. Bridge, B.S.
J.R. Bucher, Ph.D.
R.E. Chapin, Ph.D.
J.R. Hailey, D.V.M.
J.K. Haseman, Ph.D.
R.R. Maronpot, D.V.M.
G.N. Rao, D.V.M., Ph.D.
C.S. Smith, Ph.D.
G.S. Travlos, D.V.M.
D.B. Walters, Ph.D.
K.L. Witt, M.S., Integrated Laboratory Systems

## SRI International
*Conducted 14-day and 14-week studies, evaluated pathology findings*

J.B. Reid, Ph.D., Principal Investigator
R.A. Becker, Ph.D.
J.R. Hill, Ph.D.
E.F. Meierhenry, Ph.D.

## TSI Mason Laboratories
*Conducted 2-year studies, evaluated pathology findings*

M.R. Osheroff, Ph.D., Principal Investigator
C. Gamba-Vitalo, Ph.D.
F.A. Voelker, D.V.M.
D. Norlin, Ph.D.

## Experimental Pathology Laboratories, Inc.
*Provided pathology quality assurance*

J.F. Hardisty, D.V.M., Principal Investigator
J. Peckham, D.V.M., M.S., Ph.D.

## Dynamac Corporation
*Prepared quality assurance audits*

S. Brecher, Ph.D., Principal Investigator

## NTP Pathology Working Group
*Evaluated slides, prepared pathology report on rats (24 April 1997)*

J.C. Seely, D.V.M., Chairperson
PATHCO, Inc.
R. Brown, D.V.M.
Glaxo-Wellcome
V. Geiss, D.V.M., Ph.D., Observer
National Toxicology Program
J.R. Hailey, D.V.M.
National Toxicology Program
R.A. Herbert, D.V.M., Ph.D.
National Toxicology Program
J.R. Leininger, D.V.M., Ph.D.
National Toxicology Program
J. Peckham, D.V.M., M.S., Ph.D.
Experimental Pathology Laboratories, Inc.
A. Radovsky, D.V.M., Ph.D.
National Toxicology Program

*Evaluated slides, prepared pathology report on mice (24 April 1997)*

P.K. Hildebrandt, D.V.M., Chairperson
PATHCO, Inc.
R. Brown, D.V.M.
Glaxo-Wellcome
V. Geiss, D.V.M., Ph.D., Observer
National Toxicology Program
J.R. Hailey, D.V.M.
National Toxicology Program
R.A. Herbert, D.V.M., Ph.D.
National Toxicology Program
J.R. Leininger, D.V.M., Ph.D.
National Toxicology Program
J. Peckham, D.V.M., M.S., Ph.D.
Experimental Pathology Laboratories, Inc.
A. Radovsky, D.V.M., Ph.D.
National Toxicology Program

**Analytical Sciences, Inc.**
*Provided statistical analyses*

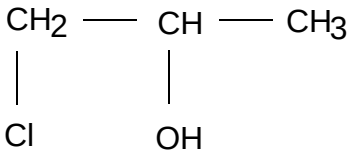
R.W. Morris, M.S., Principal Investigator
S.R. Lloyd, M.S.
N.G. Mintz, B.S.

**Biotechnical Services, Inc.**
*Prepared Technical Report*

S.R. Gunnels, M.A., Principal Investigator
G. Gordon, M.A.
L.M. Harper, B.S.
A.M. Macri-Hanson, M.A., M.F.A.
S.M. Swift, B.S.

# CONTENTS

# ABSTRACT



**TECHNICAL GRADE 1-CHLORO-2-PROPANOL**

**( ~ 75% 1-CHLORO-2-PROPANOL; ~ 25% 2-CHLORO-1-PROPANOL)**

CAS No. 127-00-4

Chemical Formula: $C_3H_7ClO$ Molecular Weight: 94.54

**Synonyms:** Chlorohydrin, 1-chloro-2-hydroxypropane, 1-chloroisopropyl alcohol, propylene-∝-chlorohydrin, *sec*-propylene chlorohydrin


1-Chloro-2-propanol and its positional isomer, 2-chloro-1-propanol, are used as chemical intermediates for the manufacture of propylene oxide, a starting material for production of polyurethane polyols and propylene glycol. The National Cancer Institute nominated 1-chloro-2-propanol for study because of potential for human exposure due to its residues in various foods that are fumigated with ethylene oxide or propylene oxide. Male and female F344/N rats and $B6C3F_1$ mice were exposed to technical grade 1-chloro-2-propanol (75% to 76% 1-chloro-2-propanol; 24% to 25% 2-chloro-1-propanol) in drinking water for 14 days, 14 weeks, or 2 years. Genetic toxicology studies were conducted in *Salmonella typhimurium*, cultured Chinese hamster ovary cells, *Drosophila melanogaster*, and mouse peripheral blood erythrocytes. Continuous breeding studies were conducted in Sprague-Dawley rats.

## 14-DAY STUDY IN RATS

Groups of 10 male and 10 female F344/N rats were administered 1-chloro-2-propanol in drinking water at concentrations of 0, 100, 330, 1,000, 3,300, or 10,000 ppm for 14 days. Two 10,000 ppm females died before the end of the study. The final mean body weights and body weight gains of 3,300 and 10,000 ppm rats were significantly less than those of the controls; rats in the 10,000 ppm groups lost weight. Water consumption by the 3,300 and 10,000 ppm groups was significantly less than that by the controls throughout the study. The thymus weights of 10,000 ppm rats were significantly less than those of the controls. Exposure to 1-chloro-2-propanol caused cytoplasmic alteration and degeneration of the acinar cells and fatty change in the pancreas, atrophy of the bone marrow, and atrophy and hematopoiesis of the spleen in males and females.

## 14-DAY STUDY IN MICE

Groups of 10 male and 10 female $B6C3F_1$ mice were administered 1-chloro-2-propanol in drinking water at concentrations of 0, 100, 330, 1,000, 3,300, or 10,000 ppm for 14 days. One male mouse in the 10,000 ppm group died before the end of the study. Mean body weight gains of 10,000 ppm mice were significantly less than those of the controls. Water consumption by 3,300 and 10,000 ppm males and females was significantly less than that by the controls throughout the study. Liver weights of 1,000, 3,300, or 10,000 ppm males and females were significantly greater and thymus weights of 10,000 ppm mice were significantly less than those of the controls. Exposure

to 1-chloro-2-propanol caused hepatocellular vacuolization, cytoplasmic alteration and degeneration of the pancreas acinar cells, and atrophy of the spleen in males and females.

## 14-WEEK STUDY IN RATS

Groups of 10 male and 10 female F344/N rats were administered 1-chloro-2-propanol at concentrations of 0, 33, 100, 330, 1,000, or 3,300 ppm (equivalent to average daily doses of approximately 5, 10, 35, 100, or 220 mg/kg) for 14 weeks. All rats survived to the end of the study. Mean body weight gains of 3,300 ppm rats were significantly less than those of the controls. Water consumption by the 3,300 ppm male and female rats was significantly less than that by the controls. A minimal to mild anemia was observed in exposed female rats. The cauda epididymis and epididymis weights of 3,300 ppm males were significantly less than those of the controls. The percentage of abnormal sperm in 3,300 ppm males and the concentration of epididymal sperm in 330 ppm males were significantly increased compared to the controls. Kidney and liver weights of males and females exposed to 100 ppm or more were generally greater than those of the controls. The incidences of acinar cell degeneration and fatty change of the pancreas in 1,000 and 3,300 ppm rats, hepatocytic metaplasia of the pancreatic islets in 3,300 ppm females, cytoplasmic vacuolization of the liver in 100, 1,000 and 3,300 ppm males, and renal tubule epithelium regeneration in 3,300 ppm females were increased compared to the controls.

## 14-WEEK STUDY IN MICE

Groups of 10 male and 10 female B6C3F$_1$ mice were administered 1-chloro-2-propanol in drinking water at concentrations of 0, 33, 100, 330, 1,000, or 3,300 ppm (equivalent to average daily doses of approximately 5, 15, 50, 170, or 340 mg/kg to males and 7, 20, 70, 260, or 420 mg/kg to females) for 14 weeks. One 330 ppm male died before the end of the study. Mean body weight gains of exposed groups were similar to those of the controls. A minimal anemia was observed in 3,300 ppm males. The right epididymis weight of 3,300 ppm males was significantly greater than that of the controls. Kidney weights of 3,300 ppm mice, liver weights of 1,000 ppm males and of all exposed groups of females, and thymus weights of 1,000 and 3,300 ppm females were greater than those of the controls. The incidences of pancreatic acinar cell degeneration and fatty change in 3,300 ppm males and females and cytoplasmic vacuolization of the liver in all groups of exposed females were significantly increased compared to the controls. The severities of renal tubule cytoplasmic vacuolization were greater in 1,000 and 3,300 ppm males than in the controls.

## 2-YEAR STUDY IN RATS

Groups of 50 male and 50 female F344/N rats were administered drinking water containing 0, 150, 325, or 650 ppm 1-chloro-2-propanol (equivalent to average daily doses of approximately 15, 30, or 65 mg/kg during the first several months of the study and 8, 17, or 34 mg/kg for the remainder of the 2-year study) for up to 105 weeks. Survival of all exposed groups was similar to that of the controls. Mean body weights of exposed rats were generally similar to those of the controls throughout most of the study. Water consumption by all exposed groups was similar to that by the controls. No treatment-related neoplasms or nonneoplastic lesions were observed in this study.

## 2-YEAR STUDY IN MICE

Groups of 50 male and 50 female B6C3F$_1$ mice were administered drinking water containing 0, 250, 500, or 1,000 ppm 1-chloro-2-propanol (equivalent to average daily doses of approximately 45, 75, or 150 mg/kg to males and 60, 105, or 210 mg/kg to females during the first several months of the study and 25, 50, or 100 mg/kg for the remainder of the 2-year study) for up to 105 weeks. Survival of all exposed groups was similar to that of the controls. The mean body weights of all exposed mice were generally similar to those of the controls throughout the study. Water consumption by all exposed groups was similar to that by the controls. No treatment-related neoplasms or nonneoplastic lesions were observed in this study.

## GENETIC TOXICOLOGY

1-Chloro-2-propanol is a demonstrated mutagen *in vitro*. It was weakly mutagenic in *S. typhimurium* strain TA100 in the presence of hamster or rat liver S9 activation enzymes and was positive, with and without S9, in TA1535. No mutagenic activity was detected in strains TA97, TA98, and TA1537, with or without S9. In cytogenetic tests with Chinese hamster ovary cells, 1-chloro-2-propanol induced high levels of sister

chromatid exchanges and chromosomal aberrations in the presence and the absence of S9. The marked ability of 1-chloro-2-propanol to induce chromosomal effects *in vitro* was not seen *in vivo*. Positive results were obtained in a test in *D. melanogaster* for induction of sex-linked recessive lethal mutations in germ cells of males administered 1-chloro-2-propanol via injection; however, negative results were obtained when males were administered 1-chloro-2-propanol in feed. A subsequent germ cell reciprocal translocation test in *D. melanogaster* yielded negative results. Further, no induction of micronucleated erythrocytes was observed in peripheral blood of male and female mice administered 1-chloro-2-propanol via drinking water for 14 weeks.

## CONCLUSIONS

Under the conditions of these 2-year drinking water studies, there was *no evidence of carcinogenic activity** of technical grade 1-chloro-2-propanol in male or female F344/N rats exposed to 150, 325, or 650 ppm. There was *no evidence of carcinogenic activity* of technical grade 1-chloro-2-propanol in male or female B6C3$F_1$ mice exposed to 250, 500, or 1,000 ppm.

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* Explanation of Levels of Evidence of Carcinogenic Activity is on page 9. A summary of the Technical Reports Review Subcommittee comments and the public discussion on this Technical Report appears on page 11.

**Summary of the 2-Year Carcinogenesis and Genetic Toxicology Studies of 1-Chloro-2-propanol**

| | Male F344/N Rats | Female F344/N Rats | Male $B6C3F_1$ Mice | Female $B6C3F_1$ Mice |
|---|---|---|---|---|
| **Concentrations** | 0, 150, 325, or 650 ppm | 0, 150, 325, or 650 ppm | 0, 250, 500, or 1,000 ppm | 0, 250, 500, or 1,000 ppm |
| **Body weights** | Exposed groups similar to control group | Exposed groups similar to control group | Exposed groups similar to control group | Exposed groups similar to control group |
| **Survival rates** | 20/50, 23/50, 24/50, 23/50 | 25/50, 33/50, 30/50, 31/50 | 40/50, 44/50, 29/50, 39/50 | 32/50, 32/50, 36/50, 32/50 |
| **Nonneoplastic effects** | None | None | None | None |
| **Neoplastic effects** | None | None | None | None |
| **Level of evidence of carcinogenic activity** | No evidence | No evidence | No evidence | No evidence |
| **Genetic toxicology** | | | | |
| *Salmonella typhimurium* gene mutations: | Positive or equivocal with S9 in strain TA100; positive with and without S9 in strain TA1535; negative with and without S9 in strains TA97, TA98, and TA1537 | | | |
| Sister chromatid exchanges | | | | |
| Cultured Chinese hamster ovary cells *in vitro*: | Positive with and without S9 | | | |
| Chromosomal aberrations | | | | |
| Cultured Chinese hamster ovary cells *in vitro*: | Positive with and without S9 | | | |
| Sex-linked recessive lethal mutations | | | | |
| *Drosophila melanogaster*: | Positive when administered via injection, negative when administered via feed | | | |
| Reciprocal translocations | | | | |
| *Drosophila melanogaster*: | Negative | | | |
| Micronucleated erythrocytes | | | | |
| Mouse peripheral blood *in vivo*: | Negative | | | |

## EXPLANATION OF LEVELS OF EVIDENCE OF CARCINOGENIC ACTIVITY

The National Toxicology Program describes the results of individual experiments on a chemical agent and notes the strength of the evidence for conclusions regarding each study. Negative results, in which the study animals do not have a greater incidence of neoplasia than control animals, do not necessarily mean that a chemical is not a carcinogen, inasmuch as the experiments are conducted under a limited set of conditions. Positive results demonstrate that a chemical is carcinogenic for laboratory animals under the conditions of the study and indicate that exposure to the chemical has the potential for hazard to humans. Other organizations, such as the International Agency for Research on Cancer, assign a strength of evidence for conclusions based on an examination of all available evidence, including animal studies such as those conducted by the NTP, epidemiologic studies, and estimates of exposure. Thus, the actual determination of risk to humans from chemicals found to be carcinogenic in laboratory animals requires a wider analysis that extends beyond the purview of these studies.

Five categories of evidence of carcinogenic activity are used in the Technical Report series to summarize the strength of the evidence observed in each experiment: two categories for positive results (**clear evidence** and **some evidence**); one category for uncertain findings (**equivocal evidence**); one category for no observable effects (**no evidence**); and one category for experiments that cannot be evaluated because of major flaws (**inadequate study**). These categories of interpretative conclusions were first adopted in June 1983 and then revised in March 1986 for use in the Technical Report series to incorporate more specifically the concept of actual weight of evidence of carcinogenic activity. For each separate experiment (male rats, female rats, male mice, female mice), one of the following five categories is selected to describe the findings. These categories refer to the strength of the experimental evidence and not to potency or mechanism.

- **Clear evidence** of carcinogenic activity is demonstrated by studies that are interpreted as showing a dose-related (i) increase of malignant neoplasms, (ii) increase of a combination of malignant and benign neoplasms, or (iii) marked increase of benign neoplasms if there is an indication from this or other studies of the ability of such tumors to progress to malignancy.
- **Some evidence** of carcinogenic activity is demonstrated by studies that are interpreted as showing a chemical-related increased incidence of neoplasms (malignant, benign, or combined) in which the strength of the response is less than that required for clear evidence.
- **Equivocal evidence** of carcinogenic activity is demonstrated by studies that are interpreted as showing a marginal increase of neoplasms that may be chemical related.
- **No evidence** of carcinogenic activity is demonstrated by studies that are interpreted as showing no chemical-related increases in malignant or benign neoplasms.
- **Inadequate study** of carcinogenic activity is demonstrated by studies that, because of major qualitative or quantitative limitations, cannot be interpreted as valid for showing either the presence or absence of carcinogenic activity.

When a conclusion statement for a particular experiment is selected, consideration must be given to key factors that would extend the actual boundary of an individual category of evidence. Such consideration should allow for incorporation of scientific experience and current understanding of long-term carcinogenesis studies in laboratory animals, especially for those evaluations that may be on the borderline between two adjacent levels. These considerations should include:

- adequacy of the experimental design and conduct;
- occurrence of common versus uncommon neoplasia;
- progression (or lack thereof) from benign to malignant neoplasia as well as from preneoplastic to neoplastic lesions;
- some benign neoplasms have the capacity to regress but others (of the same morphologic type) progress. At present, it is impossible to identify the difference. Therefore, where progression is known to be a possibility, the most prudent course is to assume that benign neoplasms of those types have the potential to become malignant;
- combining benign and malignant tumor incidence known or thought to represent stages of progression in the same organ or tissue;
- latency in tumor induction;
- multiplicity in site-specific neoplasia;
- metastases;
- supporting information from proliferative lesions (hyperplasia) in the same site of neoplasia or in other experiments (same lesion in another sex or species);
- presence or absence of dose relationships;
- statistical significance of the observed tumor increase;
- concurrent control tumor incidence as well as the historical control rate and variability for a specific neoplasm;
- survival-adjusted analyses and false positive or false negative concerns;
- structure-activity correlations; and
- in some cases, genetic toxicology.

## NATIONAL TOXICOLOGY PROGRAM BOARD OF SCIENTIFIC COUNSELORS
## TECHNICAL REPORTS REVIEW SUBCOMMITTEE

The members of the Technical Reports Review Subcommittee who evaluated the draft NTP Technical Report on 1-chloro-2-propanol on 10 December 1997 are listed below. Subcommittee members serve as independent scientists, not as representatives of any institution, company, or governmental agency. In this capacity, subcommittee members have five major responsibilities in reviewing the NTP studies:

- to ascertain that all relevant literature data have been adequately cited and interpreted,
- to determine if the design and conditions of the NTP studies were appropriate,
- to ensure that the Technical Report presents the experimental results and conclusions fully and clearly,
- to judge the significance of the experimental results by scientific criteria, and
- to assess the evaluation of the evidence of carcinogenic activity and other observed toxic responses.

Gary P. Carlson, Ph.D., Chairperson
School of Health Sciences
Purdue University
West Lafayette, IN

A. John Bailer, Ph.D.
Department of Mathematics and Statistics
Miami University
Oxford, OH

Steven A. Belinsky, Ph.D.*
Inhalation Toxicology Research Institute
Kirkland Air Force Base
Albuquerque, NM

James S. Bus, Ph.D., Principal Reviewer
Health and Environmental Sciences
Dow Chemical Company
Midland, MI

Linda A. Chatman, D.V.M., Principal Reviewer
Pfizer, Inc.
Groton, CT

John M. Cullen, Ph.D., V.M.D.
Department of Microbiology, Parasitology, and Pathology
College of Veterinary Medicine
North Carolina State University
Raleigh, NC

Susan M. Fischer, Ph.D.
M.D. Anderson Cancer Center
University of Texas
Smithville, TX

Thomas L. Goldsworthy, Ph.D.
Integrated Laboratory Systems
Research Triangle Park, NC

Irma Russo, M.D.
Fox Chase Cancer Center
Philadelphia, PA

### Special Reviewers

Stephen S. Hecht, Ph.D.
University of Minnesota Cancer Centers
Minneapolis, MN

Michele Medinsky, Ph.D.
Chemical Industry Institute of Toxicology
Research Triangle Park, NC

Jose Russo, M.D., Principal Reviewer
Fox Chase Cancer Center
Philadelphia, PA

---

* Did not attend

## SUMMARY OF TECHNICAL REPORTS REVIEW SUBCOMMITTEE COMMENTS

On 10 December 1997, the draft Technical Report on the toxicology and carcinogenesis studies of 1-chloro-2-propanol (technical grade) received public review by the National Toxicology Program's Board of Scientific Counselors' Technical Reports Review Subcommittee. The meeting was held at the National Institute of Environmental Health Sciences, Research Triangle Park, NC.

Dr. J.K. Dunnick, NIEHS, introduced the toxicology and carcinogenesis studies of 1-chloro-2-propanol by discussing the uses of the chemical and the rationale for study, describing the experimental design, reporting on any survival and body weight effects, and commenting on compound-related neoplastic and nonneoplastic lesions in rats and mice. The proposed conclusions for the 2-year studies were *no evidence of carcinogenic activity* in male or female F344/N rats or $B6C3F_1$ mice.

Dr. Chatman, a principal reviewer, agreed with the proposed conclusions. She noted that the pancreas was a target tissue in the 14-week studies, and in light of epidemiologic reports of higher rates of pancreatic cancer in humans working in the chlorohydrin industry, she asked if the top doses should have been higher in the 2-year studies. Dr. Chatman asked why inhalation was not the preferred route of exposure. Dr. Dunnick responded that the chemical was administered orally because of concern about its being present in fumigated foods.

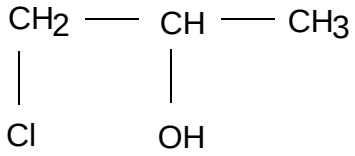
Dr. J. Russo, the second principal reviewer, agreed with the proposed conclusions. He commented on the significant decrease in drinking water consumption in exposed animals in the 14-week studies and asked whether this could be due to some type of hypothalamic damage. Dr. Dunnick said water consumption was decreased more in the 14-day studies than in the 14-week studies, and by 13 weeks, decreases in water consumption were much less as animals adapted to the taste of the chemical. Dr. Chatman inquired whether exposure concentrations were monitored in view of the decrease in water consumption. Dr. Dunnick said analyses were performed on the drinking water bottles and on the dose preparations, and, in general, concentrations were within targeted amounts.

Dr. Bus, the third principal reviewer, agreed with the proposed conclusions.

Dr. Goldsworthy also thought that the high doses may have been below maximal tolerated doses. Dr. J.R. Hailey, NIEHS, said that the 2-year study doses were based on the significant pancreatic lesions in the 14-week studies. Dr. Bus commented that based on the results of the 14-week studies, the doses for the 2-year studies were chosen properly. Dr. Cullen asked whether the pancreatic lesions in the 14-week studies were metaplastic and if the size of the pancreas had changed. Dr. Hailey replied that there was no change in size although there was apoptosis of acinar cells and replacement by adipocytes (fat cells). Dr. Chatman urged the NTP to pursue the evaluation of possible pancreatic effects in view of a possible association with increased pancreatic cancer in the workplace.

Dr. Chatman moved that the Technical Report on 1-chloro-2-propanol (technical grade) be accepted with the conclusions as written for male and female rats and mice, *no evidence of carcinogenic activity*. Dr. Goldsworthy seconded the motion, which was accepted unanimously with seven votes.

# INTRODUCTION



**TECHNICAL GRADE 1-CHLORO-2-PROPANOL**

**( ~ 75% 1-CHLORO-2-PROPANOL; ~ 25% 2-CHLORO-1-PROPANOL)**

CAS No. 127-00-4

Chemical Formula: $C_3H_7ClO$ Molecular Weight: 94.54

**Synonyms:** Chlorohydrin, 1-chloro-2-hydroxypropane, 1-chloroisopropyl alcohol, propylene-∝-chlorohydrin, *sec*-propylene chlorohydrin

## CHEMICAL AND PHYSICAL PROPERTIES

1-Chloro-2-propanol and 2-chloro-1-propanol are the isomers of propylene chlorohydrin. The chemical and physical properties of the two isomers are summarized in Table 1.

## PRODUCTION, USE, AND HUMAN EXPOSURE

Propylene chlorohydrins, organic compounds containing chlorine and hydroxyl groups, are unknown as natural products; they are manufactured by the reaction of propylene with hypochlorous acid. The production of a mixture of 1-chloro-2-propanol and 2-chloro-1-propanol in the United States in 1976 was estimated to be greater than $8.1 \times 10^8$ kg or 1.78 billion pounds (USEPA, 1977).

The chlorine in propylene chlorohydrins is labile; it dehydrohalogenates readily through an intermediate epoxide, which then hydrolyzes to glycols (*Kirk-Othmer*, 1985). Propylene chlorohydrins are used commercially as chemical intermediates in the manufacture of propylene oxide, a starting material for the production of polyurethane polyols and propylene glycol. Approximately half of the propylene oxide produced in the United States in 1979 was from propylene chlorohydrins. Prior to 1969, all propylene oxide and most ethylene oxide produced in the United States were manufactured using propylene chlorohydrins (USEPA, 1977; SRI, 1980).

Propylene chlorohydrins have been identified as potential air pollutants from chemical manufacturing plants (USEPA, 1976). However, no threshold limit values have been set for workplace air in the United States, no occupational standard for exposure to propylene chlorohydrins has been established by the Occupational Safety and Health Administration (OSHA), and no allowable limits for water or soil have been determined by the U.S. Environmental Protection Agency.

Propylene chlorohydrins are generated from the hydrolysis of epichlorohydrin, a widely used chemical intermediate (Carr and Rosenkranz, 1978), and 1-chloro-2-propanol has been identified in the headspace above a soil sample contaminated with

**TABLE 1**
**Summary of the Chemical and Physical Properties of Isomers of Propylene Chlorohydrin**[a]

| Property | 1-Chloro-2-propanol (*sec*-propylene chlorohydrin) CAS No. 127-00-4 | 2-Chloro-1-propanol (propylene chlorohydrin) CAS No. 78-89-70 |
|---|---|---|
| Molecular weight | 94.54 | 94.54 |
| Form | Colorless liquid | Colorless liquid, pleasant odor |
| Boiling point | 126° to 127° C | 133° to 134° C |
| Flash point | 52° C | 52° C |
| Density | 1.115 at 20° C | 1.103 at 20° C |
| Solubility[b] | Water, alcohol, diethyl ether | Water, alcohol, diethyl ether |
| Refractive index | 1.4392 at 20° C | 1.4362 at 20° C |
| Vapor pressure | 4.9 mm Hg at 20° C | — |

[a] *Merck Index*, 1989
[b] Lide, 1992

degradation products of burned polyurethane foam used for thermal insulation (Schulting and Wils, 1977).

Propylene chlorohydrins are found in a broad spectrum of foodstuffs, including powdered and flaked foods, cereals, dried fruits, spices, cocoa, flour, and egg powder, that have been fumigated or cold sterilized with propylene oxide (Ragelis *et al.*, 1966; Fishbein, 1969). Under conditions necessary for effective sterilization, propylene oxide reacts with naturally occurring inorganic chlorides in foods, forming propylene chlorohydrins (Wesley *et al.*, 1965). Concentrations of 1-chloro-2-propanol ranging from 4 ppm in cocoa to 47 ppm in glazed citron have been measured in foods fumigated with propylene oxide (Ragelis *et al.*, 1968). Only 5 ppm propylene chlorohydrins are permitted as a food additive in modified food starch (*Fed. Regist.*, 1969).

## ABSORPTION, DISTRIBUTION, METABOLISM, AND EXCRETION

### *Experimental Animals*

Data from limited metabolism studies indicate that propylene chlorohydrins are partly excreted in the conjugated form in the urine of laboratory animals. Following oral administration of 140 mg/kg 2-chloro-1-propanol to rabbits, 11% of the dose was excreted in the urine as its glucuronic acid conjugate (Williams, 1959). In a study of the metabolism of 1-halogenopropanes (Barnsley, 1966), 1-chloro-2-propanol (0.5 mL) was administered as a 3.3% (w/v) solution in arachis oil. 2-Hydroxypropylmercapturic acid (*N*-acetyl-*S*-(2-hydroxypropyl)-L-cysteine) was identified as a urinary metabolite of 1-chloro-2-propanol in the urine of male rats (strain not specified) 24 hours after a single subcutaneous injection. Jones and Gibson (1980) conducted *in vitro* studies of the metabolism of 1,2-dichloropropane using the methods of Barnsley (1966), proposed 1-chloro-2-propanol as an intermediate metabolite to explain the presence of the *N*-acetyl-*S*-(2-hydroxypropyl)-cysteine found in the urine of male rats injected subcutaneously with 1,2-dichloropropane. Jones and Gibson (1980) also conducted *in vivo* studies in male Sprague-Dawley rats. Following subcutaneous injection of 100 mg [$^{36}$Cl]-1-chloro-2-propanol to a single rat, 4% of the administered radiolabel was excreted unchanged in the expired air. In addition, two major urinary metabolites identified in rats dosed orally with 1-chloro-2-propanol (100 mg/kg per day for 4 days) were *N*-acetyl-*S*-(2-hydroxypropyl)-cysteine and β-chlorolactate.

The disposition of 1-chloro-2-propanol was studied in male F344/N rats (aged 11 to 13 weeks) exposed by nose-only inhalation to approximately 8 or 80 ppm [$^{14}$C]-1-chloro-2-propanol for 6 hours (Bond *et al.*, 1988). The two major routes of $^{14}$C elimination were urinary and respiratory, which together accounted for about 80% of the total radiolabel recovered 70 hours after the end of the 6-hour exposure. At both exposure concentrations, most of the radiolabel was eliminated in urine during the first day after exposure. Half-lives for elimination were 3.9 hours for breath and 5 hours for urine. The results indicated that

metabolism of 1-chloro-2-propanol was rapid and related linearly to the inhaled exposure concentration. Following inhalation, 1-chloro-2-propanol was widely distributed to tissues, rapidly metabolized, and eliminated. One hour after the end of the 6-hour exposure period, the kidney, liver, trachea, and nasal turbinates of 8 ppm rats contained 30 to 50 nmol $^{14}C$/g tissue, and those of 80 ppm rats contained 200 to 350 nmol $^{14}C$/g tissue; other tissues contained less than 150 nmol $^{14}C$/g tissue. The tissue elimination of $^{14}C$ was biphasic at both exposure concentrations, with a short-term elimination half-life of 1 to 4 hours and a long-term elimination half-life of 40 to 126 hours. No evidence of unmetabolized 1-chloro-2-propanol was seen in the tissues examined. Biliary excretion was a major route of elimination of 1-chloro-2-propanol; approximately 30% of the administered radiolabel was excreted in the bile within 10 hours. Three hours after exposure of rats to 80 ppm, two major metabolites were detected in the urine and three major metabolites were detected in liver. In both cases, one of these metabolites was identified as *N*-acetyl-*S*-(hydroxypropyl)-cysteine and/or *S*-(2-hydroxypropyl)-cysteine, which is consistent with data obtained by Barnsley (1966) and Jones and Gibson (1980). These metabolites appear to be derived from the conjugation of 1-chloro-2-propanol with glutathione. Bond *et al*. (1988) also investigated whether the exhaled radiolabeled $CO_2$ was derived from the second and/or third carbon atoms using 1-chloro-2-propanol labeled with $^{14}C$ either at both carbons or only at the second carbon atom. Less $^{14}CO_2$ was detected in rats exposed to [2-$^{14}C$]-1-chloro-2-propanol than in rats exposed to [2,3-$^{14}C$]-1-chloro-2-propanol, indicating that the second and third carbon atoms are both metabolized, at least in part, to $CO_2$.

### *Humans*

No information on the absorption, distribution, metabolism, or excretion of 1-chloro-2-propanol in humans was found in the literature.

## TOXICITY

### *Experimental Animals*

The acute oral (gavage) $LD_{50}$ for a commercial grade of propylene chlorohydrins was 0.22 mL/kg in Carworth-Wistar rats (4 to 5 weeks of age) and 0.72 g/kg in guinea pigs; narcosis was observed in rats and guinea pigs at $LD_{50}$ doses and greater (Smyth *et al*., 1941, 1969). Data from the Food and Drug Administration indicated an acute oral $LD_{50}$ of 217 mg/kg for propylene chlorohydrins in the rat (strain not specified) (FAO, 1974). The acute oral $LD_{50}$ for 1-chloro-2-propanol in rats was 0.1 to 0.3 g/kg (*Patty's*, 1982). Dogs (number not specified) survived an oral dose of 150 mg propylene chlorohydrin/kg (FAO, 1974). At 200 mg/kg, one of seven treated dogs died; single doses of 250 mg/kg or greater were lethal to all six dogs in each group. The dermal $LD_{50}$ for propylene chlorohydrin (24-hour plastic-covered contact on clipped skin) was 0.48 mL/kg in male New Zealand rabbits (Smyth *et al*., 1969).

No skin irritation was observed in a single New Zealand rabbit 24 hours after the uncovered topical application of 0.01 mL (approximately 10 mg) neat propylene chlorohydrins to the clipped skin of the abdomen (Smyth *et al*., 1969). Severe (grade 8 on a scale of 1 to 10) corneal injury resulted from instillation of 0.005 mL (approximately 5 mg) neat propylene chlorohydrins or an excess of a 40% solution in propylene glycol into the eye of albino rabbits (Carpenter and Smyth, 1946).

Inhalation of 500 ppm commercial propylene chlorohydrins resulted in the death of one of six rats after a 4-hour exposure period (Smyth *et al*., 1969). In an inhalation study by Bond *et al*. (1988), there were no overt acute toxic effects of 1-chloro-2-propanol at exposure concentrations up to 80 ppm.

In an inhalation study by Gage (1970) using Alderley-Park specific-pathogen-free rats, exposure of two male and two female rats to a vapor concentration of 1,000 ppm 1-chloro-2-propanol for two 6-hour periods at a 3-day interval resulted in lethargy after the first exposure and the death of one rat after the second exposure. In the animal that died, necropsy findings included a pale liver and edematous, congested lungs; histopathology findings included swollen, vacuolated hepatocytes with nuclear degeneration and pulmonary interstitial inflammation. Following fifteen 6-hour exposures of two male and two female rats to 250 ppm, lethargy, irregular weight gain, and congestion and perivascular edema of the lungs were observed. Fifteen 6-hour exposures to 100 ppm resulted in no findings of toxicity in four male and four female rats; however, histopathologic findings included congestion and perivascular edema of the

lungs. No toxic or histopathologic effects were observed in four males or four females following fourteen 6-hour exposures to 30 ppm 1-chloro-2-propanol.

### *Humans*

No information on toxicity in humans was reported in the literature.

## CARCINOGENICITY

### *Experimental Animals*

The carcinogenicity of 1-chloro-2-propanol was evaluated in a bioassay system involving induction of pulmonary adenomas in strain A mice (Theiss *et al*., 1979). Groups of 10 male and 10 female mice were given intraperitoneal injections of 1-chloro-2-propanol in tricaprylin three times per week (total of 24 injections) at concentrations of 0.53, 1.06, or 2.12 mmol/kg. Twenty-four weeks after the first injection, the number of adenomas on the lung surface was counted. No statistically significant differences in the average number of lung neoplasms per mouse were observed between treated and control mice.

### *Humans*

Several studies in the literature examined mortality in men assigned to a chlorohydrin unit that produced ethylene chlorohydrin and/or propylene chlorohydrin from 1925 and 1957. Greenberg *et al*. (1990) reported statistically significant excess mortality due to pancreatic cancer and leukemia in men assigned to the chlorohydrin unit for 2 years or more during the period from 1925 through 1957; six deaths due to pancreatic cancer (0.7 expected) and three deaths due to leukemia (0.4 expected) occurred. A fourth death due to leukemia occurred in a man assigned to the chlorohydrin unit for less than 2 years. Nine of the ten decedents worked in the chlorohydrin unit between 1935 and 1945. The six men who died from pancreatic cancer were first assigned to the chlorohydrin unit between 1929 and 1944; their cumulative duration of assignments ranged from 2 to 30 years and averaged 12 years, and they died between 26 and 48 years after their first chlorohydrin assignment. The four men who died from leukemia were first assigned to the chlorohydrin unit prior to 1937; the average duration of their assignments was 9 years and ranged from less than 1 to 16 years. They died between 18 to 39 years after their first chlorohydrin assignment. Significant trends with duration of assignment to the chlorohydrin unit were found for both cancers. The authors concluded that the observed excesses of pancreatic cancer and leukemia were primarily associated with the production of ethylene chlorohydrin and/or propylene chlorohydrins although quantitative measurements of exposure were not available.

A second retrospective study was conducted at the same chemical plant to verify the previous findings of cancer excesses among 278 men with a mean duration of assignment to the chlorohydrin unit of 5.9 years and mean duration of follow-up of 36.5 years (Benson and Teta, 1993). During 1979 through 1988, two additional deaths from pancreatic cancer (0.9 expected) were reported, bringing the total to 8 observed versus 1.6 deaths expected. There were no additional deaths from leukemia, but the three- to fourfold increase in risk for lymphopoietic cancers persisted due to new cases of non-Hodgkin's lymphoma and multiple myeloma. Increases in risk were seen for total cancer, pancreatic cancer, all lymphatic and hematopoietic cancers, and leukemia with increasing durations of assignment to the chlorohydrin unit. The data were insufficient to conclusively identify the causative agent or combination of agents. However, the authors suggested that high exposure to ethylene dichloride, perhaps in combination with other chlorinated hydrocarbons, was the most likely agent. IARC has found insufficient epidemiological studies for ethylene dichloride, bischloro ethylene, ethylene chlorohydrin, and propylene chlorohydrin to determine the carcinogenic potential to humans (IARC, 1979).

## REPRODUCTIVE AND DEVELOPMENTAL TOXICITY

### *Experimental Animals*

Administration of gavage doses of 8, 20, 50, or 125 mg propylene chlorohydrin/kg body weight per day to groups of five female rats on gestation days 6 to 15 had no effect on maternal growth or the growth and survival of fetuses (Exxon Chemical Company, 1980). There was a slight decrease in embryo survival in the 8 and 125 mg/kg groups, and two fetuses (dose level not specified) showed gross malformations. The investigators concluded that propylene chlorohydrin may be a weak teratogen.

### *Humans*

No information on the reproductive or developmental toxicity in humans was reported in the literature.

## GENETIC TOXICITY

1-Chloro-2-propanol (both 97% pure and 70% technical grade) was mutagenic in *Salmonella typhimurium* strains TA100 and TA1535, with and without induced S9 metabolic activation enzymes; no mutagenicity was detected in strains TA97, TA98, and TA1537, which revert via a frameshift mechanism (Carr and Rosenkranz, 1978; Pfeiffer and Dunkelberg, 1980; Zeiger *et al.*, 1987). The chemical was also positive in the *Escherichia coli* pol A assay for DNA damage (Hyman *et al.*, 1980). 1-Chloro-2-propanol (technical grade) induced sex-linked recessive lethal mutations in germ cells of male *Drosophila melanogaster* when administered by injection; however, results of a subsequent test for induction of reciprocal translocations in germ cells of male *D. melanogaster* were negative (Foureman *et al.*, 1994).

A mixture (proportions not stated) of 2-chloro-1-propanol and 1-chloro-2-propanol was tested for mutagenicity in *S. typhimurium*, and positive results were reported with strains TA100 and TA1535 in the absence of S9 (Pfeiffer and Dunkelberg, 1980). Biles and Piper (1983) confirmed this response in *S. typhimurium* with a 75:25 mixture of 1-chloro-2-propanol:2-chloro-1-propanol and further reported that addition of S9 enhanced the mutagenic response. In addition, they reported positive results with this mixture in the L5178Y mouse lymphoma assay, with and without S9. Finally, these authors reported that this mixture in doses of 10, 31, and 100 mg/kg per day for 5 days induced significant dose-related increases in chromosomal aberrations, consisting mainly of chromatid breaks, in rat bone marrow cells.

## STUDY RATIONALE

The National Cancer Institute nominated 1-chloro-2-propanol and 2-chloro-1-propanol for carcinogenesis evaluation because these chemicals may be present in food fumigated with propylene oxide. The pure chemicals were not available and, therefore, technical grade 1-chloro-2-propanol (approximately 75% 1-chloro-2-propanol and 25% 2-chloro-1-propanol) was evaluated in the NTP studies. Drinking water was selected as the route of administration because human exposure may occur by the oral route.

# MATERIALS AND METHODS

## PROCUREMENT AND CHARACTERIZATION OF 1-CHLORO-2-PROPANOL

Technical grade 1-chloro-2-propanol (approximately 75% 1-chloro-2-propanol and 25% 2-chloro-1-propanol) was obtained from Eastman Kodak Laboratory Chemicals (Rochester, NY) in one lot (B15). Identity, purity, and stability analyses were conducted by the analytical chemistry laboratory, Midwest Research Institute (Kansas City, MO) (Appendix J). Reports on analyses performed in support of the 1-chloro-2-propanol studies are on file at the National Institute of Environmental Health Sciences.

The major component of the test chemical, a clear, colorless liquid, was identified as 1-chloro-2-propanol by infrared, ultraviolet/visible, and nuclear magnetic resonance spectroscopy. The purity of lot B15 was determined by elemental analyses, Karl Fischer water analysis, free acid titration, and gas chromatography. Elemental analyses for carbon, chlorine, and hydrogen were in agreement with the theoretical values for 1-chloro-2-propanol. Karl Fischer water analysis indicated 0.62% ± 0.02% water. Free acid titration indicated a hydrochloric acid content of 1,149 ± 2 ppm, equivalent to 0.0315 ± 0.0001 mEq of acid per gram of sample. Gas chromatography using one system indicated two major peaks and two impurities with a combined area of 0.47% relative to the total major peak area. Gas chromatography using another system indicated two major peaks and three impurities with a combined area of 0.67% relative to the total major peak area. No additional impurities with areas of 0.1% or greater relative to the major peak were detected using either system. The second major peak represents 2-chloro-1-propanol, a positional isomer of 1-chloro-2-propanol. The concentrations of 1-chloro-2-propanol and 2-chloro-1-propanol were estimated to be approximately 75% to 76% and 24% to 25%, respectively.

Stability studies of the bulk chemical were performed by the analytical chemistry laboratory using gas chromatography. These studies indicated that 1-chloro-2-propanol was stable as a bulk chemical for 2 weeks when stored protected from light at temperatures up to 60° C. To ensure stability, the bulk chemical was stored at 5.5° C (14-day and 14-week studies) or 1° to 8° C (2-year studies) protected from light in sealed glass containers. Stability was monitored during the 14-week studies using gas chromatography and free acid titration and during the 14-day and 2-year studies using gas chromatography. No degradation of the bulk chemical was detected.

## PREPARATION AND ANALYSIS OF DOSE FORMULATIONS

The dose formulations were prepared twice during the 14-day studies, every 2 weeks in the 14-week studies, and approximately every 2 weeks in the 2-year studies by mixing 1-chloro-2-propanol with ultraviolet light-treated, deionized water for the 14-day and 14-week studies and with deionized water for the 2-year studies (Table J1). The dose formulations were stored in closed bottles in the dark at room temperature prior to use. In the animal rooms, the drinking water bottles were changed twice per week.

Periodic analyses of the dose formulations of 1-chloro-2-propanol were conducted at the study laboratory using gas chromatography. During the 14-day studies, dose formulations were analyzed once per week (Table J2). Dose formulations were analyzed at the beginning, midpoint, and end of the 14-week studies (Table J3). During the 2-year studies, dose formulations were analyzed approximately every 8 weeks (Table J4). Through the 14-day, 14-week, and 2-year studies, all but one of the 149 dose formulations analyzed was within 10% of the target concentration; that formulation was remixed. Similarly, all but one of 54 animal room

samples was within 10% of target concentration. One 250 ppm animal room sample was outside of specifications and this was attributed to technical error; the dose was contaminated with a 650 ppm rat dose formulation. Results of periodic referee analyses performed by the analytical chemistry laboratory agreed with the results obtained by the study laboratory for the 14-week studies (Table J5).

## 14-DAY STUDIES

Male and female F344/N rats and B6C3F$_1$ mice were obtained from Taconic Farms (Germantown, NY). On receipt, the rats and mice were 4 weeks old. Animals were quarantined for 11 to 14 days and were 6 weeks old on the first day of the studies. Groups of 10 male and 10 female rats and mice were exposed to 1-chloro-2-propanol at concentrations of 0, 100, 333, 1,000, 3,300, or 10,000 ppm in drinking water. Feed and water were available *ad libitum*. Rats were housed five per cage, and mice were housed individually. Clinical findings were recorded daily for rats and mice. Water consumption was recorded weekly. The animals were weighed initially, weekly, and at the end of the studies. Details of the study design and animal maintenance are summarized in Table 2.

A necropsy was performed on all rats and mice. The brain, heart, right kidney, liver, lung, right testis, and thymus were weighed. Complete histopathologic examinations were performed on 0 and 10,000 ppm rats and mice. Additionally, the following tissues were examined to a no-effect level: bone marrow, pancreas, spleen, and uterus of rats and liver, pancreas, spleen, and thymus of mice. Table 2 lists the tissues and organs examined.

## 14-WEEK STUDIES

The 14-week studies were conducted to evaluate the cumulative toxic effects of repeated exposure to 1-chloro-2-propanol and to determine the appropriate exposure concentrations to be used in the 2-year studies.

Male and female F344/N rats and B6C3F$_1$ mice were obtained from Taconic Farms (Germantown, NY). On receipt, the rats and mice were approximately 4 weeks old. Animals were quarantined for 11 to 12 days and were 6 weeks old on the first day of the studies. Before initiation of the studies, five male and five female rats and mice were randomly selected for parasite evaluation and gross observation for evidence of disease. At the end of the studies, serologic analyses were performed on five male and five female control rats and sentinel mice using the protocols of the NTP Sentinel Animal Program (Appendix M).

Groups of 10 male and 10 female rats and mice were given drinking water containing 1-chloro-2-propanol at concentrations of 0, 33, 100, 330, 1,000, or 3,300 ppm. Groups of 10 male and 10 female rats exposed to the same concentrations were designated as special study animals for clinical pathology evaluations. Feed and water were available *ad libitum*. Rats were housed five per cage, and mice were housed individually. Clinical findings were recorded weekly for rats and mice. Water consumption was recorded weekly. The animals were weighed initially, weekly, and at the end of the studies. Details of the study design and animal maintenance are summarized in Table 2.

On days 3, 15, and 45, clinical chemistry evaluations were performed for all male and female rats designated for special studies. At study termination, hematology and clinical chemistry evaluations were performed for all special study rats. Starting on day 14 and the day prior to study termination, timed urine collections were performed for all special study rats for urine chemistry evaluations. Hematology evaluations were performed for all core study mice at the end of the study. At all time points, rats and mice were anesthetized with a $CO_2/O_2$ mixture and blood was drawn from the retroorbital sinus. Blood for hematology determinations was placed in tubes containing potassium EDTA as the anticoagulant; blood for clinical chemistry analyses was placed in tubes without anticoagulant, allowed to clot at room temperature, and centrifuged, and the serum was separated. For urinalysis studies, rats were placed individually into metabolism cages for a 16-hour urine collection. During urine collection, containers were kept chilled with ice to minimize evaporation and suppress bacterial growth. Animals had access to food and water during the urine collection period. Table 2 lists the hematology, clinical chemistry, and urinalysis parameters evaluated.

Hematology determinations including erythrocyte and leukocyte counts, hemoglobin concentration, hematocrit, mean cell volume, mean cell hemoglobin, and mean cell hemoglobin concentration were performed on a Coulter Hematology Analyzer, Model S560 (Coulter Electronics, Hialeah, FL). Platelet counts were determined with a Baker Series 810 Whole Blood Platelet Analyzer (Serono-Baker Diagnostics, Allentown, PA). Leukocyte differential and nucleated erythrocyte counts and morphologic evaluation of blood cells were determined by light microscopic examination of blood films stained with Romanowsky stain. Blood smears stained with brilliant cresyl blue were examined microscopically for the quantitative determination of reticulocytes. Clinical chemistry and urinalysis evaluations were performed on a Gemini Miniature Centrifugal Analyzer (Electronucleonics, Inc., Fairfield, NJ) using commercially available reagents. Urine specific gravity was determined by refractometry; urine volume was a calculated value based on measurements of mass and specific gravity.

At the end of the 14-week studies, samples were collected for sperm morphology and vaginal cytology evaluations on rats and mice exposed to 0, 33, 330, and 3,300 ppm. The parameters evaluated are listed in Table 2. Methods used were those described in the NTP's sperm morphology and vaginal cytology evaluations protocol (NTP, 1985a). For 7 consecutive days prior to the scheduled terminal sacrifice, the vaginal vaults of the females were moistened with saline, if necessary, and samples of vaginal fluid and cells were stained. Relative numbers of leukocytes, nucleated epithelial cells, and large squamous epithelial cells were determined and used to ascertain estrous cycle stage (i.e., diestrus, proestrus, estrus, and metestrus). Male animals were evaluated for sperm morphology, count, and motility. The right testis and right epididymis were isolated and weighed. The tail of the epididymis (cauda epididymis) was then removed from the epididymal body (corpus epididymis) and weighed. Test yolk (rats) or modified Tyrode's buffer (mice) was applied to slides, and a small incision was made at the distal border of the cauda epididymis. The sperm effluxing from the incision were dispersed in the buffer on the slides, and the numbers of motile and nonmotile spermatozoa were counted for five fields per slide by two observers. Following completion of sperm motility estimates, each right cauda epididymis was placed in buffered saline solution. Caudae were finely minced, and the tissue was incubated in the saline solution and then heat fixed at 65° C. Sperm density was then determined microscopically with the aid of a hemacytometer. Four sperm morphology slides were prepared for each animal evaluated. An aliquot of killed sperm suspension was stained in a test tube, spread on a microscope slide under a coverslip, and examined.

A necropsy was performed on all animals. The brain, heart, right kidney, liver, lung, right testis, and thymus were weighed. Tissues for microscopic examination were fixed and preserved in 10% neutral buffered formalin, processed and trimmed, embedded in paraffin, sectioned to a thickness of 4 to 6 µm, and stained with hematoxylin and eosin. A complete histopathologic examination was performed on 0 and 3,300 ppm rats and mice. In addition, the kidney of mice, the liver of male rats and male and female mice, and the pancreas of rats and mice were examined in 33, 100, 330, and 1,000 ppm groups. Table 2 lists the tissues and organs routinely examined.

## 2-YEAR STUDIES

### Study Design

Groups of 50 male and 50 female rats were given drinking water containing 1-chloro-2-propanol at concentrations of 0, 150, 325, or 650 ppm. Groups of 50 male and 50 female mice were exposed to 1-chloro-2-propanol in drinking water at concentrations of 0, 250, 500, or 1,000 ppm.

### Source and Specification of Animals

Male and female F344/N rats and B6C3F$_1$ mice were obtained from Taconic Farms (Germantown, NY) for use in the 2-year studies. Rats and mice were quarantined for 12 to 15 days before the beginning of the studies. Five male and five female rats and mice were randomly selected for parasite evaluation and gross observation of disease. Rats and mice were approximately 7 weeks old at the beginning of the studies. The health of the animals was monitored during the studies according to the protocols of the NTP Sentinel Animal Program (Appendix M).

## Animal Maintenance

Rats were housed five per cage, and mice were housed individually. Feed and water were available *ad libitum*. Water consumption was measured approximately monthly. Cages were changed three times per week for male rats, two times per week for female rats, and once per week for mice, and racks were rotated once every two weeks. Further details of animal maintenance are given in Table 2. Information on feed composition and contaminants is provided in Appendix L.

## Clinical Examinations and Pathology

All animals were observed twice daily. Clinical findings were recorded monthly, except for an additional observation at week 6 for male mice. Body weights were recorded initially, weekly for 14 weeks, monthly thereafter, and at the end of the studies.

A complete necropsy and microscopic examination were performed on all rats and mice. At necropsy, all organs and tissues were examined for grossly visible lesions, and all major tissues were fixed and preserved in 10% neutral buffered formalin, processed and trimmed, embedded in paraffin, sectioned to a thickness of 4 to 6 µm, and stained with hematoxylin and eosin for microscopic examination. For all paired organs (i.e., adrenal gland, kidney, ovary), samples from each organ were examined. Tissues examined microscopically are listed in Table 2.

Microscopic evaluations were completed by the study laboratory pathologist, and the pathology data were entered into the Toxicology Data Management System. The microscopic slides, paraffin blocks, and residual wet tissues were sent to the NTP Archives for inventory, slide/block match, and wet tissue audit. The slides, individual animal data records, and pathology tables were evaluated by an independent quality assessment laboratory. The individual animal records and tables were compared for accuracy, the slide and tissue counts were verified, and the histotechnique was evaluated. For the 2-year studies, a quality assessment pathologist evaluated slides from all tumors and all potential target organs which included the mammary gland, pancreas (for acinar cell atrophy), and pituitary gland of rats, the liver, lung, and mesentery lymph nodes of male and female mice, and the pituitary gland pars distalis (for hyperplasia) of female mice.

The quality assessment report and the reviewed slides were submitted to the NTP Pathology Working Group (PWG) chairperson, who reviewed the selected tissues and addressed any inconsistencies in the diagnosis made by the laboratory and quality assessment pathologists. Representative histopathology slides containing examples of lesions related to chemical administration, examples of disagreements in diagnoses between the laboratory and quality assessment pathologists, or lesions of general interest were presented by the chairperson to the PWG for review. The PWG consisted of the quality assessment pathologist and other pathologists experienced in rodent toxicologic pathology. This group examined the tissues without any knowledge of dose groups or previously rendered diagnoses. When the PWG consensus differed from the opinion of the laboratory pathologist, the diagnosis was changed. Final diagnoses for reviewed lesions represent a consensus between the laboratory pathologist, reviewing pathologist(s), and the PWG. Details of these review procedures have been described, in part, by Maronpot and Boorman (1982) and Boorman *et al*. (1985). For subsequent analyses of the pathology data, the decision of whether to evaluate the diagnosed lesions for each tissue type separately or combined was generally based on the guidelines of McConnell *et al*. (1986).

**TABLE 2**
**Experimental Design and Materials and Methods in the Drinking Water Studies of 1-Chloro-2-propanol**

| 14-Day Studies | 14-Week Studies | 2-Year Studies |
|---|---|---|
| **Study Laboratory** | | |
| SRI International (Menlo Park, CA) | SRI International (Menlo Park, CA) | TSI Mason Laboratories (Worcester, MA) |
| **Strain and Species** | | |
| Rats: F344/N | Rats: F344/N | Rats: F344/N |
| Mice: $B6C3F_1$ | Mice: $B6C3F_1$ | Mice: $B6C3F_1$ |
| **Animal Source** | | |
| Taconic Farms (Germantown, NY) | Taconic Farms (Germantown, NY) | Taconic Farms (Germantown, NY) |
| **Time Held Before Studies** | | |
| Rats: 11 days (males) or 12 days (females) | Rats: 11 days (males) or 12 days (females) | Rats: 12 days (males) or 14 days (females) |
| Mice: 13 days (males) or 14 days (females) | Mice: 11 days (males) or 12 days (females) | Mice: 13 days (males) or 15 days (females) |
| **Average Age When Studies Began** | | |
| 6 weeks | 6 weeks | 7 weeks |
| **Date of First Exposure** | | |
| Rats: 15 September 1986 (males)<br>16 September 1986 (females) | Rats: 9 February 1987 (males)<br>10 February 1987 (females) | Rats: 5 February 1991 (males)<br>7 February 1991 (females) |
| Mice: 17 September 1986 (males)<br>18 September 1986 (females) | Mice: 2 February 1987 (males)<br>3 February 1987 (females) | Mice: 2 January 1991 (males)<br>4 January 1991 (females) |
| **Duration of Exposure** | | |
| 14 days | 14 weeks | 105 weeks |
| **Date of Last Exposure** | | |
| Rats: 29 September 1986 (males)<br>30 September 1986 (females) | Rats: 11 May 1987 (males)<br>12 May 1987 (females) | Rats: 2 February 1993 (males)<br>9-10 February 1993 (females) |
| Mice: 1 October 1986 (males)<br>2 October 1986 (females) | Mice: 4 May 1987 (males)<br>5 May 1987 (females) | Mice: 30-31 December 1992 (males)<br>7 January 1993 (females) |
| **Necropsy Dates** | | |
| Rats: 29 September 1986 (males)<br>30 September 1986 (females) | Rats: 11 May 1987 (males)<br>12 May 1987 (females) | Rats: 2 February 1993 (males)<br>9-10 February 1993 (females) |
| Mice: 1 October 1986 (males)<br>2 October 1986 (females) | Mice: 4 May 1987 (males)<br>5 May 1987 (females) | Mice: 30-31 December 1992 (males)<br>7 January 1993 (females) |
| **Average Age at Necropsy** | | |
| 8 weeks | 19 weeks | 111 weeks (males) or 112 weeks (females) |
| **Size of Study Groups** | | |
| 10 males and 10 females | 10 males and 10 females | 50 males and 50 females |
| **Method of Distribution** | | |
| Animals were distributed randomly into groups of approximately equal initial mean body weights. | Same as 14-day studies | Same as 14-day studies |
| **Animals per Cage** | | |
| Rats: 5 | Rats: 5 | Rats: 5 |
| Mice: 1 | Mice: 1 | Mice: 1 |

**TABLE 2**
**Experimental Design and Materials and Methods in the Drinking Water Studies of 1-Chloro-2-propanol**

| 14-Day Studies | 14-Week Studies | 2-Year Studies |
|---|---|---|
| **Method of Animal Identification** | | |
| Toe clip | Toe clip | Tail tattoo |
| **Diet** | | |
| NIH-07 open formula block diet (Zeigler Brothers, Inc., Gardners, PA), available *ad libitum*, changed once per week | Same as 14-day studies | NIH-07 open formula pelleted diet (Zeigler Brothers, Inc., Gardners, PA), available *ad libitum*, changed once per week |
| **Water** | | |
| UV treated, deionized water (Menlo Park municipal supply) via glass sipper tube water bottles (Lab Products, Rochelle Park, NJ), available *ad libitum*, changed twice per week | Same as 14-day studies | Deionized water (Worcester municipal supply) via glass sipper tube water bottles (Allentown Cage Co. Inc., Allentown, PA), available *ad libitum*, changed twice per week |
| **Cages** | | |
| Polycarbonate cages (Lab Products, Rochelle Park, NJ), changed twice per week | Same as 14-day studies, except changed weekly for mice | Same as 14-day studies, except changed three times per week for male rats, two times per week for female rats, and once per week for mice |
| **Bedding** | | |
| Sani-Chips (P.J. Murphy Forest Products Corp., Rochelle Park, NJ), changed twice per week | Same as 14-day studies | Same as 14-day studies, except changed three times per week for male rats, two times per week for female rats, and changed once per week for mice |
| **Cage Filters** | | |
| Spun bonded polyester fabric (Snow Filtration, Cincinnati, OH) | Same as 14-day studies, except changed once every two weeks | Same as 14-week studies |
| **Racks** | | |
| Stainless-steel (Lab Products, Rochelle Park, NJ) | Same as 14-day studies, except changed once every two weeks | Same as 14-week studies |
| **Animal Room Environment** | | |
| Temperature: 22.2°-25.0° C<br>Relative humidity: 41%-60%<br>Room fluorescent light: 12 hours/day<br>Room air changes: 10/hour | Temperature: 18.9°-27.2° C (rats)<br>18.9°-25.6° C (mice)<br>Relative humidity: 24%-77% (rats)<br>18%-65% (mice)<br>Room fluorescent light: 12 hours/day<br>Room air changes: 10/hour | Temperature: 18.3°-24.4° C (rats)<br>20.6°-24.4° C (mice)<br>Relative humidity: 8%-78% (rats)<br>10%-68% (mice)<br>Room fluorescent light: 12 hours/day<br>Room air changes: 10/hour |
| **Exposure Concentrations** | | |
| 0, 100, 333, 1,000, 3,300, or 10,000 ppm in drinking water, available *ad libitum* | 0, 33, 100, 330, 1,000, or 3,300 ppm in drinking water, available *ad libitum* | Rats: 0, 150, 325, or 650 ppm in drinking water, available *ad libitum*<br>Mice: 0, 250, 500, or 1,000 ppm in drinking water, available *ad libitum* |

**TABLE 2**
**Experimental Design and Materials and Methods in the Drinking Water Studies of 1-Chloro-2-propanol**

| 14-Day Studies | 14-Week Studies | 2-Year Studies |
|---|---|---|
| **Type and Frequency of Observation** | | |
| Observed twice daily; animals were weighed initially, weekly, and at the end of the studies; clinical findings were recorded daily. Water consumption was recorded weekly. | Observed twice daily; animals were weighed initially, weekly, and at the end of the studies; clinical findings were recorded weekly. Water consumption was recorded weekly. | Observed twice daily; animals were weighed initially, weekly for 13 weeks, monthly thereafter, and at the end of the studies. Clinical findings were recorded monthly, except for an additional observation at week 6 for male mice. Water consumption was measured approximately monthly. |
| **Method of Sacrifice** | | |
| $CO_2$ asphyxiation | $CO_2$ asphyxiation | $CO_2$ asphyxiation |
| **Necropsy** | | |
| Necropsy performed on all animals. Organs weighed were brain, heart, right kidney, liver, lung, right testis, and thymus. | Necropsy performed on all animals. Organs weighed were brain, heart, right kidney, liver, lung, right testis, and thymus. | Necropsy performed on all animals. |
| **Clinical Pathology** | | |
| None | Blood was collected from the retroorbital sinus of special study rats and core study mice at week 14 for hematology analyses. Blood was collected from the retroorbital sinus of special study rats on days 3, 15, and 45, and at 14 weeks for clinical chemistry. Rats were placed in metabolism cages for 16-hour urine collection at the end of the study.<br>***Hematology:*** hematocrit; hemoglobin concentration; erythrocyte, reticulocyte, nucleated erythrocyte, and platelet counts; mean cell volume; mean cell hemoglobin; mean cell hemoglobin concentration; and total leukocyte count and differentials<br>***Clinical chemistry:*** creatinine, albumin, alanine aminotransferase, creatine kinase, sorbitol dehydrogenase, and γ-glutamyltransferase<br>***Urinalysis:*** glucose, protein, volume, and specific gravity | None |

**TABLE 2**
**Experimental Design and Materials and Methods in the Drinking Water Studies of 1-Chloro-2-propanol**

| 14-Day Studies | 14-Week Studies | 2-Year Studies |
|---|---|---|
| **Histopathology** | | |
| Complete histopathology was performed on 0 and 10,000 ppm rats and mice. In addition to gross lesions and tissue masses, the following tissues were examined: adrenal gland, bone (including marrow), brain, clitoral gland, esophagus, gallbladder (mice), heart, large intestine (cecum, colon, and rectum), small intestine (duodenum, jejunum, and ileum), kidney, liver, lung (and mainstem bronchi), lymph nodes (mandibular and mesenteric), mammary gland (with adjacent skin), nose, ovary, pancreas, parathyroid gland, pituitary gland, preputial gland, prostate gland, salivary gland, spleen, stomach (forestomach and glandular), testis (with epididymis and seminal vesicle), thymus, thyroid gland, trachea, urinary bladder, and uterus. In addition, bone marrow in 330 ppm female rats and 1,000 and 3,300 ppm male and female rats; uterus in all female rats; liver in all mice; spleen in 1,000 ppm rats and 3,300 ppm rats and mice; and thymus in 3,300 ppm female rats and female mice were examined. | Complete histopathology was performed on 0 and 3,300 ppm rats and mice. In addition to gross lesions and tissue masses, the following tissues were examined: adrenal gland, bone (including marrow), brain, clitoral gland, esophagus, gallbladder (mice), heart, large intestine (cecum, colon, and rectum), small intestine (duodenum, jejunum, and ileum), kidney, liver, lung (and mainstem bronchi), lymph nodes (mandibular and mesenteric), mammary gland (with adjacent skin), nose, ovary, pancreas, parathyroid gland, pituitary gland, preputial gland, prostate gland, salivary gland, spleen, stomach (forestomach and glandular), testis (with epididymis and seminal vesicle), thymus, thyroid gland, trachea, urinary bladder, and uterus. In addition, the kidney of mice, the liver of male rats and male and female mice, and the pancreas of rats and mice were examined in all remaining exposure groups. | Complete histopathology was performed all rats and mice. In addition to gross lesions and tissue masses, the following tissues were examined: adrenal gland, bone (including marrow), brain, clitoral gland, esophagus, gallbladder (mice), heart, large intestine (cecum, colon, and rectum), small intestine (duodenum, jejunum, and ileum), kidney, liver, lung (and mainstem bronchi), lymph nodes (mandibular and mesenteric), mammary gland (with adjacent skin), nose, ovary, pancreas, parathyroid gland, pituitary gland, preputial gland, prostate gland, salivary gland, spleen, stomach (forestomach and glandular), testis (with epididymis and seminal vesicle), thymus, thyroid gland, trachea, urinary bladder, and uterus. |
| **Sperm Morphology and Vaginal Cytology** | | |
| None | At the end of the studies, sperm samples were collected from all male animals in the 0, 33, 330, and 3,300 ppm exposure groups for sperm morphology evaluations. The following parameters were evaluated: epididymal sperm concentration, morphology, and motility. The right cauda epididymis, epididymis, and testis were weighed. Vaginal samples were collected for up to 7 consecutive days prior to the end of the studies from all females exposed to 0, 33, 330, or 3,300 ppm for vaginal cytology evaluations. The parameters evaluated were relative frequency of estrous stages and estrous cycle length. | None |

# STATISTICAL METHODS

## Survival Analyses

The probability of survival was estimated by the product-limit procedure of Kaplan and Meier (1958) and is presented in the form of graphs. Animals found dead of other than natural causes were censored from the survival analyses; animals dying from natural causes were not censored. Statistical analyses for possible dose-related effects on survival used Cox's (1972) method for testing two groups for equality and Tarone's (1975) life table test to identify dose-related trends. All reported P values for the survival analyses are two sided.

## Calculation of Incidence

The incidences of neoplasms or nonneoplastic lesions as presented in Tables A1, A5, B1, B4, C1, C4, D1, and D5 are given as the number of animals bearing such lesions at a specific anatomic site and the number of animals with that site examined microscopically. For calculation of statistical significance, the incidences of most neoplasms (Tables A3, B3, C3, and D3) and all nonneoplastic lesions are given as the numbers of animals affected at each site examined microscopically. However, when macroscopic examination was required to detect neoplasms in certain tissues (e.g., harderian gland, intestine, mammary gland, and skin) before microscopic evaluation, or when neoplasms had multiple potential sites of occurrence (e.g., leukemia or lymphoma), the denominators consist of the number of animals on which a necropsy was performed. Tables A3, B3, C3, and D3 also give the survival-adjusted neoplasm rate for each group and each site-specific neoplasm. This survival-adjusted rate (based on the Poly-3 method described below) accounts for differential mortality by assigning a reduced risk of neoplasm, proportional to the third power of the fraction of time on study, to animals that do not reach terminal sacrifice.

## Analysis of Neoplasm and Nonneoplastic Lesion Incidences

The Poly-k test (Bailer and Portier, 1988; Portier and Bailer, 1989; Piegorsch and Bailer, 1997) was used to assess neoplasm and nonneoplastic lesion prevalence. This test is a survival-adjusted quantal-response procedure that modifies the Cochran-Armitage linear trend test to take survival differences into account. More specifically, this method modifies the denominator in the quantal estimate of lesion incidence to approximate more closely the total number of animal years at risk. For analysis of a given site, each animal is assigned a risk weight. This value is one if the animal had a lesion at that site or if it survived until terminal sacrifice; if the animal died prior to terminal sacrifice and did not have a lesion at that site, its risk weight is the fraction of the entire study time that it survived, raised to the kth power.

This method yields a lesion prevalence rate that depends only upon the choice of a shape parameter for a Weibull hazard function describing cumulative lesion incidence over time (Bailer and Portier, 1988). Unless otherwise specified, a value of k=3 was used in the analysis of site-specific lesions. This value was recommended by Bailer and Portier (1988) following an evaluation of neoplasm onset time distributions for a variety of site-specific neoplasms in control F344 rats and B6C3F$_1$ mice (Portier *et al.*, 1986). Bailer and Portier (1988) showed that the Poly-3 test gave valid results if the true value of k was anywhere in the range from 1 to 5. A further advantage of the Poly-3 method is that it does not require lesion lethality assumptions. Variation introduced by the use of risk weights, which reflect differential mortality, was accommodated by adjusting the variance of the Poly-3 statistic as recommended by Bieler and Williams (1993).

Tests of significance included pairwise comparisons of each exposed group with controls and a test for an overall exposure-related trend. Continuity-corrected tests were used in the analysis of lesion incidence, and reported P values are one sided.

## Analysis of Continuous Variables

Two approaches were employed to assess the significance of pairwise comparisons between exposed and control groups in the analysis of continuous variables. Organ and body weight data, which have approximately normal distributions, were analyzed with the parametric multiple comparison procedures of Dunnett (1955) and Williams (1971, 1972). Hematology, clinical chemistry, urinalysis, spermatid, and epididymal spermatozoal data, which have typically skewed distributions, were analyzed using the nonparametric multiple comparison methods of Shirley (1977) and Dunn (1964). Jonckheere's test (Jonckheere, 1954) was used to assess the significance of the dose-related trends and to determine whether a trend-sensitive test (Williams' or Shirley's test) was

more appropriate for pairwise comparisons than a test that does not assume a monotonic dose-related trend (Dunnett's or Dunn's test). Prior to statistical analysis, extreme values identified by the outlier test of Dixon and Massey (1951) were examined by NTP personnel, and implausible values were eliminated from the analysis. Average severity values were analyzed for significance with the Mann-Whitney U test (Hollander and Wolfe, 1973). Because vaginal cytology data are proportions (the proportion of the observation period that an animal was in a given estrous stage), an arcsine transformation was used to bring the data into closer conformance with a normality assumption. Treatment effects were investigated by applying a multivariate analysis of variance (Morrison, 1976) to the transformed data to test for simultaneous equality of measurements across exposure concentrations.

### Historical Control Data

Although the concurrent control group is always the first and most appropriate control group used for evaluation, historical control data can be helpful in the overall assessment of neoplasm incidence in certain instances. Consequently, neoplasm incidences from the NTP historical control database, which is updated yearly, are included in the NTP reports for neoplasms appearing to show compound-related effects.

## QUALITY ASSURANCE METHODS

The 14-week and 2-year studies were conducted in compliance with Food and Drug Administration Good Laboratory Practice Regulations (21 CFR, Part 58). In addition, as records from the 2-year studies were submitted to the NTP Archives, these studies were audited retrospectively by an independent quality assurance contractor. Separate audits covering completeness and accuracy of the pathology data, pathology specimens, final pathology tables, and a draft of this NTP Technical Report were conducted. Audit procedures and findings are presented in the reports and are on file at NIEHS. The audit findings were reviewed and assessed by NTP staff, so all comments had been resolved or were otherwise addressed during the preparation of this Technical Report.

## GENETIC TOXICOLOGY

The genetic toxicity of 1-chloro-2-propanol was assessed by testing the ability of the chemical to induce mutations in various strains of *Salmonella typhimurium*, sister chromatid exchanges and chromosomal aberrations in cultured Chinese hamster ovary cells, sex-linked recessive lethal mutations in *Drosophila melanogaster*, and increases in the frequency of micronucleated erythrocytes in peripheral blood of mice. The protocols for these studies and the results are given in Appendix E.

The genetic toxicity studies of 1-chloro-2-propanol are part of a larger effort by the NTP to develop a database that would permit the evaluation of carcinogenicity in experimental animals from the molecular structure and the effects of the chemical in short-term *in vitro* and *in vivo* genetic toxicity tests. These genetic toxicity tests were originally developed to study mechanisms of chemical-induced DNA damage and to predict carcinogenicity in animals, based on the electrophilicity theory of chemical mutagenesis and the somatic mutation theory of cancer (Miller and Miller, 1977; Straus, 1981; Crawford, 1985).

There is a strong correlation between a chemical's potential electrophilicity (structural alert to DNA reactivity), mutagenicity in *Salmonella*, and carcinogenicity in rodents. The combination of electrophilicity and *Salmonella* mutagenicity is highly correlated with the induction of carcinogenicity in rats and mice and/or at multiple tissue sites (Ashby and Tennant, 1991). Other *in vitro* genetic toxicity tests correlate less well with rodent carcinogenicity (Tennant *et al.*, 1987; Zeiger *et al.*, 1990), although these other tests can provide information on the types of DNA and chromosome effects that can be induced by the chemical being investigated. Data from NTP studies show that a positive response in *Salmonella* is the

most predictive *in vitro* test for rodent carcinogenicity (89% of the *Salmonella* mutagens are rodent carcinogens), and that there is no complementarity among the *in vitro* genetic toxicity tests. That is, no battery of tests that included the *Salmonella* test improved the predictivity of the *Salmonella* test alone.

The predictivity for carcinogenicity of a positive response in bone marrow chromosome aberration or micronucleus tests appears to be less than the *Salmonella* test (Shelby *et al.*, 1993; Shelby and Witt, 1995). Positive responses in long-term peripheral blood micronucleus tests have not been formally evaluated for their predictivity for rodent carcinogenicity. But, because of the theoretical and observed associations between induced genetic damage and adverse effects in somatic and germ cells, the determination of *in vivo* genetic effects is important to the overall understanding of the risks associated with exposure to a particular chemical.

# RESULTS

## RATS

### 14-DAY STUDY

Two 10,000 ppm female rats died before the end of the study (Table 3). The final mean body weights and body weight gains of 3,300 and 10,000 ppm males and females were significantly less than those of the controls; male and female rats in the 10,000 ppm groups lost weight during the study. Water consumption by the 3,300 and 10,000 ppm males and females was significantly less than that by the controls throughout the study. Drinking water concentrations of 100, 330, 1,000, 3,300, or 10,000 ppm 1-chloro-2-propanol resulted in average daily doses of approximately 15, 45, 140, 260, or 265 mg 1-chloro-2-propanol/kg body weight. Clinical findings observed in the 10,000 ppm males and females included eye exudate, hypoactivity, thinness, and hunched posture.

The absolute and relative thymus weights of 10,000 ppm males and females were significantly less than those of the controls (Table H1). No other biologically significant organ weight changes were observed.

**TABLE 3**
**Survival, Body Weights, and Water Consumption of Rats in the 14-Day Drinking Water Study of 1-Chloro-2-propanol**

| Concentration (ppm) | Survival[a] | Mean Body Weight[b] (g) | | | Final Weight Relative to Controls (%) | Water Consumption[c] | |
|---|---|---|---|---|---|---|---|
| | | Initial | Final | Change | | Week 1 | Week 2 |
| **Male** | | | | | | | |
| 0 | 10/10 | 121 ± 2 | 196 ± 3 | 74 ± 2 | | 19.9 ± 0.1 | 22.3 ± 0.1 |
| 100 | 10/10 | 117 ± 3 | 193 ± 5 | 75 ± 2 | 99 | 19.4 ± 0.1 | 21.6 ± 0.7 |
| 330 | 10/10 | 117 ± 3 | 198 ± 3 | 81 ± 2 | 101 | 20.1 ± 0.4 | 23.2 ± 1.6 |
| 1,000 | 10/10 | 119 ± 3 | 195 ± 5 | 76 ± 3 | 100 | 20.2 ± 0.0 | 22.5 ± 0.1 |
| 3,300 | 10/10 | 118 ± 2 | 162 ± 4** | 44 ± 2** | 83 | 10.8 ± 0.0** | 13.4 ± 0.2** |
| 10,000 | 10/10 | 123 ± 2 | 88 ± 2** | –36 ± 3** | 45 | 2.7 ± 0.2** | 3.2 ± 0.1** |
| **Female** | | | | | | | |
| 0 | 10/10 | 105 ± 2 | 136 ± 2 | 31 ± 1 | | 18.2 ± 0.9 | 18.0 ± 2.1 |
| 100 | 10/10 | 104 ± 2 | 139 ± 2 | 35 ± 1 | 102 | 17.5 ± 0.3 | 17.9 ± 0.4 |
| 330 | 10/10 | 103 ± 2 | 139 ± 2 | 36 ± 1 | 102 | 17.9 ± 0.8 | 18.7 ± 1.1 |
| 1,000 | 10/10 | 105 ± 2 | 139 ± 3 | 34 ± 1 | 102 | 17.6 ± 0.3 | 17.8 ± 0.2 |
| 3,300 | 10/10 | 103 ± 2 | 123 ± 1** | 20 ± 1** | 90 | 8.5 ± 0.1** | 9.9 ± 0.2** |
| 10,000 | 8/10[d] | 103 ± 2 | 67 ± 3** | –36 ± 3** | 49 | 2.0 ± 0.2** | 2.2 ± 0.2** |

** Significantly different ($P \leq 0.01$) from the control group by Williams' or Dunnett's test
[a] Number of animals surviving at 14 days/number initially in group. Subsequent calculations are based on animals surviving to the end of the study.
[b] Weights and weight changes are given as mean ± standard error.
[c] Water consumption is expressed as grams per animal per day ± standard error.
[d] Day of deaths: 12

The incidences of cytoplasmic alteration and degeneration of the acinar cells of the exocrine pancreas in 3,300 and 10,000 ppm males and females and 1,000 ppm females were significantly increased compared to the controls (Table 4). The incidences of fatty change in 3,300 ppm males and females and 10,000 ppm males were significantly increased compared to the controls. Cytoplasmic alteration was characterized by basophilic cells having reduced amounts of acidophilic cytoplasmic granules (zymogen) and small acini. In some animals, the basophilic acinar cells appeared to be hyperplastic or hypertrophic. Degeneration was defined as the presence of cellular or nuclear debris within acinar cells (autophagic vacuoles and/or apoptosis). The fatty change consisted of mature fat cells that appeared to be within the interstitium.

There were increased incidences of minimal to moderate atrophy of the bone marrow in the 3,300 and 10,000 ppm male and female rats and in 1,000 ppm females compared to the controls (Table 4). Atrophy was characterized by a reduction in the number of hematopoietic cells with a concomitant increase in the amount of adipose tissue within the marrow.

There were increased incidences of minimal to mild diffuse atrophy of the spleen in 10,000 ppm males and females compared to the controls (Table 4). Minimal to mild hematopoiesis of the spleen occurred in males and females in the 3,300 ppm groups.

**TABLE 4**
**Incidence of Selected Nonneoplastic Lesions in Rats in the 14-Day Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 100 ppm | 330 ppm | 1,000 ppm | 3,300 ppm | 10,000 ppm |
|---|---|---|---|---|---|---|
| **Male** | | | | | | |
| Pancreas[a] | 10 | —[c] | — | 10 | 10 | 10 |
| Acinar Cell, Cytoplasmic Alteration[b] | 0 | | | 0 | 10** | 9** |
| Degeneration | 0 | | | 0 | 10** | 7** |
| Fatty Change | 0 | | | 0 | 6** | 4* |
| Bone Marrow | 10 | — | — | 10 | 10 | 10 |
| Atrophy | 0 | | | 0 | 10** (1.0)[d] | 10** (3.0) |
| Spleen | 10 | — | — | 10 | 10 | 10 |
| Atrophy, Diffuse | 0 | | | 0 | 0 | 10** (1.9) |
| Hematopoiesis | 0 | | | 0 | 7** (1.0) | 0 |
| **Female** | | | | | | |
| Pancreas | 10 | — | — | 10 | 10 | 10 |
| Acinar Cell, Cytoplasmic Alteration | 0 | | | 10** | 10** | 5* |
| Degeneration | 0 | | | 5* | 10** | 6** |
| Fatty Change | 0 | | | 0 | 6** | 1 |
| Bone Marrow | 10 | — | 10 | 10 | 10 | 10 |
| Atrophy | 0 | | 0 | 8** (1.3) | 10** (1.8) | 10** (3.2) |
| Spleen | 10 | 2 | — | 10 | 10 | 10 |
| Atrophy, Diffuse | 0 | 0 | | 0 | 0 | 10** (2.0) |
| Hematopoiesis | 0 | 0 | | 0 | 6** (2.2) | 0 |

* Significantly different ($P \leq 0.05$) from the control group by the Fisher exact test
** $P \leq 0.01$
[a] Number of animals with tissue examined microscopically
[b] Number of animals with lesion
[c] Tissue not examined at this exposure concentration
[d] Average severity grade of lesions in affected animals: 1=minimal, 2=mild, 3=moderate, 4=marked

## 14-WEEK STUDY

All rats survived to the end of the study (Table 5). The final mean body weights and body weight gains of 3,300 ppm males and females were significantly less than those of the controls. Water consumption by the 3,300 ppm male and female rats was significantly less than that by the controls throughout the study. Drinking water concentrations of 33, 100, 330, 1,000, or 3,300 ppm 1-chloro-2-propanol resulted in average daily doses of approximately 5, 10, 35, 100, or 220 mg 1-chloro-2-propanol/kg body weight. No clinical findings that could be attributed to 1-chloro-2-propanol exposure were observed.

**TABLE 5**
**Survival, Body Weights, and Water Consumption of Rats in the 14-Week Drinking Water Study of 1-Chloro-2-propanol**

| Concentration (ppm) | Survival[a] | Mean Body Weight[b] (g) | | | Final Weight Relative to Controls (%) | Water Consumption[c] | |
|---|---|---|---|---|---|---|---|
| | | Initial | Final | Change | | Week 1 | Week 13 |
| **Male** | | | | | | | |
| 0 | 10/10 | 116 ± 3 | 383 ± 6 | 267 ± 5 | | 19.5 ± 0.6 | 21.8 ± 0.4 |
| 33 | 10/10 | 114 ± 3 | 372 ± 9 | 257 ± 7 | 97 | 19.7 ± 0.7 | 20.7 ± 0.5 |
| 100 | 10/10 | 120 ± 4 | 373 ± 9 | 254 ± 6 | 98 | 19.6 ± 0.5 | 22.7 ± 1.6 |
| 330 | 10/10 | 118 ± 3 | 378 ± 8 | 260 ± 6 | 99 | 19.3 ± 0.1 | 21.5 ± 1.0 |
| 1,000 | 10/10 | 115 ± 2 | 373 ± 5 | 258 ± 5 | 97 | 18.5 ± 0.2 | 19.7 ± 0.2 |
| 3,300 | 10/10 | 116 ± 3 | 312 ± 5** | 196 ± 4** | 82 | 8.7 ± 0.1** | 14.1 ± 0.0** |
| **Female** | | | | | | | |
| 0 | 10/10 | 103 ± 2 | 211 ± 5 | 108 ± 4 | | 16.2 ± 0.4 | 17.7 ± 0.8 |
| 33 | 10/10 | 103 ± 2 | 209 ± 3 | 106 ± 3 | 99 | 16.7 ± 0.3 | 16.9 ± 1.7 |
| 100 | 10/10 | 103 ± 2 | 212 ± 3 | 109 ± 2 | 101 | 15.8 ± 0.1 | 17.4 ± 0.3 |
| 330 | 10/10 | 101 ± 2 | 205 ± 3 | 104 ± 2 | 97 | 17.1 ± 0.4 | 18.5 ± 1.2 |
| 1,000 | 10/10 | 102 ± 2 | 202 ± 3 | 100 ± 3* | 96 | 16.3 ± 0.0 | 16.8 ± 0.8 |
| 3,300 | 10/10 | 100 ± 2 | 182 ± 2** | 82 ± 1** | 86 | 7.0 ± 0.1** | 8.8 ± 0.6** |

* Significantly different ($P \leq 0.05$) from the control group by Williams' or Dunnett's test
** $P \leq 0.01$
[a] Number of animals surviving at 14 weeks/number initially in group
[b] Weights and weight changes are given as mean ± standard error.
[c] Water consumption is expressed as grams per animal per day ± standard error.

The hematology, clinical chemistry, and urinalysis data are listed in Table G1. At study termination, a treatment-related anemia occurred in the exposed female rats; the anemia was evidenced by decreases in hematocrit values, hemoglobin concentrations, and erythrocyte counts. The anemia was of minimal to mild severity and was most pronounced in the 1,000 and 3,300 ppm groups. The male rats were less affected, and hemoglobin concentrations decreased only in the 3,300 ppm group. Slightly lower water consumption by 3,300 ppm males and females suggests that dehydration could have occurred. Dehydration can cause a relative erythrocytosis due to decreased blood volume and hemoconcentration. If significant dehydration occurred in these animals, the severity of the anemia could have been masked. The anemia in female rats was characterized as macrocytic, normochromic, and responsive. Macrocytosis was evidenced by minimal increases in the mean cell volumes in 3,300 ppm females. Normochromatic erythrocytes were evidenced by the absence of change in the mean cell hemoglobin concentrations. Evidence of an erythropoietic response was demonstrated by minimal increases in the reticulocyte counts in the 33, 100, and 3,300 ppm female groups.

An exposure-related decrease in serum alanine amino-transferase activity occurred at all time points for male and female rats in the 1,000 and 3,300 ppm groups; transient decreases occurred in the lower exposure groups on day 3 and/or day 15. The decreased enzyme activity could suggest altered enzyme metabolism (e.g., decreased synthesis or increased catabolism) or an enzyme-inhibitory effect of 1-chloro-2-propanol. A transient decrease in albumin concentration occurred on day 3 for all exposed groups. The decreases, while treatment related, were not exposure related, and the magnitude of the decreases were equal for all exposed groups. Decreased albumin concentrations could suggest altered albumin/protein metabolism by the liver and could be consistent with the decreased alanine aminotransferase activity. A marked decrease in the 16-hour urine volume and concomitant increase in urine specific gravity occurred in 3,300 ppm male and female rats on day 15 and at week 14. These alterations in urine volume and specific gravity would reflect a physiologic response of water conservation and would be consistent with the decreased water intake that occurred.

The cauda epididymis and epididymis weights of 3,300 ppm males were significantly less than those of the controls (Table I1). The percentage of abnormal sperm in 3,300 ppm males and the concentration of epididymal sperm in 330 ppm males were significantly increased compared to the controls. No significant differences from the controls in estrous cycle length or percentage of time spent in estrous cycle stages were observed in female rats (Table I2).

The absolute kidney weights of 100 ppm males and females and 1,000 ppm females and the relative kidney weights of 100 ppm or greater males and females were significantly greater than those of the controls (Table H2). The absolute liver weights of 330 and 1,000 ppm males and 100 and 1,000 ppm females and the relative liver weights of males and females exposed to 100 ppm or greater were significantly greater than those of the controls.

The incidences of acinar cell degeneration and fatty change of the pancreas in 1,000 and 3,300 ppm males and females were significantly increased compared to the controls (Table 6). In the most severely affected animals, much of the normal parenchyma was replaced by large vacuolated cells (adipocytes) (Plates 1 through 3). The adipocytes appeared to be of interstitial origin and were much less common in the 1,000 ppm animals. Within residual acinar cells, the number of zymogen granules was reduced or absent (Plates 4 and 5); cellular or nuclear debris was often observed within or adjacent to these cells (autophagic vacuoles and/or apoptosis; Plate 6) and was diagnosed as degeneration. An increased number of cells in the interstitium was also observed.

In general, pancreatic islets (endocrine pancreas) remained intact; however, hepatocytic metaplasia was observed in a few islets in five females in the 3,300 ppm group. Within the peripheral region of affected islets, there was a variably thick band of large polygonal cells with abundant eosinophilic cytoplasm which resembled hepatocytes (Plate 7).

**TABLE 6**
**Incidence of Selected Nonneoplastic Lesions in Rats in the 14-Week Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | | 33 ppm | | 100 ppm | | 330 ppm | | 1,000 ppm | | 3,300 ppm | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Male** | | | | | | | | | | | | |
| Pancreas[a] | 10 | | 10 | | 10 | | 10 | | 10 | | 9 | |
| Acinar Cell, Degeneration[b] | 0 | | 0 | | 0 | | 0 | | 10** | (1.0)[c] | 9** | (3.0) |
| Fatty Change | 0 | | 0 | | 0 | | 0 | | 10** | (1.4) | 9** | (3.0) |
| Liver | 10 | | 10 | | 10 | | 10 | | 10 | | 10 | |
| Cytoplasmic Vacuolization | 0 | | 1 | (1.0) | 6** | (1.2) | 2 | (1.0) | 7** | (1.0) | 10** | (1.4) |
| Kidney | 10 | | 10 | | 10 | | 10 | | 10 | | 10 | |
| Epithelium, Regeneration, Tubular | 8 | (1.0) | 0 | | 0 | | 0 | | 0 | | 10 | (1.0) |
| **Female** | | | | | | | | | | | | |
| Pancreas | 10 | | 10 | | 10 | | 10 | | 10 | | 10 | |
| Acinar Cell, Degeneration | 0 | | 0 | | 0 | | 0 | | 10** | (1.0) | 10** | (3.0) |
| Fatty Change | 0 | | 0 | | 0 | | 1 | (1.0) | 10** | (1.0) | 10** | (3.0) |
| Pancreatic Islets | 10 | | 10 | | 10 | | 10 | | 10 | | 10 | |
| Metaplasia, Focal | 0 | | 0 | | 0 | | 0 | | 0 | | 5* | (1.0) |
| Kidney | 10 | | 10 | | 10 | | 10 | | 10 | | 10 | |
| Epithelium, Regeneration, Tubular | 1 | (1.0) | 0 | | 0 | | 1 | (1.0) | 2 | (1.0) | 8** | (1.0) |

* Significantly different ($P \leq 0.05$) from the control group by the Fisher exact test
** $P \leq 0.01$
[a] Number of animals with tissue examined microscopically
[b] Number of animals with lesions
[c] Average severity grade of lesions in affected animals: 1=minimal, 2=mild, 3=moderate, 4=marked

There were increased incidences of cytoplasmic vacuolization of the liver in 100, 1,000, and 3,300 ppm males compared to the controls. The cytoplasmic vacuolization was primarily observed within hepatocytes in the centrilobular region of the liver. Plate 8 represents one of the more severely affected animals. Vacuoles were variable in size with the largest slightly displacing the nucleus. Eosinophilic staining material was often observed within the vacuoles. Vacuolar change is often a nonspecific change in the liver, and this minimal change is considered of little biologic significance.

There was an increased incidence of regeneration of renal tubule epithelium in the 3,300 ppm female rats compared to the controls (Table 6). Within the renal cortex of the affected kidneys, there were occasional tubules composed of slightly smaller and more basophilic appearing cells which were considered to represent a regenerative response to injury. This change is very similar to that observed in the early stages of the background nephropathy that occurs in the F344/N rat. This was an extremely subtle change, and it is not certain if it represents a slight exacerbation of the background nephropathy or a primary insult to the kidney. The spontaneous nephropathy that occurs in the F344/N rat is most severe in males, and at 14 weeks virtually all males have regenerative tubules while females do not. While a difference was not observed between control and exposed males, detection of a subtle increase in regenerative tubules is very difficult with the background nephropathy.

*Exposure Concentration Selection Rationale:* Based on chemical-related lesions of the pancreas, 1-chloro-2-propanol exposure concentrations selected for the 2-year drinking water study in rats were 150, 325, and 650 ppm.

# 2-YEAR STUDY

## *Survival*

Estimates of 2-year survival probabilities for male and female rats are shown in Table 7 and in the Kaplan-Meier survival curves (Figure 1). Survival of all exposed groups was similar to that of the controls.

## *Body Weights, Water and Compound Consumption, and Clinical Findings*

Mean body weights of exposed males and females were generally similar to those of the controls throughout the study (Tables 8 and 9 and Figure 2). Water consumption by all groups of exposed rats was similar to that by the controls (Tables K1 and K2). Drinking water concentrations of 150, 325, or 650 ppm 1-chloro-2-propanol resulted in average daily doses of approximately 15, 30, or 65 mg 1-chloro-2-propanol/kg body weight to males and females during the first several months of the study and 8, 17, or 34 mg/kg for the remainder of the 2-year study. No clinical findings that could be attributed to 1-chloro-2-propanol exposure were observed.

**TABLE 7**
**Survival of Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 150 ppm | 325 ppm | 650 ppm |
|---|---|---|---|---|
| **Male** | | | | |
| Animals initially in study | 50 | 50 | 50 | 50 |
| Moribund | 12 | 13 | 7 | 10 |
| Natural deaths | 18 | 14 | 19 | 17 |
| Animals surviving to study termination | 20[d] | 23 | 24 | 23 |
| Percent probability of survival at end of study[a] | 40 | 46 | 48 | 46 |
| Mean survival (days)[b] | 659 | 678 | 672 | 680 |
| Survival analysis[c] | P=0.564N | P=0.476N | P=0.507N | P=0.514N |
| **Female** | | | | |
| Animals initially in study | 50 | 50 | 50 | 50 |
| Moribund | 12 | 7 | 7 | 5 |
| Natural deaths | 13 | 10 | 13 | 14 |
| Animals surviving to study termination | 25 | 33 | 30 | 31 |
| Percent probability of survival at end of study | 50 | 66 | 60 | 62 |
| Mean survival (days) | 698 | 705 | 700 | 701 |
| Survival analysis | P=0.513N | P=0.137N | P=0.474N | P=0.334N |

[a] Kaplan-Meier determinations
[b] Mean of all deaths (uncensored, censored, and terminal sacrifice)
[c] The result of the life table trend test (Tarone, 1975) is in the control column, and the results of the life table pairwise comparisons (Cox, 1972) with the controls are in the exposed group columns. A negative trend or lower mortality in an exposure group is indicated by **N**.
[d] Includes one animal that died during the last week of the study

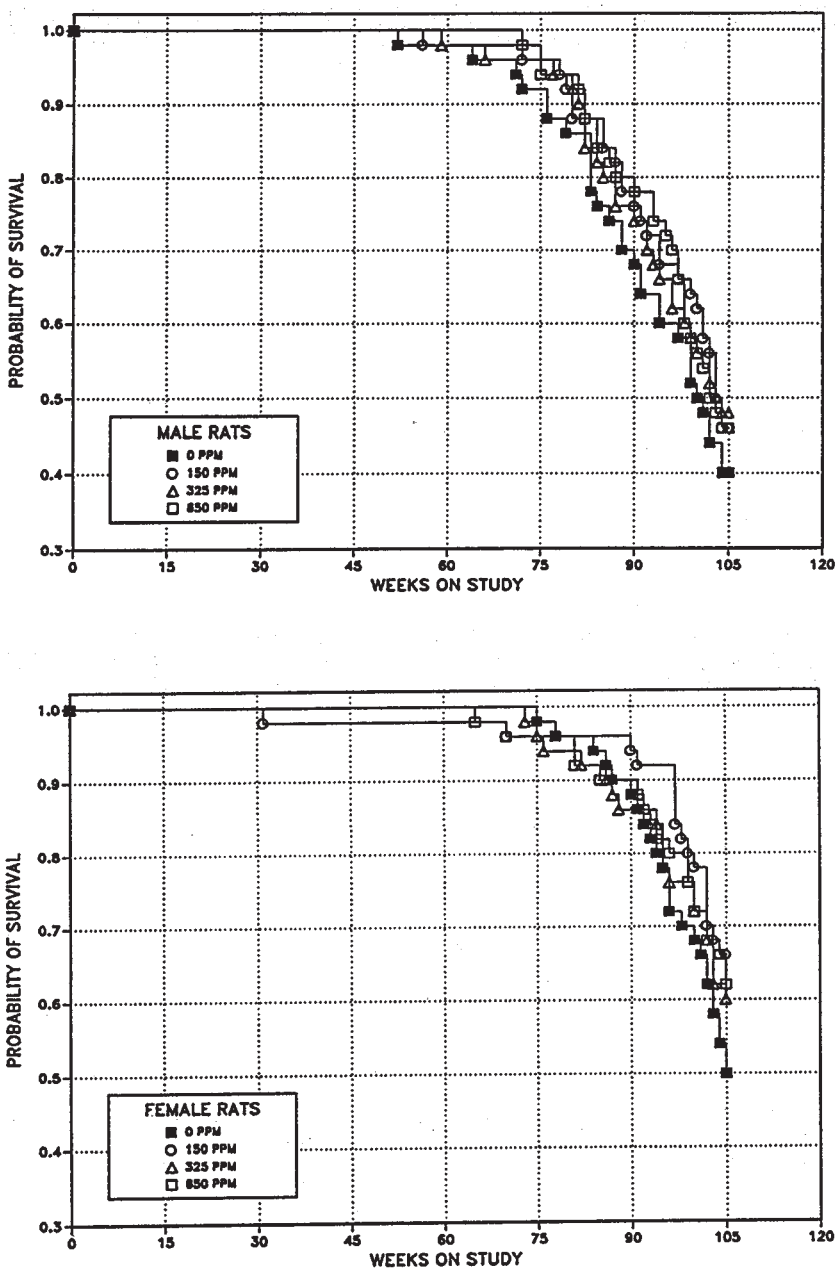



**FIGURE 1**
**Kaplan-Meier Survival Curves for Male and Female Rats Administered 1-Chloro-2-propanol in Drinking Water for 2 Years**

**TABLE 8**
**Mean Body Weights and Survival of Male Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| Weeks on Study | 0 ppm | | 150 ppm | | | 325 ppm | | | 650 ppm | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Av. Wt. (g) | No. of Survivors | Av. Wt. (g) | Wt. (% of controls) | No. of Survivors | Av. Wt. (g) | Wt. (% of controls) | No. of Survivors | Av. Wt. (g) | Wt. (% of controls) | No. of Survivors |
| 1 | 132 | 50 | 130 | 99 | 50 | 131 | 99 | 50 | 131 | 100 | 50 |
| 2 | 166 | 50 | 163 | 99 | 50 | 166 | 100 | 50 | 167 | 101 | 50 |
| 3 | 194 | 50 | 197 | 102 | 50 | 201 | 104 | 50 | 202 | 104 | 50 |
| 4 | 224 | 50 | 225 | 101 | 50 | 231 | 103 | 50 | 230 | 103 | 50 |
| 5 | 247 | 50 | 249 | 101 | 50 | 256 | 104 | 50 | 253 | 103 | 50 |
| 6 | 263 | 50 | 266 | 101 | 50 | 274 | 104 | 50 | 270 | 103 | 50 |
| 7 | 277 | 50 | 282 | 102 | 50 | 289 | 104 | 50 | 285 | 103 | 50 |
| 8 | 289 | 50 | 293 | 101 | 50 | 296 | 103 | 50 | 294 | 102 | 50 |
| 9 | 306 | 50 | 306 | 100 | 50 | 312 | 102 | 50 | 308 | 101 | 50 |
| 10 | 314 | 50 | 319 | 101 | 50 | 324 | 103 | 50 | 320 | 102 | 50 |
| 11 | 325 | 50 | 328 | 101 | 50 | 332 | 102 | 50 | 329 | 101 | 50 |
| 12 | 337 | 50 | 341 | 101 | 50 | 346 | 103 | 50 | 340 | 101 | 50 |
| 13 | 349 | 50 | 351 | 100 | 50 | 355 | 102 | 50 | 351 | 101 | 50 |
| 17 | 375 | 50 | 378 | 101 | 50 | 383 | 102 | 50 | 382 | 102 | 50 |
| 21 | 410 | 50 | 409 | 100 | 50 | 414 | 101 | 50 | 413 | 101 | 50 |
| 25 | 426 | 50 | 424 | 100 | 50 | 432 | 101 | 50 | 428 | 101 | 50 |
| 29 | 445 | 50 | 444 | 100 | 50 | 451 | 101 | 50 | 450 | 101 | 50 |
| 33 | 454 | 50 | 454 | 100 | 50 | 462 | 102 | 50 | 461 | 102 | 50 |
| 37 | 462 | 50 | 462 | 100 | 50 | 473 | 102 | 50 | 470 | 102 | 50 |
| 41 | 478 | 50 | 478 | 100 | 50 | 491 | 103 | 50 | 488 | 102 | 50 |
| 45 | 488 | 50 | 487 | 100 | 50 | 501 | 103 | 50 | 496 | 102 | 50 |
| 49 | 484 | 50 | 485 | 100 | 50 | 497 | 103 | 50 | 494 | 102 | 50 |
| 53 | 503 | 49 | 500 | 99 | 50 | 516 | 103 | 50 | 507 | 101 | 50 |
| 57 | 504 | 49 | 503 | 100 | 49 | 517 | 103 | 50 | 509 | 101 | 50 |
| 61 | 505 | 49 | 507 | 100 | 49 | 523 | 104 | 49 | 516 | 102 | 50 |
| 65 | 502 | 48 | 502 | 100 | 49 | 518 | 103 | 49 | 508 | 101 | 50 |
| 69 | 502 | 48 | 504 | 100 | 49 | 520 | 104 | 48 | 508 | 101 | 50 |
| 73 | 510 | 46 | 514 | 101 | 48 | 529 | 104 | 48 | 510 | 100 | 49 |
| 77 | 512 | 44 | 513 | 100 | 48 | 524 | 102 | 48 | 509 | 100 | 47 |
| 81 | 513 | 43 | 516 | 101 | 44 | 532 | 104 | 46 | 503 | 98 | 47 |
| 85 | 514 | 38 | 516 | 100 | 44 | 537 | 104 | 41 | 505 | 98 | 42 |
| 89 | 512 | 35 | 504 | 98 | 39 | 524 | 102 | 38 | 497 | 97 | 40 |
| 93 | 516 | 32 | 497 | 96 | 36 | 522 | 101 | 35 | 487 | 94 | 39 |
| 97 | 516 | 29 | 502 | 97 | 34 | 506 | 98 | 31 | 477 | 93 | 35 |
| 101 | 481 | 25 | 492 | 102 | 31 | 495 | 103 | 28 | 468 | 97 | 28 |
| 104 | 464 | 20 | 479 | 103 | 23 | 488 | 105 | 24 | 460 | 99 | 23 |
| **Mean for weeks** | | | | | | | | | | | |
| 1-13 | 263 | | 265 | 101 | | 270 | 103 | | 268 | 102 | |
| 14-52 | 447 | | 447 | 100 | | 456 | 102 | | 454 | 102 | |
| 53-104 | 504 | | 504 | 100 | | 518 | 103 | | 497 | 99 | |

**TABLE 9**
**Mean Body Weights and Survival of Female Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| Weeks on Study | 0 ppm | | 150 ppm | | | 325 ppm | | | 650 ppm | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Av. Wt. (g) | No. of Survivors | Av. Wt. (g) | Wt. (% of controls) | No. of Survivors | Av. Wt. (g) | Wt. (% of controls) | No. of Survivors | Av. Wt. (g) | Wt. (% of controls) | No. of Survivors |
| 1 | 111 | 50 | 111 | 100 | 50 | 111 | 100 | 50 | 110 | 99 | 50 |
| 2 | 128 | 50 | 128 | 100 | 50 | 128 | 100 | 50 | 127 | 99 | 50 |
| 3 | 144 | 50 | 143 | 99 | 50 | 143 | 100 | 50 | 143 | 100 | 50 |
| 4 | 152 | 50 | 151 | 100 | 50 | 152 | 100 | 50 | 153 | 101 | 50 |
| 5 | 160 | 50 | 160 | 100 | 50 | 161 | 100 | 50 | 163 | 102 | 50 |
| 6 | 169 | 50 | 169 | 100 | 50 | 169 | 100 | 50 | 172 | 101 | 50 |
| 7 | 174 | 50 | 175 | 100 | 50 | 173 | 99 | 50 | 176 | 101 | 50 |
| 8 | 182 | 50 | 180 | 99 | 50 | 180 | 99 | 50 | 182 | 100 | 50 |
| 9 | 188 | 50 | 187 | 99 | 50 | 186 | 99 | 50 | 189 | 101 | 50 |
| 10 | 191 | 50 | 190 | 99 | 50 | 190 | 99 | 50 | 192 | 100 | 50 |
| 11 | 193 | 50 | 192 | 99 | 50 | 193 | 100 | 50 | 195 | 101 | 50 |
| 12 | 198 | 50 | 198 | 100 | 50 | 199 | 100 | 50 | 201 | 101 | 50 |
| 13 | 201 | 50 | 201 | 100 | 50 | 201 | 100 | 50 | 205 | 102 | 50 |
| 17 | 216 | 50 | 216 | 100 | 50 | 213 | 99 | 50 | 218 | 101 | 50 |
| 21 | 224 | 50 | 221 | 99 | 50 | 220 | 98 | 50 | 224 | 100 | 50 |
| 25 | 230 | 50 | 228 | 99 | 50 | 227 | 99 | 50 | 231 | 100 | 50 |
| 29 | 240 | 50 | 238 | 99 | 50 | 238 | 99 | 50 | 242 | 101 | 50 |
| 33 | 246 | 50 | 244 | 99 | 49 | 244 | 99 | 50 | 247 | 100 | 50 |
| 37 | 254 | 50 | 252 | 99 | 49 | 252 | 99 | 50 | 255 | 101 | 50 |
| 41 | 266 | 50 | 265 | 100 | 49 | 266 | 100 | 50 | 268 | 101 | 50 |
| 45 | 269 | 50 | 268 | 99 | 49 | 269 | 100 | 50 | 270 | 100 | 50 |
| 49 | 281 | 50 | 278 | 99 | 49 | 280 | 100 | 50 | 282 | 100 | 50 |
| 53 | 292 | 50 | 293 | 100 | 49 | 290 | 99 | 50 | 297 | 102 | 50 |
| 57 | 296 | 50 | 298 | 101 | 49 | 295 | 100 | 50 | 301 | 102 | 50 |
| 61 | 305 | 50 | 305 | 100 | 49 | 302 | 99 | 50 | 309 | 101 | 50 |
| 65 | 305 | 50 | 307 | 101 | 49 | 303 | 99 | 50 | 311 | 102 | 49 |
| 69 | 315 | 50 | 315 | 100 | 49 | 311 | 99 | 50 | 318 | 101 | 49 |
| 73 | 321 | 50 | 323 | 101 | 48 | 316 | 99 | 50 | 324 | 101 | 48 |
| 77 | 329 | 49 | 332 | 101 | 48 | 328 | 100 | 47 | 333 | 101 | 48 |
| 81 | 326 | 48 | 334 | 102 | 48 | 326 | 100 | 47 | 331 | 102 | 47 |
| 85 | 333 | 47 | 337 | 101 | 48 | 327 | 98 | 46 | 338 | 101 | 46 |
| 89 | 339 | 45 | 343 | 101 | 48 | 337 | 99 | 43 | 348 | 103 | 45 |
| 93 | 338 | 42 | 344 | 102 | 46 | 336 | 100 | 43 | 353 | 105 | 43 |
| 97 | 345 | 36 | 336 | 97 | 46 | 337 | 98 | 38 | 358 | 104 | 40 |
| 101 | 345 | 33 | 341 | 99 | 39 | 333 | 96 | 36 | 367 | 107 | 36 |
| **Mean for weeks** | | | | | | | | | | | |
| 1-13 | 169 | | 168 | 99 | | 168 | 99 | | 170 | 101 | |
| 14-52 | 247 | | 246 | 100 | | 245 | 99 | | 249 | 101 | |
| 53-101 | 322 | | 324 | 101 | | 319 | 99 | | 330 | 102 | |

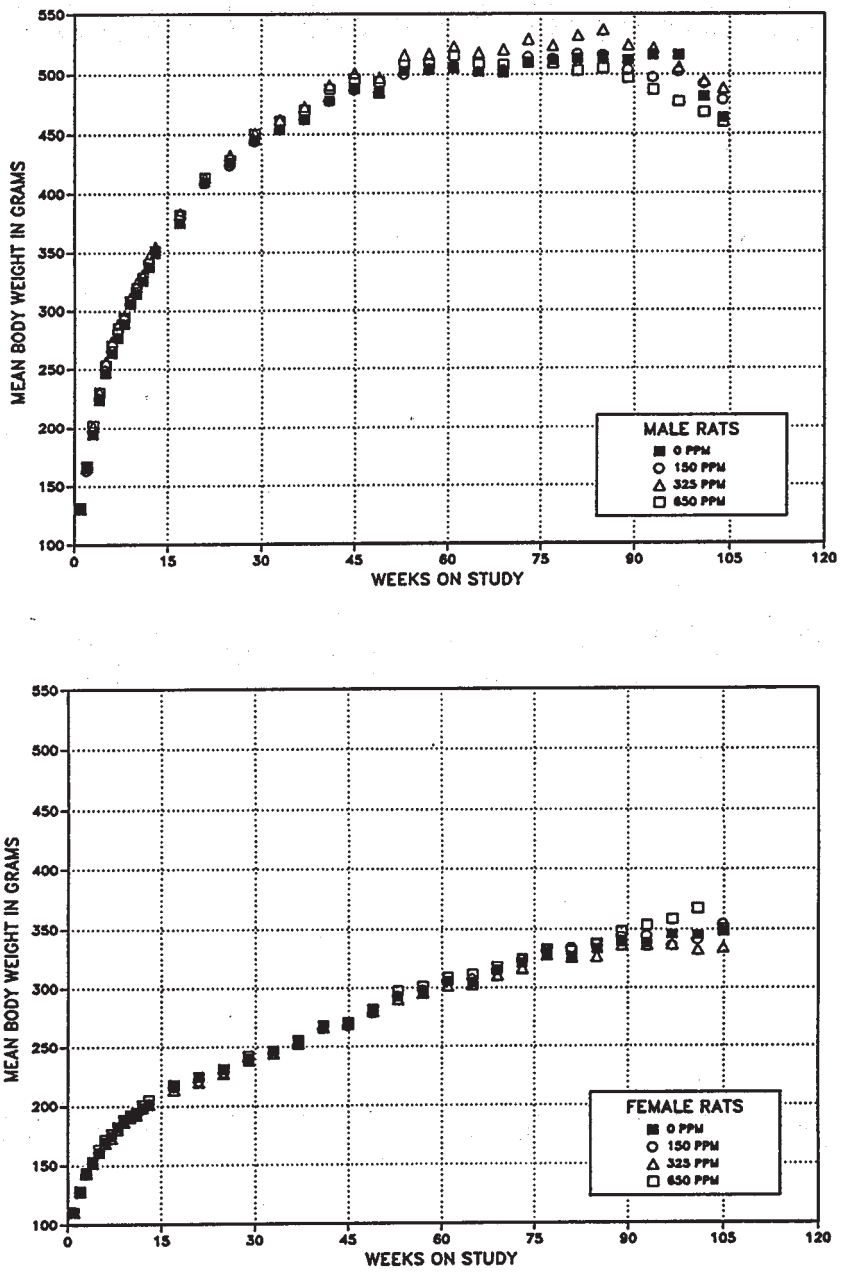



**FIGURE 2**
**Growth Curves for Male and Female Rats Administered 1-Chloro-2-propanol in Drinking Water for 2 Years**

## *Pathology and Statistical Analyses*

This section describes the statistically significant or biologically noteworthy changes in the incidences of neoplasms of the mammary gland. Summaries of the incidences of neoplasms and nonneoplastic lesions, individual animal tumor diagnoses, statistical analyses of primary neoplasms that occurred with an incidence of at least 5% in at least one animal group, and historical incidences for the neoplasms mentioned in this section are presented in Appendix A for male rats and Appendix B for female rats.

There were no significant increases or decreases in the incidences of neoplastic or nonneoplastic lesions that were attributed to administration of 1-chloro-2-propanol in drinking water for 2 years.

*Mammary Gland:* The incidence of fibroadenoma was significantly decreased in 150 ppm males compared to the controls (0 ppm, 7/50; 150 ppm, 0/50; 325 ppm, 6/50; 650 ppm, 6/50; Table A3). The incidence of fibroadenoma in control male rats exceeded that observed in historical control groups from drinking water, feed, corn oil gavage, and inhalation studies (Table A4).

# MICE

## 14-DAY STUDY

One male mouse in the 10,000 ppm group died before the end of the study (Table 10). The final mean body weights and body weight gains of 10,000 ppm males and females were significantly less than those of the controls, and the male mice in the 10,000 ppm group lost weight during the study. Water consumption by 3,300 and 10,000 ppm males and females was significantly less than that by the controls throughout the study. Drinking water concentrations of 100, 330, 1,000, 3,300, or 10,000 ppm 1-chloro-2-propanol resulted in average daily doses of approximately 20, 60, 175, 430, or 630 mg 1-chloro-2-propanol/kg body weight to males and 25, 95, 290, 640, or 940 mg/kg to females. No clinical findings that could be attributed to 1-chloro-2-propanol exposure were observed.

The relative liver weights of 1,000, 3,300, and 10,000 ppm males and females were significantly greater than those of the controls (Table H3). The absolute and relative thymus weights of 10,000 ppm males and females were significantly less than those of the controls. The relative kidney weights of 10,000 ppm males and females were significantly greater than those of the controls, probably reflecting decreased water consumption.

The incidences of minimal to mild hepatocellular vacuolization in 1,000, 3,300, and 10,000 ppm male and female mice were significantly increased compared to the controls (Table 11). In general, the vacuolar change involved hepatocytes scattered throughout the liver, but it was sometimes more pronounced in the periportal regions. Affected hepatocytes contained

**TABLE 10**
**Survival, Body Weights, and Water Consumption of Mice in the 14-Day Drinking Water Study of 1-Chloro-2-propanol**

| Concentration (ppm) | Survival[a] | Mean Body Weight[b] (g) | | | Final Weight Relative to Controls (%) | Water Consumption[c] | |
|---|---|---|---|---|---|---|---|
| | | Initial | Final | Change | | Week 1 | Week 2 |
| **Male** | | | | | | | |
| 0 | 10/10 | 26.0 ± 0.6 | 28.1 ± 0.6 | 2.0 ± 0.2 | | 4.6 ± 0.2 | 4.8 ± 0.3 |
| 100 | 10/10 | 25.3 ± 0.5 | 27.7 ± 0.5 | 2.5 ± 0.2 | 99 | 4.4 ± 0.3 | 5.2 ± 0.2 |
| 330 | 10/10 | 24.8 ± 0.7 | 27.5 ± 0.7 | 2.7 ± 1.1 | 98 | 4.7 ± 0.4 | 5.0 ± 0.3 |
| 1,000 | 10/10 | 25.7 ± 0.4 | 28.7 ± 0.4 | 3.0 ± 0.2 | 102 | 4.7 ± 0.2 | 4.8 ± 0.2 |
| 3,300 | 10/10 | 25.0 ± 0.4 | 28.4 ± 0.5 | 3.4 ± 0.2 | 101 | 3.4 ± 0.2** | 3.5 ± 0.2** |
| 10,000 | 9/10[d] | 24.8 ± 0.4 | 24.3 ± 0.6** | –0.5 ± 0.5** | 87 | 1.3 ± 0.1**[e] | 1.8 ± 0.1**[e] |
| **Female** | | | | | | | |
| 0 | 10/10 | 19.3 ± 0.2 | 21.6 ± 0.2 | 2.3 ± 0.2 | | 5.4 ± 0.3 | 5.7 ± 0.2 |
| 100 | 10/10 | 19.5 ± 0.4 | 22.0 ± 0.4 | 2.5 ± 0.2 | 102 | 5.2 ± 0.3 | 5.5 ± 0.2 |
| 330 | 10/10 | 19.0 ± 0.3 | 21.6 ± 0.4 | 2.6 ± 0.2 | 100 | 5.4 ± 0.5 | 6.2 ± 0.4 |
| 1,000 | 10/10 | 19.1 ± 0.3 | 22.0 ± 0.3 | 2.9 ± 0.4 | 102 | 5.8 ± 0.5 | 6.2 ± 0.6 |
| 3,300 | 10/10 | 19.8 ± 0.4 | 22.9 ± 0.3 | 3.1 ± 0.2 | 106 | 3.7 ± 0.2** | 3.9 ± 0.2** |
| 10,000 | 10/10 | 19.5 ± 0.3 | 19.8 ± 0.8* | 0.3 ± 0.9** | 92 | 1.5 ± 0.2** | 1.9 ± 0.1** |

* Significantly different ($P \leq 0.05$) from the control group by Williams' or Dunnett's test
** $P \leq 0.01$
[a] Number of animals surviving at 14 days/number initially in group. Subsequent calculations are based on animals surviving to the end of the study.
[b] Weights and weight changes are given as mean ± standard error.
[c] Water consumption is expressed as grams per animal per day ± standard error.
[d] Day of death: 3
[e] n=9

small, sometimes coalescing vacuoles that often filled the cytoplasm but did not displace the nucleus.

As was observed in the rats, there were increased incidences of minimal to mild cytoplasmic alteration in 3,300 and 10,000 ppm male and female mice and minimal to mild degeneration of the pancreatic acinar cells in 3,300 ppm males and 3,300 and 10,000 ppm females compared to those in the controls (Table 11). The lesions were qualitatively similar to those described in the rats. Fatty change was not observed in the mice, however.

Minimal to mild atrophy of red pulp (hematopoietic cells) was observed in the spleen of four 10,000 ppm males and five 10,000 ppm females (Table 11).

**TABLE 11**
**Incidence of Selected Nonneoplastic Lesions in Mice in the 14-Day Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | | 100 ppm | | 330 ppm | | 1,000 ppm | | 3,300 ppm | | 10,000 ppm | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Male** | | | | | | | | | | | | |
| Liver[a] | 10 | | 10 | | 10 | | 10 | | 10 | | 10 | |
| Hepatocyte, Cytoplasmic, Vacuolization[b] | 1 | (3.0)[c] | 3 | (1.3) | 5 | (1.4) | 10** | (2.1) | 10** | (2.0) | 10** | (2.0) |
| Pancreas | 10 | | 10 | | 10 | | 10 | | 10 | | 10 | |
| Acinar Cell, Cytoplasmic Alteration | 0 | | 0 | | 0 | | 0 | | 7** | | 8** | |
| Degeneration | 0 | | 0 | | 0 | | 0 | | 10** | | 3 | |
| Spleen | 10 | | —[d] | | — | | — | | 10 | | 10 | |
| Atrophy | 0 | | | | | | | | 0 | | 4* | (1.5) |
| **Female** | | | | | | | | | | | | |
| Liver | 10 | | 10 | | 10 | | 10 | | 10 | | 10 | |
| Hepatocyte, Cytoplasmic, Vacuolization | 0 | | 0 | | 3 | (2.0) | 8** | (1.5) | 10** | (1.8) | 9** | (1.8) |
| Pancreas | 10 | | 10 | | 10 | | 10 | | 10 | | 10 | |
| Acinar Cell, Cytoplasmic Alteration | 0 | | 0 | | 0 | | 0 | | 7** | | 9** | |
| Degeneration | 0 | | 0 | | 0 | | 0 | | 9** | | 10** | |
| Spleen | 10 | | — | | — | | — | | 10 | | 10 | |
| Atrophy | 0 | | | | | | | | 0 | | 5* | (1.6) |

* Significantly different ($P \leq 0.05$) from the control group by the Fisher exact test
** $P \leq 0.01$
[a] Number of animals with tissue examined microscopically
[b] Number of animals with lesion
[c] Average severity grade of lesions in affected animals: 1=minimal, 2=mild, 3=moderate, 4=marked
[d] Tissue not examined at this exposure concentration

## 14-WEEK STUDY

One 330 ppm male died before the end of the study (Table 12). Final mean body weights and body weight gains of exposed groups were similar to those of the controls. Water consumption by exposed groups was generally similar to that by the controls, except at 13 weeks, when water consumption by the 3,300 ppm females was less than that by the controls. Drinking water concentrations of 33, 100, 330, 1,000, or 3,300 ppm 1-chloro-2-propanol resulted in average daily doses of approximately 5, 15, 50, 170, or 340 mg 1-chloro-2-propanol/kg body weight to males and 7, 20, 70, 260, or 420 mg/kg to females. No clinical findings that could be attributed to 1-chloro-2-propanol exposure were observed.

Hematology data are listed in Table G2. There was some evidence of minimal anemia in 3,300 ppm male mice; this was characterized by decreased erythrocyte count and hemoglobin concentration. The lower water consumption by 3,300 ppm mice suggests that dehydration may have occurred. Dehydration can cause a relative erythrocytosis due to decreased blood volumes and hemoconcentration. If significant dehydration occurred in these animals, the severity of the anemia could have been masked. The erythrocytes of 330, 1,000, and 3,300 ppm male mice were minimally larger, as evidenced by increases in mean cell volume. Increases in mean cell volume usually suggest increased numbers of larger immature erythrocytes (reticulocytes) in the bloodstream. However,

**TABLE 12**
**Survival, Body Weights, and Water Consumption of Mice in the 14-Week Drinking Water Study of 1-Chloro-2-propanol**

| Concentration (ppm) | Survival[a] | Mean Body Weight[b] (g) | | | Final Weight Relative to Controls (%) | Water Consumption[c] | |
|---|---|---|---|---|---|---|---|
| | | Initial | Final | Change | | Week 1 | Week 13 |
| **Male** | | | | | | | |
| 0 | 10/10 | 22.8 ± 0.3 | 38.4 ± 0.9 | 15.6 ± 0.7 | | 4.4 ± 0.2 | 4.1 ± 0.2 |
| 33 | 10/10 | 23.5 ± 0.4 | 40.2 ± 1.1 | 16.8 ± 1.0 | 105 | 4.9 ± 0.2 | 5.0 ± 1.0 |
| 100 | 10/10 | 23.6 ± 0.6 | 39.5 ± 1.1 | 16.0 ± 1.0 | 103 | 4.7 ± 0.2[e] | 4.6 ± 0.5 |
| 330 | 9/10[d] | 23.1 ± 0.3 | 39.2 ± 1.3 | 16.1 ± 1.1 | 102 | 5.1 ± 0.4[e] | 4.4 ± 0.4[e] |
| 1,000 | 10/10 | 23.4 ± 0.5 | 39.0 ± 0.8 | 15.6 ± 0.5 | 101 | 5.1 ± 0.3[e] | 4.2 ± 0.2 |
| 3,300 | 10/10 | 24.2 ± 0.4 | 39.8 ± 0.7 | 15.6 ± 0.5 | 103 | 3.5 ± 0.2* | 3.1 ± 0.2* |
| **Female** | | | | | | | |
| 0 | 10/10 | 20.0 ± 0.2 | 34.0 ± 1.0 | 14.0 ± 0.9 | | 3.8 ± 0.1 | 6.0 ± 0.6 |
| 33 | 10/10 | 19.3 ± 0.3 | 33.8 ± 0.9 | 14.5 ± 0.8 | 99 | 4.0 ± 1.1 | 5.8 ± 0.4 |
| 100 | 10/10 | 19.1 ± 0.3 | 31.5 ± 1.5 | 12.4 ± 1.4 | 93 | 4.1 ± 0.6 | 6.3 ± 0.7 |
| 330 | 10/10 | 19.7 ± 0.2 | 34.8 ± 0.9 | 15.1 ± 0.8 | 102 | 4.3 ± 0.3 | 5.6 ± 0.6 |
| 1,000 | 10/10 | 19.9 ± 0.5 | 33.5 ± 1.2 | 13.7 ± 0.8 | 99 | 3.8 ± 0.3 | 5.1 ± 0.4 |
| 3,300 | 10/10 | 19.4 ± 0.2 | 33.5 ± 0.8 | 14.1 ± 0.7 | 99 | 3.0 ± 0.6[e] | 3.4 ± 0.3** |

* Significantly different ($P \leq 0.05$) from the control group by Williams' or Dunnett's test
** $P \leq 0.01$
[a] Number of animals surviving at 14 weeks/number initially in group
[b] Weights and weight changes are given as mean ± standard error. Subsequent calculations are based on animals surviving to the end of the study.
[c] Water consumption is expressed as grams per animal per day ± standard error.
[d] Week of death: 7
[e] n=9

the reticulocyte counts were not increased, suggesting that the anemia observed in 3,300 ppm males was too minimal to stimulate a strong bone marrow response. Other hematologic changes were not considered to be toxicologically relevant.

The right epididymis weight of 3,300 ppm males was significantly greater than that of the controls (Table I3). No significant differences from the controls were observed in the length of estrous cycle or the percentage of time spent in estrous cycle stages (Table I4).

The absolute and relative right kidney weights of 3,300 ppm males and females were significantly greater than those of the controls (Table H4). The absolute and relative liver weights of 1,000 ppm males and of all exposed groups of females were significantly greater than those of the controls. The absolute and relative thymus weights of 1,000 ppm females and the absolute thymus weight of 3,300 ppm females were significantly greater than those of the controls.

The incidences of pancreatic acinar cell degeneration and fatty change in 3,300 ppm males and females were significantly increased compared to the controls (Table 13). The degeneration and fatty change were qualitatively similar to that described for the rats, but the lesions were much milder in mice.

The severities of renal tubule cytoplasmic vacuolization were greater in 1,000 and 3,300 ppm males than in the controls (Table 13).

**TABLE 13**
**Incidence of Selected Nonneoplastic Lesions in Mice in the 14-Week Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | | 33 ppm | | 100 ppm | | 330 ppm | | 1,000 ppm | | 3,300 ppm | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Male** | | | | | | | | | | | | |
| Pancreas[a] | 10 | | 10 | | 10 | | 10 | | 10 | | 10 | |
| Acinar Cell, Degeneration[b] | 0 | | 0 | | 0 | | 0 | | 2 | (1.0)[c] | 10** | (1.1) |
| Fatty Change | 0 | | 0 | | 0 | | 0 | | 2 | (1.0) | 9** | (1.1) |
| Kidney | 10 | | 10 | | 10 | | 10 | | 10 | | 10 | |
| Renal Tubule, Vacuolization, Cytoplasmic | 10 | (1.1) | 10 | (1.1) | 10 | (1.4) | 8 | (1.1) | 10 | (1.6) | 10 | (1.7) |
| **Female** | | | | | | | | | | | | |
| Pancreas | 10 | | 10 | | 10 | | 10 | | 10 | | 10 | |
| Acinar Cell, Degeneration | 0 | | 0 | | 0 | | 0 | | 0 | | 9** | (1.0) |
| Fatty Change | 0 | | 0 | | 0 | | 0 | | 0 | | 4* | (1.0) |
| Liver | 10 | | 10 | | 10 | | 10 | | 10 | | 10 | |
| Cytoplasmic Vacuolization | 0 | | 7** | (1.0) | 10** | (1.5) | 7** | (1.1) | 9** | (1.4) | 10** | (2.0) |

* Significantly different ($P \leq 0.05$) from the control group by the Fisher exact test
** $P \leq 0.01$
[a] Number of animals with tissue examined microscopically
[b] Number of animals with lesions
[c] Average severity grade of lesions in affected animals: 1=minimal, 2=mild, 3=moderate, 4=marked

The incidences of cytoplasmic vacuolization of the liver in all groups of exposed females were significantly increased compared to the controls (Table 13). The nature of the vacuolization was similar between groups and was generally characterized by indistinct borders and irregularly shaped clear spaces in the cytoplasm.

*Exposure Concentration Selection Rationale:* Based on chemical-related lesions of the pancreas in the 3,300 ppm groups, 1-chloro-2-propanol exposure concentrations selected for the 2-year drinking water study in mice were 250, 500, and 1,000 ppm.

# 2-YEAR STUDY

## *Survival*

Estimates of 2-year survival probabilities for male and female mice are shown in Table 14 and in the Kaplan-Meier survival curves (Figure 3). Survival of all exposed groups was similar to that of the controls.

## *Body Weights, Water and Compound Consumption, and Clinical Findings*

The mean body weights of all groups of exposed males and females were generally similar to those of the controls throughout the study (Figure 4 and Tables 15 and 16). Water consumption by all exposed groups of mice was similar to that by the controls (Tables K3 and K4). Drinking water concentrations of 0, 250, 500, or 1,000 ppm 1-chloro-2-propanol resulted in average daily doses of approximately 45, 75, or 150 mg 1-chloro-2-propanol/kg body weight to males and 60, 105, or 210 mg/kg to females during the first several months of the study and 25, 50, or 100 mg/kg for the remainder of the 2-year study. No clinical findings related to 1-chloro-2-propanol exposure were observed.

**TABLE 14**
**Survival of Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 250 ppm | 500 ppm | 1,000 ppm |
|---|---|---|---|---|
| **Male** | | | | |
| Animals initially in study | 50 | 50 | 50 | 50 |
| Accidental deaths[a] | 0 | 0 | 5 | 3 |
| Moribund | 8 | 0 | 7 | 4 |
| Natural deaths | 2 | 6 | 9 | 4 |
| Animals surviving to study termination | 40 | 44 | 29 | 39 |
| Percent probability of survival at end of study[b] | 80 | 88 | 65 | 83 |
| Mean survival (days)[c] | 689 | 712 | 624 | 686 |
| Survival analysis[d] | P=0.986 | P=0.386N | P=0.151 | P=0.824N |
| **Female** | | | | |
| Animals initially in study | 50 | 50 | 50 | 50 |
| Accidental deaths[a] | 3 | 0 | 1 | 2 |
| Moribund | 8 | 7 | 3 | 5 |
| Natural deaths | 7 | 11 | 10 | 11 |
| Animals surviving to study termination | 32 | 32 | 36 | 32 |
| Percent probability of survival at end of study | 68 | 64 | 74 | 67 |
| Mean survival (days) | 692 | 700 | 680 | 662 |
| Survival analysis | P=0.888 | P=0.650 | P=0.944N | P=0.812 |

[a] Censored from survival analyses; some accidental deaths were attributed to hypothermia due to leakage of water bottles and flooding of cages.
[b] Kaplan-Meier determinations
[c] Mean of all deaths (uncensored, censored, and terminal sacrifice)
[d] The result of the life table trend test (Tarone, 1975) is in the control column, and the results of the life table pairwise comparisons (Cox, 1972) with the controls are in the exposed group columns. A lower mortality in an exposure group is indicated by **N**.

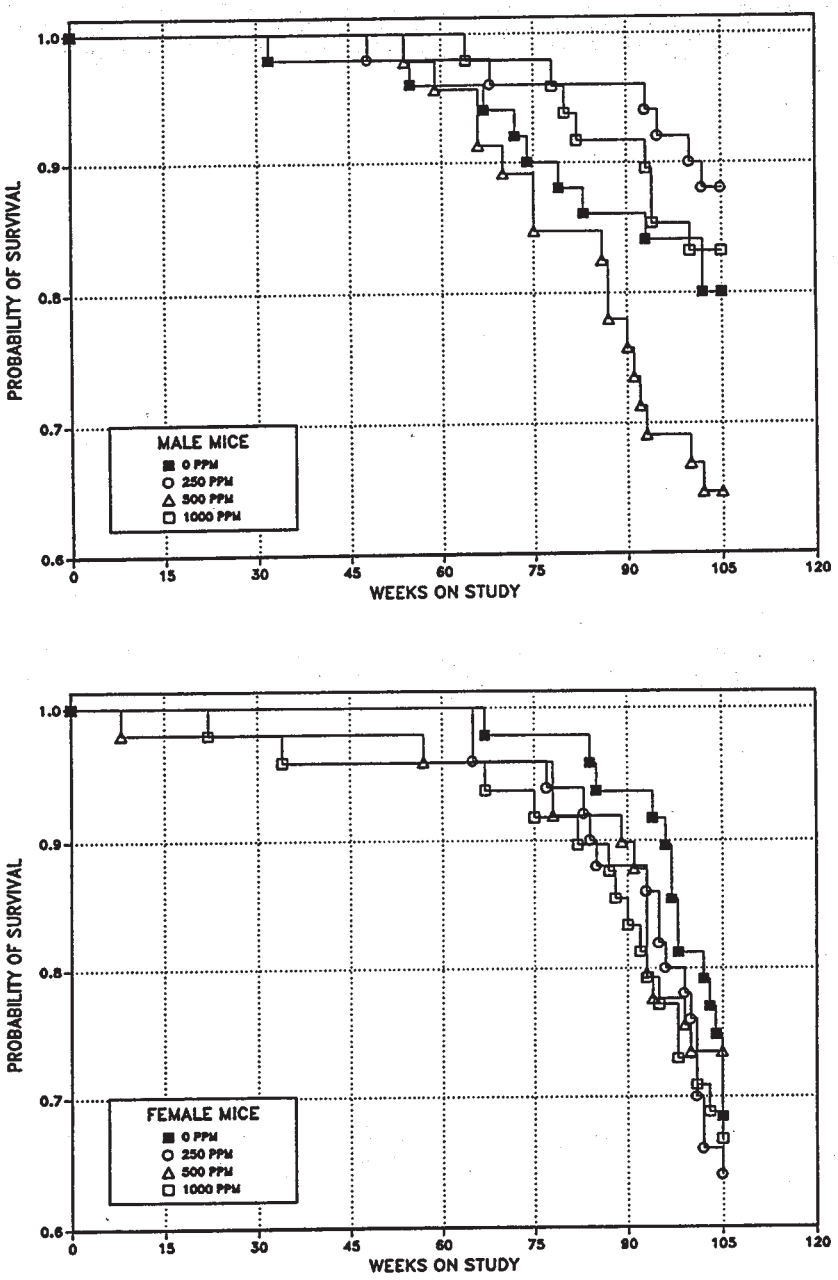



**FIGURE 3**
**Kaplan-Meier Survival Curves for Male and Female Mice Administered 1-Chloro-2-propanol in Drinking Water for 2 Years**

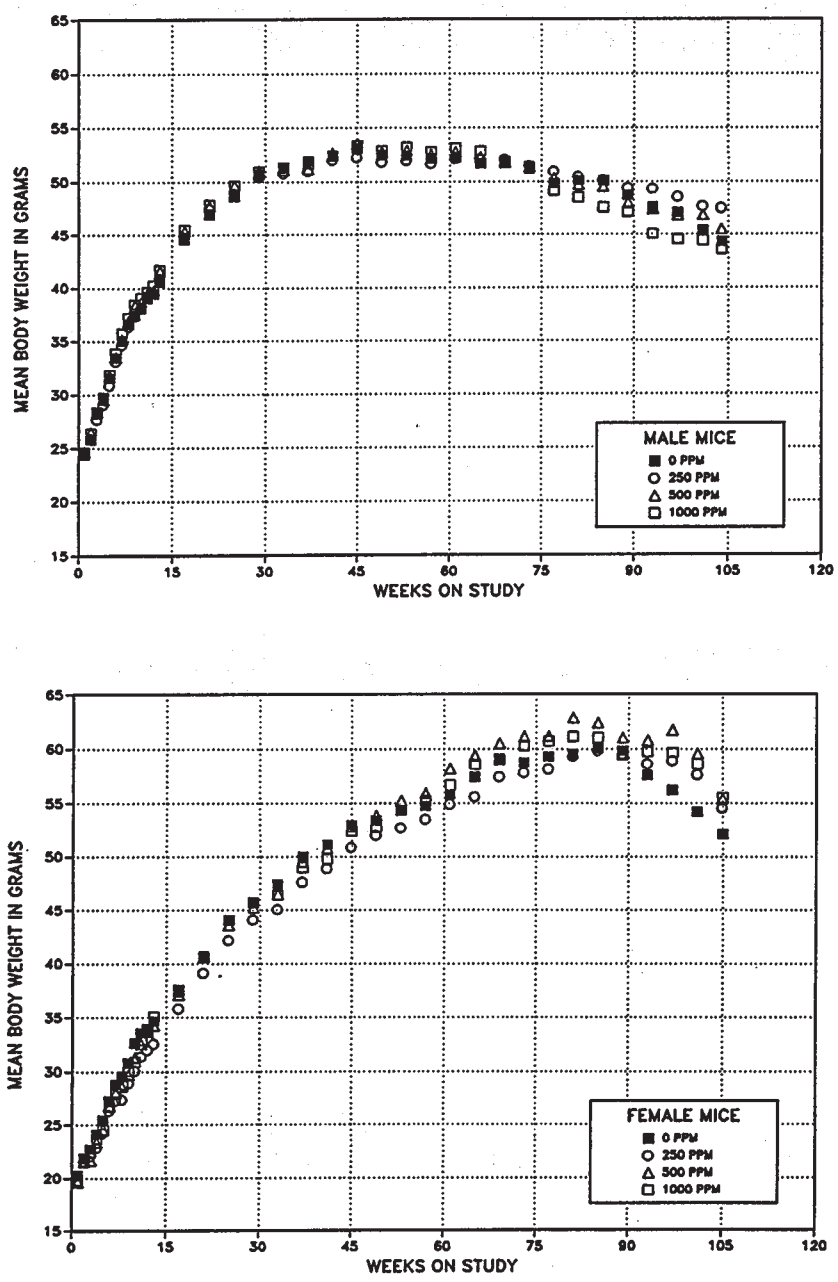



**FIGURE 4**
**Growth Curves for Male and Female Mice Administered 1-Chloro-2-propanol in Drinking Water for 2 Years**

**TABLE 15**
**Mean Body Weights and Survival of Male Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| Weeks on Study | 0 ppm | | 250 ppm | | | 500 ppm | | | 1,000 ppm | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Av. Wt. (g) | No. of Survivors | Av. Wt. (g) | Wt. (% of controls) | No. of Survivors | Av. Wt. (g) | Wt. (% of controls) | No. of Survivors | Av. Wt. (g) | Wt. (% of controls) | No. of Survivors |
| 1 | 24.4 | 50 | 24.6 | 101 | 50 | 24.7 | 101 | 50 | 24.6 | 101 | 50 |
| 2 | 25.8 | 50 | 25.9 | 100 | 50 | 26.5 | 103 | 50 | 26.4 | 102 | 50 |
| 3 | 28.2 | 50 | 27.7 | 98 | 50 | 28.4 | 101 | 50 | 28.4 | 101 | 50 |
| 4 | 29.7 | 50 | 29.1 | 98 | 50 | 29.6 | 100 | 50 | 29.8 | 100 | 50 |
| 5 | 31.5 | 50 | 30.9 | 98 | 50 | 31.7 | 101 | 50 | 31.9 | 101 | 50 |
| 6 | 33.4 | 50 | 33.1 | 99 | 50 | 33.5 | 100 | 50 | 33.9 | 102 | 50 |
| 7 | 35.0 | 50 | 34.7 | 99 | 50 | 35.2 | 101 | 50 | 35.7 | 102 | 50 |
| 8 | 36.6 | 50 | 36.3 | 99 | 50 | 36.9 | 101 | 50 | 37.2 | 102 | 50 |
| 9 | 37.4 | 50 | 37.4 | 100 | 50 | 38.3 | 102 | 50 | 38.5 | 103 | 50 |
| 10 | 38.0 | 50 | 38.1 | 100 | 50 | 38.7 | 102 | 50 | 39.1 | 103 | 50 |
| 11 | 39.0 | 50 | 39.2 | 101 | 50 | 39.5 | 101 | 50 | 39.7 | 102 | 50 |
| 12 | 39.5 | 50 | 39.6 | 100 | 50 | 39.8 | 101 | 50 | 40.2 | 102 | 50 |
| 13 | 40.6 | 50 | 40.9 | 101 | 50 | 41.6 | 103 | 49 | 41.7 | 103 | 50 |
| 17 | 44.6 | 50 | 44.8 | 100 | 50 | 45.3 | 102 | 48 | 45.5 | 102 | 50 |
| 21 | 46.9 | 50 | 47.5 | 101 | 50 | 47.7 | 102 | 48 | 47.9 | 102 | 50 |
| 25 | 48.6 | 50 | 48.9 | 101 | 50 | 49.6 | 102 | 48 | 49.7 | 102 | 50 |
| 29 | 50.7 | 50 | 50.5 | 100 | 50 | 51.0 | 101 | 46 | 50.9 | 100 | 50 |
| 33 | 51.3 | 49 | 50.8 | 99 | 50 | 51.1 | 100 | 46 | 51.3 | 100 | 50 |
| 37 | 51.9 | 49 | 51.0 | 98 | 50 | 51.2 | 99 | 46 | 51.6 | 99 | 48 |
| 41 | 52.4 | 49 | 52.0 | 99 | 50 | 52.7 | 101 | 46 | 52.4 | 100 | 48 |
| 45 | 53.1 | 49 | 52.2 | 98 | 50 | 53.5 | 101 | 46 | 53.4 | 101 | 48 |
| 49 | 52.4 | 49 | 51.8 | 99 | 49 | 52.7 | 101 | 46 | 52.9 | 101 | 48 |
| 53 | 52.4 | 49 | 52.0 | 99 | 49 | 52.9 | 101 | 46 | 53.2 | 102 | 48 |
| 57 | 52.1 | 48 | 51.7 | 99 | 49 | 52.5 | 101 | 45 | 52.8 | 101 | 48 |
| 61 | 52.3 | 48 | 52.1 | 100 | 49 | 52.7 | 101 | 44 | 53.1 | 102 | 48 |
| 65 | 51.7 | 48 | 52.1 | 101 | 49 | 52.3 | 101 | 44 | 52.9 | 102 | 47 |
| 69 | 51.8 | 47 | 52.1 | 101 | 48 | 51.8 | 100 | 42 | 51.9 | 100 | 47 |
| 73 | 51.4 | 46 | 51.5 | 100 | 48 | 51.4 | 100 | 41 | 51.2 | 100 | 47 |
| 77 | 49.8 | 45 | 51.0 | 102 | 48 | 50.3 | 101 | 38 | 49.2 | 99 | 47 |
| 81 | 50.1 | 44 | 50.4 | 101 | 48 | 49.7 | 99 | 38 | 48.5 | 97 | 45 |
| 85 | 50.1 | 43 | 50.1 | 100 | 48 | 49.5 | 99 | 38 | 47.6 | 95 | 44 |
| 89 | 48.7 | 43 | 49.4 | 101 | 48 | 48.0 | 99 | 35 | 47.2 | 97 | 44 |
| 93 | 47.6 | 43 | 49.3 | 104 | 47 | 47.4 | 100 | 31 | 45.1 | 95 | 43 |
| 97 | 47.0 | 42 | 48.6 | 103 | 46 | 46.8 | 100 | 31 | 44.6 | 95 | 40 |
| 101 | 45.4 | 42 | 47.7 | 105 | 45 | 46.9 | 103 | 30 | 44.4 | 98 | 39 |
| 104 | 44.3 | 40 | 47.5 | 107 | 44 | 45.5 | 103 | 29 | 43.6 | 98 | 39 |
| **Mean for weeks** | | | | | | | | | | | |
| 1-13 | 33.8 | | 33.7 | 100 | | 34.2 | 101 | | 34.4 | 102 | |
| 14-52 | 50.2 | | 49.9 | 99 | | 50.5 | 101 | | 50.6 | 101 | |
| 53-104 | 49.6 | | 50.4 | 102 | | 49.8 | 100 | | 49.0 | 99 | |

**TABLE 16**
**Mean Body Weights and Survival of Female Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| Weeks on Study | 0 ppm | | 250 ppm | | | 500 ppm | | | 1,000 ppm | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Av. Wt. (g) | No. of Survivors | Av. Wt. (g) | Wt. (% of controls) | No. of Survivors | Av. Wt. (g) | Wt. (% of controls) | No. of Survivors | Av. Wt. (g) | Wt. (% of controls) | No. of Survivors |
| 1 | 20.3 | 50 | 19.6 | 97 | 50 | 19.6 | 97 | 50 | 19.8 | 98 | 50 |
| 2 | 21.9 | 50 | 21.6 | 99 | 50 | 21.6 | 99 | 50 | 21.5 | 98 | 50 |
| 3 | 22.7 | 50 | 22.1 | 97 | 50 | 21.7 | 96 | 50 | 22.4 | 99 | 50 |
| 4 | 24.1 | 50 | 22.8 | 95 | 50 | 23.4 | 97 | 50 | 23.6 | 98 | 50 |
| 5 | 25.5 | 50 | 24.2 | 95 | 50 | 24.6 | 97 | 50 | 24.5 | 96 | 50 |
| 6 | 27.2 | 50 | 26.3 | 97 | 50 | 26.9 | 99 | 50 | 26.7 | 98 | 50 |
| 7 | 28.8 | 50 | 27.3 | 95 | 50 | 28.0 | 97 | 50 | 28.0 | 97 | 50 |
| 8 | 29.6 | 50 | 27.4 | 93 | 50 | 28.6 | 97 | 49 | 28.9 | 98 | 50 |
| 9 | 30.8 | 50 | 28.9 | 94 | 50 | 29.7 | 96 | 49 | 30.1 | 98 | 50 |
| 10 | 32.6 | 50 | 30.1 | 92 | 50 | 31.3 | 96 | 49 | 30.9 | 95 | 50 |
| 11 | 33.5 | 50 | 31.4 | 94 | 50 | 32.5 | 97 | 49 | 32.9 | 98 | 50 |
| 12 | 33.9 | 49 | 32.0 | 94 | 50 | 33.6 | 99 | 49 | 33.8 | 100 | 49 |
| 13 | 34.6 | 49 | 32.6 | 94 | 50 | 34.2 | 99 | 49 | 35.1 | 101 | 49 |
| 17 | 37.6 | 49 | 35.8 | 95 | 50 | 37.1 | 99 | 48 | 37.4 | 100 | 49 |
| 21 | 40.7 | 49 | 39.1 | 96 | 50 | 40.7 | 100 | 48 | 40.6 | 100 | 49 |
| 25 | 44.0 | 49 | 42.2 | 96 | 50 | 43.6 | 99 | 48 | 44.1 | 100 | 48 |
| 29 | 45.7 | 49 | 44.1 | 97 | 50 | 45.3 | 99 | 48 | 45.7 | 100 | 48 |
| 33 | 47.4 | 49 | 45.1 | 95 | 50 | 46.5 | 98 | 48 | 46.4 | 98 | 48 |
| 37 | 50.0 | 49 | 47.6 | 95 | 50 | 49.5 | 99 | 48 | 49.0 | 98 | 47 |
| 41 | 51.1 | 48 | 48.9 | 96 | 50 | 50.8 | 99 | 48 | 49.8 | 98 | 46 |
| 45 | 53.0 | 48 | 50.9 | 96 | 50 | 52.8 | 100 | 48 | 52.4 | 99 | 46 |
| 49 | 53.3 | 48 | 52.0 | 98 | 50 | 53.9 | 101 | 48 | 52.8 | 99 | 46 |
| 53 | 54.4 | 48 | 52.7 | 97 | 50 | 55.3 | 102 | 48 | 54.4 | 100 | 46 |
| 57 | 54.7 | 48 | 53.5 | 98 | 50 | 55.9 | 102 | 48 | 55.2 | 101 | 46 |
| 61 | 55.8 | 48 | 54.9 | 98 | 50 | 58.2 | 104 | 47 | 56.7 | 102 | 46 |
| 65 | 57.4 | 48 | 55.6 | 97 | 50 | 59.4 | 104 | 47 | 58.6 | 102 | 46 |
| 69 | 59.1 | 47 | 57.4 | 97 | 48 | 60.5 | 102 | 47 | 59.0 | 100 | 45 |
| 73 | 58.7 | 47 | 57.8 | 99 | 48 | 61.1 | 104 | 47 | 60.3 | 103 | 45 |
| 77 | 59.3 | 47 | 58.1 | 98 | 48 | 61.2 | 103 | 47 | 60.7 | 102 | 44 |
| 81 | 59.5 | 47 | 59.3 | 100 | 47 | 62.9 | 106 | 45 | 61.2 | 103 | 44 |
| 85 | 60.1 | 46 | 59.8 | 100 | 45 | 62.4 | 104 | 45 | 61.0 | 102 | 43 |
| 89 | 59.8 | 45 | 59.5 | 100 | 44 | 61.0 | 102 | 45 | 59.5 | 100 | 41 |
| 93 | 57.6 | 45 | 58.6 | 102 | 44 | 60.8 | 106 | 43 | 59.7 | 104 | 39 |
| 97 | 56.2 | 42 | 58.9 | 105 | 40 | 61.7 | 110 | 38 | 59.7 | 106 | 37 |
| 101 | 54.2 | 38 | 57.6 | 106 | 38 | 59.6 | 110 | 36 | 58.6 | 108 | 34 |
| **Mean for weeks** | | | | | | | | | | | |
| 1-13 | 28.1 | | 26.6 | 95 | | 27.4 | 98 | | 27.6 | 98 | |
| 14-52 | 47.0 | | 45.1 | 96 | | 46.7 | 99 | | 46.5 | 99 | |
| 53-101 | 57.4 | | 57.2 | 100 | | 60.0 | 105 | | 58.8 | 102 | |

### *Pathology and Statistical Analyses*

This section describes the statistically significant or biologically noteworthy changes in the incidences of neoplasms of the liver. Summaries of the incidences of neoplasms and nonneoplastic lesions, individual animal tumor diagnoses, statistical analyses of primary neoplasms that occurred with an incidence of at least 5% in at least one animal group, and historical incidences for the neoplasms mentioned in this section are presented in Appendix C for male mice and Appendix D for female mice.

There were no significant increases or decreases in the incidences of neoplasms or nonneoplastic lesions that were attributed to administration of 1-chloro-2-propanol in drinking water for 2 years.

*Liver:* There were high incidences of hepatocellular adenoma, hepatocellular carcinoma, or hepatoblastoma (combined) in all groups of male and female mice (males: 0 ppm, 40/50; 250 ppm, 39/50; 500 ppm, 37/50; 1,000 ppm, 36/50; females: 41/50, 41/50, 43/50, 42/50; Tables C3 and D3). The incidence of these combined lesions in the female control group (82%) was at the upper limit of the historical control range for drinking water studies (32% to 82%; Table D4).

## GENETIC TOXICOLOGY

1-Chloro-2-propanol is genotoxic *in vitro*. It was tested for mutation induction in *Salmonella typhimurium* in three studies at two laboratories, and all test responses were similar (Table E1; Zeiger *et al.*, 1987). In strain TA100, equivocal responses were obtained in the absence of S9; with S9, equivocal or weakly positive mutagenic activity was seen. Clearly positive, reproducible responses were seen across laboratories with strain TA1535, with and without S9. No mutagenic activity was detected with strain TA97, TA98, or TA1537, with or without S9.

1-Chloro-2-propanol induced marked increases in sister chromatid exchanges (Table E2) and chromosomal aberrations (Table E3) in cultured Chinese hamster ovary cells, with and without S9. Cell cycle delay was induced in cultures treated with concentrations of 1,700 µg/mL 1-chloro-2-propanol and greater; to obtain sufficient cells for scoring, incubation time was extended to up to 34 hours in the sister chromatid exchange test. Experimental design normally calls for no more than 33 hours exposure to BrdU, but, because increases in sister chromatid exchange frequencies were also seen at standard harvest times, in the absence of S9, the delayed harvest results were accepted as confirmatory of the results seen in Trial 1. In the sister chromatid exchange test with S9, the only concentration that produced a significant increase in sister chromatid exchanges was the 1,700 µg/mL dose, which employed a culture time of 33.5 hours. However, because the response was so strong, it was accepted that even if BrdU exposure contributed to some extent to the induction of sister chromatid exchanges, much of the increase was due to exposure to 1-chloro-2-propanol. This trial was not repeated because it was apparent from the combined results of the three trials that 1-chloro-2-propanol induced sister chromatid exchanges in cultured Chinese hamster ovary cells. In the cultured Chinese hamster ovary cell chromosomal aberrations test with 1-chloro-2-propanol, fewer than the usual 200 cells per concentration were scored because a marked increase in aberrations as well as in the percentage of cells with aberrations was observed.

The chromosomal effects seen *in vitro* were not apparent in the *in vivo* studies, but induction of gene mutations was observed. Positive results were obtained in the *Drosophila melanogaster* test for induction of sex-linked recessive lethal mutations in germ cells of male flies administered 1-chloro-2-propanol via injection (Table E4; Foureman *et al.*, 1994). However, a subsequent test for induction of reciprocal chromosomal translocations in germ cells of male *D. melanogaster* yielded negative results (Table E5; Foureman *et al.*, 1994). Additional negative results were obtained for chromosomal effects in mice. No induction of micronucleated erythrocytes was observed in peripheral blood of male or female mice administered 1-chloro-2-propanol in drinking water for 14 weeks (Table E6).

## CONTINUOUS BREEDING STUDY IN SPRAGUE-DAWLEY RATS

The complete methods and results of the continuous breeding study are presented in Appendix F. Exposure to 1-chloro-2-propanol did not cause significant

reproductive toxicity in rats. All exposed and control pairs except one 300 ppm pair were fertile; all pairs exposed to 1,300 ppm delivered five litters. The average numbers of litters per pair of all exposed groups were similar to that of the controls. The cumulative number of days to litter for the 1,300 ppm group was slightly but significantly greater than that of the controls for litter 5. At delivery of each litter, the mean body weights of dams in the 650 ppm group (except for the second litter) and the 1,300 ppm group were significantly less than those of the controls. Mean body weights of litter 5 dams in the 650 ppm group were significantly less than those of the controls from lactation days 0 to 14, and the mean body weights of dams in the 1,300 ppm group were significantly less than those of the controls throughout lactation.

The survival of the final litters of exposed $F_1$ pups was similar to that of the controls throughout lactation. Male and female $F_1$ pup weights were significantly less than those of the controls in the 1,300 ppm group on days 7, 14, and 21 and in the 650 ppm group on days 14 and 21.

During the offspring assessment phase of the continuous breeding study, the mean body weight of dams in the 1,300 ppm group at delivery was significantly less than that of the controls. Exposure to 1,300 ppm did not affect the number of live pups per litter, the sex ratio, or pup or organ weights. The percentage of abnormal sperm was significantly greater in 1,300 ppm male rats than in the controls. There were no significant differences in estrous cycle parameters between control and 1,300 ppm females.

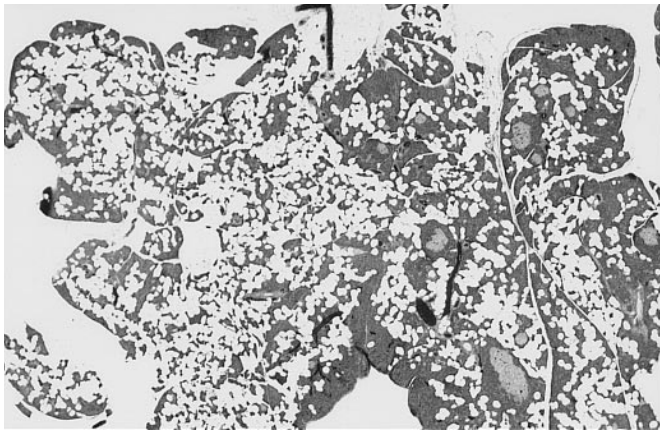


**PLATE 1**

Pancreas from a male F344 rat exposed to 3,300 ppm 1-chloro-2-propanol in drinking water for 90 days. Note the diffuse vacuolated appearance of the pancreas compared to a normal pancreas in Plate 2. H&E; 13 ×

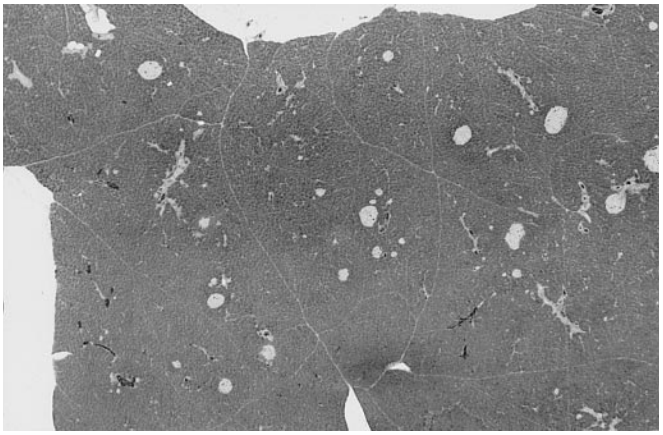


**PLATE 2**

Pancreas from a control F344 rat at the same magnification as Plate 1. H&E; 13 ×

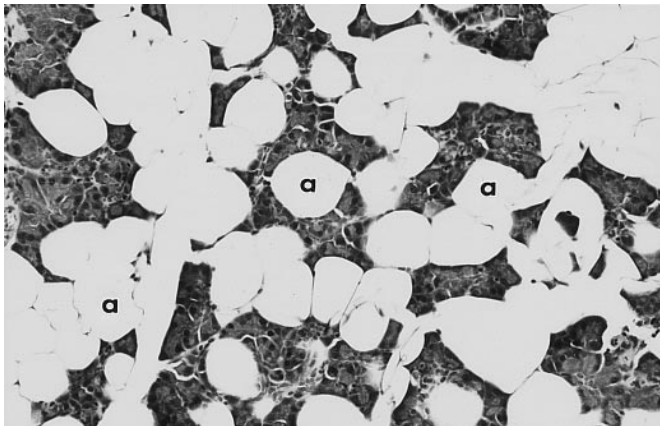



**PLATE 3**

Pancreas from a male F344 rat exposed to 3,300 ppm 1-chloro-2-propanol in drinking water for 90 days. Higher magnification of Plate 1 showing the large adiposytes (a) and interspersed residual exocrine pancreatic tissue. H&E; 125 ×

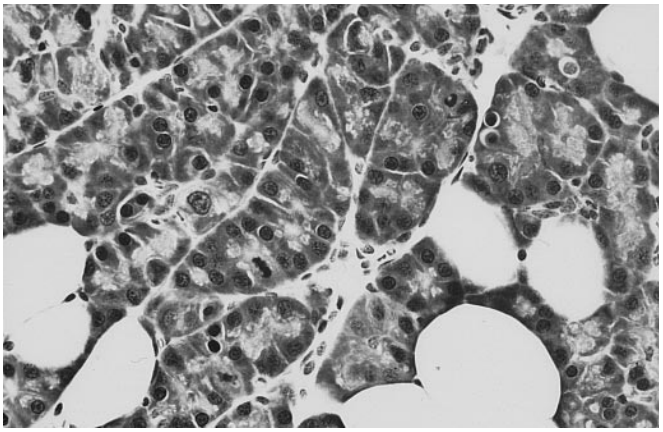


**PLATE 4**

Pancreas from a male F344 rat exposed to 3,300 ppm 1-chloro-2-propanol in drinking water for 90 days. Zymogen granules are lacking in the apical region of the acinar cells, compared with a normal pancreas in Plate 5. H&E; 250 ×

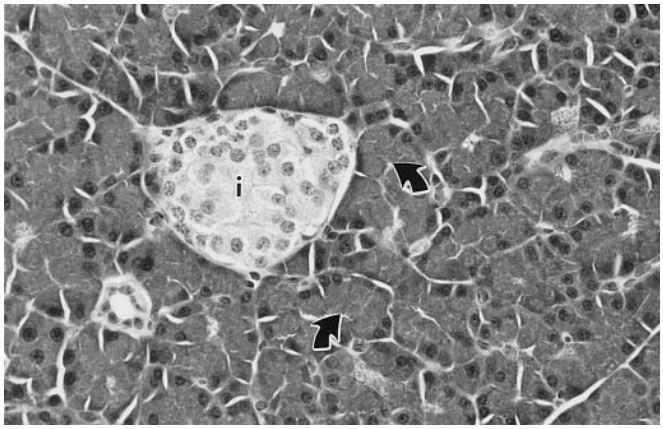



**PLATE 5**

Pancreas from a control male F344 rat. The pancreas is normal; note the abundant zymogen granules in the apical region of the acinar cells (arrows). The structure in the center is an islet (I). H&E; 250 ×

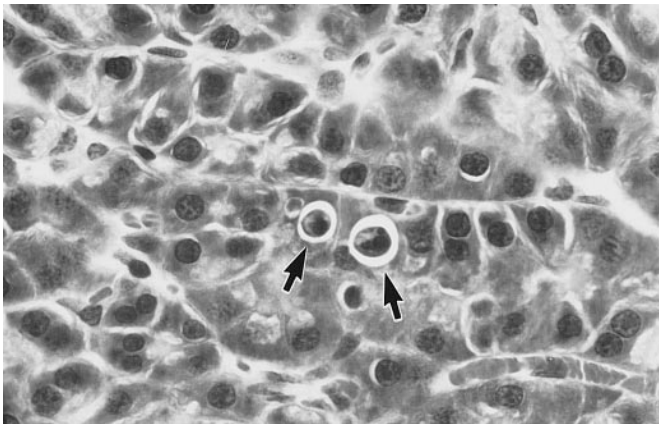


**PLATE 6**

Pancreas from a male F344 rat exposed to 3,300 ppm 1-chloro-2-propanol in drinking water for 90 days. Note the cellular debris (apoptosis) which appears to be within acinar cells (arrows). H&E; 500 ×

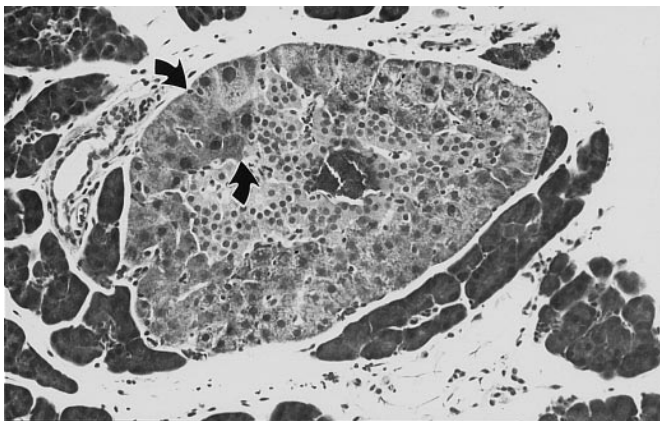


**PLATE 7**

Pancreas from a female F344 rat exposed to 3,300 ppm 1-chloro-2-propanol in drinking water for 90 days. Note the large polygonal cells (hepatocyte metaplasia) at the border of the pancreatic islet (between arrows); compare to the centrally located smaller, normal islet cells. H&E; 125 ×

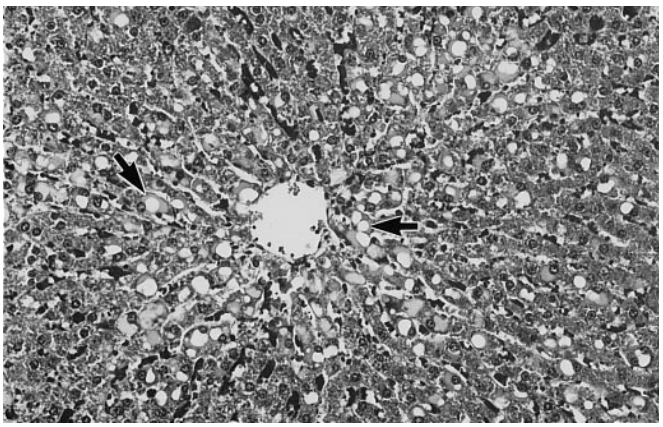


**PLATE 8**

Liver from a male F344 rat exposed to 3,300 ppm 1-chloro-2-propanol in drinking water for 90 days. Vacuoles (arrows) are present within hepatocytes in the centrilobular region of the liver. H&E; 125 ×

# DISCUSSION AND CONCLUSIONS

The NTP conducted toxicology and carcinogenesis studies of technical grade 1-chloro-2-propanol (75% to 76% 1-chloro-2-propanol and 24% to 25% 2-chloro-1-propanol; also known as chlorohydrins). The National Cancer Institute nominated 1-chloro-2-propanol for study because of the potential for human exposure to chlorohydrins that are formed as a by-product of sterilization of various foods fumigated with ethylene oxide or propylene oxide. Such fumigation may be used for sterilizing foodstuffs including spices, cocoa, flour, dried egg powder, desiccated coconut, dried fruits, and dehydrated vegetables (Wesley *et al.*, 1965; Ragelis *et al.*, 1966; Fishbein, 1969).

In the 14-day studies, rats and mice received 1-chloro-2-propanol in drinking water at concentrations of 0, 100, 330, 1,000, 3,300, or 10,000 ppm. Two female rats and one male mouse in the 10,000 ppm groups died before the end of the studies. Minimal to mild lesions of the exocrine pancreas were observed in the 3,300 and 10,000 ppm male and female groups of rats and mice. Atrophy and/or hematopoiesis of the bone marrow and spleen occurred in 3,300 and 10,000 ppm male and female rats. A minimal to mild hepatocellular vacuolization of the liver in 1,000, 3,300, and 10,000 ppm male and female mice and atrophy of the spleen in 10,000 ppm male and female mice were observed.

In the 14-week studies, rats and mice received 0, 33, 100, 330, 1,000 or 3,300 ppm 1-chloro-2-propanol in drinking water. No treatment-related effects on survival occurred. The exocrine pancreatic lesions observed in the 14-day studies were also observed in the 14-week studies; however, the lesions were more severe and occurred in 1,000 and 3,300 ppm male and female rats and in 3,300 ppm male and female mice. In general, pancreatic islets (endocrine pancreas) remained intact; however, metaplasia (hepatocytic) was observed in a few islets in five of ten 3,300 ppm female rats. Within the peripheral region of affected islets, there was a variably thick band of large polygonal cells with abundant eosinophilic cytoplasm which resembled hepatocytes (Plate 7). In other studies, these cells have been shown to have characteristics of hepatocytes, not of exocrine or endocrine pancreatic cells. These "pancreatic hepatocytes" may occur spontaneously and increases have been observed with administration of some chemicals/agents (McDonald and Boorman, 1989). In many instances, increased incidences have been associated with pancreatic atrophy and fibrosis.

Rodent acinar cells are sensitive to the toxic effects of a wide variety of chemicals and also to viruses, nutritional deficit, and trauma (Angiolelli and Rio, 1972; Lansdown, 1976; Longnecker, 1982; Rao *et al.*, 1987). Acute pancreatitis can be caused by direct injury of acinar cells, resulting in necrosis and release of enzymes into the interstitium, which causes injury to adjacent acinar cells. The acinar cells of the pancreas comprise approximately 85% of the pancreas volume. These cells synthesize and store digestive proenzymes packaged into zymogen granules, and this elaborate intercellular compartmentation of enzymes protects the cell from destruction by its own enzymes (deoxyribonuclease, ribonuclease, lipase, amylase, etc.) (Longnecker, 1982). Ingestion of food "activates" the zymogen granules into the duct system, where the enzymes mix with water and bicarbonate ions, and this pancreatic juice is released into the duodenoma.

The exposure concentrations for the 2-year studies were set just below the concentrations that were known to induce exocrine pancreas lesions in the 14-day and 14-week studies. The severity of the exocrine pancreatic lesions progressed when treatment was lengthened from 14 days to 14 weeks, and it was thought that the severities of these lesions would continue to progress during the 2-year studies; therefore, exposure concentrations at which these lesions occurred would not be suitable for the 2-year studies. When enzyme secretion from the pancreas is reduced more than 10% by necrosis, clinical evidence of malabsorption develops (Longnecker, 1982).

In the 2-year rat study, animals received 0, 150, 325, or 650 ppm 1-chloro-2-propanol in drinking water (equivalent to average daily doses of approximately 15, 30, or 65 mg/kg to males and females during the first several months of the study and 8, 17, or 34 mg/kg for the remainder of the 2-year study). In the 2-year mouse study, animals received exposure concentrations of 0, 250, 500 or 1,000 ppm in drinking water (equivalent to average daily doses of approximately 45, 75, or 150 mg/kg to males and 60, 105, or 210 mg/kg to females during the first several months of the study and 25, 50, or 100 mg/kg for the remainder of the study). There were no treatment-related effects on survival or body weights and no treatment-related neoplasms or nonneoplastic lesions.

Inflammatory pancreatic responses occur in humans and may be due to a variety of causes (e.g., alcohol, gall stones, etc.) (Mack *et al.*, 1986; Steinberg and Tenner, 1994; Steer *et al.*, 1995), but this syndrome did not occur with 1-chloro-2-propanol at the time points evaluated, although there was significant loss of exocrine pancreatic tissue and replacement by mature adipocytes. In the 1-chloro-2-propanol studies, the pancreatic changes were suggestive of a mild insult rather than acute pancreatitis in which the released enzymes and necrotic debris incite an acute inflammation and pancreatitis. With chemicals that cause a subtle insult, the only histologic evidence of injury may be autophagic vacuoles and/or apoptotic bodies and little to no inflammatory response. In these studies, acinar cells containing minimal zymogen granules and autophagic vacuoles and/or apoptotic bodies were commonly observed.

In 13-week NTP studies of another chlorohydrin, ethylene chlorohydrin (NTP, 1985b), exocrine pancreatic lesions were also observed in rats and mice. The pancreatic lesions were composed of minimal to mild vacuolar changes within acinar cells and an apparent reduction of zymogen granules. The extensive fatty change and acinar cell degeneration seen in the 1-chloro-2-propanol studies did not occur.

Several studies have been conducted to characterize the putative preneoplastic pancreatic lesions in rodents following exposure to pancreatic carcinogens. With azaserine, a pancreatic carcinogen in rats, a small proportion of acidophilic foci and/or focal acinar cell hyperplasia is thought to progress to adenocarcinoma in lifetime studies (Longnecker *et al.*, 1984; Roebuck *et al.*, 1987; Longnecker and Millar, 1990). The acinar cell is considered to be the cell of origin for pancreatic exocrine tumors in rats. In general, tumors of the exocrine pancreas are more frequent in male rats than in female rats (Longnecker and Millar, 1990). Acidophilic foci (or acinar cell hyperplasia) were not observed in rats or mice in the 14-week studies of 1-chloro-2-propanol, and the lesions observed in the 14-week studies did not occur in the 2-year studies.

The following chemicals studied by the NTP have been found to cause some or clear evidence of causing pancreatic neoplasms [exocrine tumors (acinar cell adenoma/adenocarcinoma)] in the rat, most often in males: nitrofen (NCI, 1978), cinnamyl anthranilate (NCI, 1980), commercial grade 2,4 (80%)- and 2,6 (20%)-toluene diisocyanate (NTP, 1986), chlorendic acid (NTP, 1987a), 2-amino-5-nitrophenol (NTP, 1988a), 2-mercaptobenzothiazole (NTP, 1988b), dichlorvos (NTP, 1989), and 1,2,3-trichloropropane (NTP, 1993). In the NTP historical database there are no chemicals reported to cause pancreatic neoplasms in mice. Other chemicals, particularly N-nitroso compounds, have been reported to cause pancreatic neoplasms in rats (Longnecker *et al.*, 1984). The NTP has found increased incidences of focal acinar hyperplasia and acinar adenoma in male rats administered corn oil by gavage for 2 years as compared to male rats not administered corn oil (Eustis and Boorman, 1985).

With these pancreatic carcinogens studied by the NTP, with corn oil, and with azaserine and other rodent pancreatic carcinogens, increased preneoplastic acinar cell hyperplasia may occur at various time points after treatment. In the studies of pancreatic carcinogens by the NTP, acinar cell hyperplasia was often observed at the end of the 2-year studies. No lesions of the exocrine pancreas similar to those observed at 13 weeks in the current study were seen in NTP studies of chemicals that caused pancreatic neoplasms. In the 1-chloro-2-propanol rat studies, acinar cell hyperplasia occurred in three males in the 650 ppm group, but there was no evidence of a neoplasm response. While there is no established database for nonneoplastic pancreatic lesions, the incidence of pancreatic hyperplasia in untreated male F344/N rats from 17 NTP feed studies was 2.6%, with a range of 0% to 10% (Eustis and Boorman, 1985). This minimal incidence of pancreatic hyperplasia was not considered to be related to chemical administration.

In the United States, carcinoma of the exocrine pancreas ranks fifth among all cancers and is the fourth leading cause of cancer deaths (Benson and Teta, 1993). The etiology of pancreatic carcinoma is not known, although some studies have shown an association between smoking and pancreatic cancer (Mack *et al.*, 1986). It would be of interest to study the progression of pancreatic lesions seen in the 14-day and 14-week studies of 1-chloro-2-propanol. That pancreatic cancer is rising in incidence suggests that environmental factors may play a role in this disease (Longnecker, 1982; Longnecker and Millar, 1990). The incidence of pancreatic cancer is low in the Japanese population, but Japanese who have migrated to the United States have a higher incidence of pancreatic cancer, which supports the hypothesis that environmental factors play a role in the etiology of this cancer (Longnecker, 1982).

In the workplace (at a chlorohydrin plant in South Carolina), where chlorohydrins are one of several chemicals to which exposures are possible, there is evidence for increased mortality from pancreatic cancer (type of pancreatic cancer not specified) and lymphocytic leukemia (Greenberg *et al.*, 1990; Benson and Teta, 1993). Studies of other chlorohydrin production facilities in Louisiana and Texas did not find any association between work in the plant and an increase in pancreatic cancer incidences (Olsen *et al.*, 1997), although the duration of follow-up was 25 years versus 36 years in the studies of the South Carolina workers. In addition, other differences in the plant processes were noted (e.g., closed facility versus open facility at the South Carolina plant). Other epidemiological studies have implicated short-chain hydrocarbons in the occurrence of pancreatic cancer (Benson and Teta, 1993).

1-Chloro-2-propanol (technical grade) was weakly mutagenic in *Salmonella typhimurium* with and without metabolic activation in strains TA100 and TA1535 but not in strain TA97, TA98, or TA1537 (the strains that revert via frameshift mutation) (Carr and Rosenkranz, 1978; Pfeiffer and Dunkelberg, 1980; Zeiger *et al.*, 1987). In addition, 1-chloro-2-propanol was positive in the mouse lymphoma assay and induced significant chromosomal aberrations consisting mainly of chromatid breaks in rat bone marrow cells at doses of 10, 31, or 100 mg/kg per day (Biles and Piper, 1983). In general, these mutagenicity studies used the same technical grade 1-chloro-2-propanol as was used in the 14-day, 14-week, and 2-year studies. Assay systems are available to detect damage to the DNA in pancreatic acinar cells (Curphey *et al.*, 1987), and testing chlorinated hydrocarbons in these assay systems may be warranted.

In the 14-week studies, sperm morphology results showed a greater percentage of abnormal sperm and lower cauda epididymis and epididymis weights in 3,300 ppm male rats than those in the controls. In mice, there was no effect on sperm morphology or concentration, although there was a significantly lower epididymis weight in 3,300 ppm males than in the controls. This effect may have been related in part to body weights lower than those of the controls. However, to more completely examine the potential of 1-chloro-2-propanol to affect fertility, a rat continuous breeding study was conducted according to an NTP study design (Gulati *et al.*, 1991). Morrissey *et al.* (1989) and Chapin *et al.* (1997) have found that the organ weight change that best correlates with reduced fertility is reduced epididymal weight.

In the NTP CD BR outbred Sprague-Dawley albino rat continuous breeding study, 1-chloro-2-propanol did not affect fertility or reproduction when given in the drinking water at exposure concentrations of 300, 650, or 1,300 ppm. The percentage of abnormal sperm was significantly greater in 1,300 ppm $F_1$ rats than in the controls. Therefore, in these follow-up rat continuous breeding studies, which used a study design sensitive to small changes (8%) in fertility, there were no changes in fertility after exposure to 1-chloro-2-propanol.

## CONCLUSIONS

Under the conditions of these 2-year drinking water studies, there was *no evidence of carcinogenic activity** of technical grade 1-chloro-2-propanol in male or female F344/N rats exposed to 150, 325, or 650 ppm. There was *no evidence of carcinogenic activity* of technical grade 1-chloro-2-propanol in male or female B6C3F$_1$ mice exposed to 250, 500, or 1,000 ppm.

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* Explanation of Levels of Evidence of Carcinogenic Activity is on page 9. A summary of the Technical Reports Review Subcommittee comments and the public discussion on this Technical Report appears on page 11.

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# APPENDIX A
# SUMMARY OF LESIONS IN MALE RATS IN THE 2-YEAR DRINKING WATER STUDY OF 1-CHLORO-2-PROPANOL

**TABLE A1**
**Summary of the Incidence of Neoplasms in Male Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**[a]

| | 0 ppm | 150 ppm | 325 ppm | 650 ppm |
|---|---|---|---|---|
| **Disposition Summary** | | | | |
| Animals initially in study | 50 | 50 | 50 | 50 |
| Early deaths | | | | |
| Moribund | 12 | 13 | 7 | 10 |
| Natural deaths | 18 | 14 | 19 | 17 |
| Survivors | | | | |
| Died last week of study | 1 | | | |
| Terminal sacrifice | 19 | 23 | 24 | 23 |
| Animals examined microscopically | 50 | 50 | 50 | 50 |
| **Alimentary System** | | | | |
| Esophagus | (50) | (50) | (50) | (50) |
| Squamous cell carcinoma | 1 (2%) | | | |
| Intestine large, colon | (46) | (46) | (48) | (47) |
| Squamous cell carcinoma, metastatic, skin | | 1 (2%) | | |
| Intestine large, cecum | (45) | (46) | (45) | (44) |
| Intestine small, duodenum | (46) | (45) | (46) | (48) |
| Intestine small, jejunum | (39) | (42) | (41) | (42) |
| Intestine small, ileum | (39) | (41) | (41) | (43) |
| Liver | (50) | (50) | (50) | (50) |
| Hepatocellular carcinoma | | | 1 (2%) | 1 (2%) |
| Hepatocellular adenoma | 1 (2%) | 3 (6%) | 1 (2%) | 2 (4%) |
| Histiocytic sarcoma | | 1 (2%) | | 1 (2%) |
| Mesentery | (12) | (11) | (10) | (14) |
| Lipoma | | | | 1 (7%) |
| Oral mucosa | (2) | | | |
| Squamous cell papilloma | 1 (50%) | | | |
| Pancreas | (48) | (45) | (46) | (48) |
| Acinus, adenoma | 1 (2%) | 1 (2%) | 1 (2%) | 1 (2%) |
| Salivary glands | (50) | (50) | (49) | (50) |
| Histiocytic sarcoma | | | | 1 (2%) |
| Stomach, forestomach | (50) | (49) | (48) | (49) |
| Stomach, glandular | (50) | (49) | (48) | (50) |
| **Cardiovascular System** | | | | |
| Blood vessel | (48) | (50) | (50) | (50) |
| Heart | (50) | (50) | (50) | (50) |
| **Endocrine System** | | | | |
| Adrenal cortex | (50) | (49) | (49) | (50) |
| Carcinoma | | 1 (2%) | | |
| Adrenal medulla | (50) | (49) | (49) | (50) |
| Pheochromocytoma malignant | 1 (2%) | | 1 (2%) | 2 (4%) |
| Pheochromocytoma benign | 7 (14%) | 13 (27%) | 13 (27%) | 11 (22%) |
| Bilateral, pheochromocytoma benign | 6 (12%) | 1 (2%) | 4 (8%) | 1 (2%) |
| Islets, pancreatic | (49) | (45) | (46) | (47) |
| Adenoma | 2 (4%) | 1 (2%) | 2 (4%) | 3 (6%) |
| Carcinoma | | | | 1 (2%) |
| Pituitary gland | (48) | (49) | (49) | (50) |
| Pars distalis, adenoma | 15 (31%) | 20 (41%) | 25 (51%) | 24 (48%) |

**TABLE A1**
**Summary of the Incidence of Neoplasms in Male Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 150 ppm | 325 ppm | 650 ppm |
|---|---|---|---|---|
| **Endocrine System** (continued) | | | | |
| Thyroid gland | (50) | (50) | (50) | (50) |
| C-cell, adenoma | 5 (10%) | 1 (2%) | 6 (12%) | 3 (6%) |
| C-cell, carcinoma | | 2 (4%) | | 1 (2%) |
| Follicular cell, adenoma | 1 (2%) | | | 1 (2%) |
| **General Body System** | | | | |
| Peritoneum | (3) | | | (1) |
| **Genital System** | | | | |
| Epididymis | (50) | (49) | (50) | (50) |
| Preputial gland | (50) | (50) | (50) | (49) |
| Adenoma | 1 (2%) | 1 (2%) | 2 (4%) | 2 (4%) |
| Carcinoma | 1 (2%) | 4 (8%) | 4 (8%) | 3 (6%) |
| Bilateral, carcinoma | | | 1 (2%) | |
| Prostate | (50) | (50) | (50) | (50) |
| Adenoma | 1 (2%) | | | |
| Seminal vesicle | (50) | (50) | (50) | (50) |
| Testes | (50) | (49) | (50) | (50) |
| Bilateral, interstitial cell, adenoma | 36 (72%) | 32 (65%) | 31 (62%) | 34 (68%) |
| Interstitial cell, adenoma | 10 (20%) | 11 (22%) | 9 (18%) | 12 (24%) |
| **Hematopoietic System** | | | | |
| Bone marrow | (47) | (45) | (47) | (49) |
| Lymph node | (24) | (23) | (23) | (24) |
| Iliac, squamous cell carcinoma, metastatic, skin | | 1 (4%) | | |
| Lymph node, mandibular | (50) | (50) | (50) | (50) |
| Carcinoma, metastatic, Zymbal's gland | | 1 (2%) | | |
| Histiocytic sarcoma | | | | 1 (2%) |
| Squamous cell carcinoma, metastatic, uncertain primary site | 1 (2%) | | | |
| Lymph node, mesenteric | (49) | (50) | (50) | (50) |
| Spleen | (50) | (50) | (50) | (50) |
| Thymus | (49) | (47) | (48) | (47) |
| Thymoma benign | | 1 (2%) | | |
| **Integumentary System** | | | | |
| Mammary gland | (50) | (45) | (48) | (47) |
| Fibroadenoma | 7 (14%) | | 5 (10%) | 6 (13%) |
| Fibroadenoma, multiple | | | 1 (2%) | |

**TABLE A1**
**Summary of the Incidence of Neoplasms in Male Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 150 ppm | 325 ppm | 650 ppm |
|---|---|---|---|---|
| **Integumentary System** (continued) | | | | |
| Skin | (50) | (50) | (50) | (50) |
| Basal cell carcinoma | 1 (2%) | | | |
| Keratoacanthoma | 2 (4%) | 3 (6%) | 3 (6%) | 6 (12%) |
| Keratoacanthoma, multiple | | 1 (2%) | | |
| Squamous cell carcinoma, multiple | | 1 (2%) | | |
| Squamous cell papilloma | | | | 1 (2%) |
| Trichoepithelioma | | 1 (2%) | | |
| Subcutaneous tissue, fibroma | 3 (6%) | 8 (16%) | 7 (14%) | 6 (12%) |
| Subcutaneous tissue, fibrosarcoma | | 1 (2%) | | 1 (2%) |
| Subcutaneous tissue, histiocytic sarcoma | | 1 (2%) | | |
| Subcutaneous tissue, lipoma | | | | 1 (2%) |
| Subcutaneous tissue, melanoma malignant | | 1 (2%) | | |
| Subcutaneous tissue, sarcoma | 1 (2%) | | | |
| **Musculoskeletal System** | | | | |
| Bone | (50) | (50) | (50) | (50) |
| Osteosarcoma | | | | 1 (2%) |
| Vertebra, osteosarcoma | 1 (2%) | | | |
| Skeletal muscle | (2) | | | (1) |
| Histiocytic sarcoma | | | | 1 (100%) |
| **Nervous System** | | | | |
| Brain | (50) | (50) | (50) | (50) |
| Carcinoma, metastatic, Zymbal's gland | | 1 (2%) | | |
| **Respiratory System** | | | | |
| Lung | (50) | (50) | (50) | (50) |
| Alveolar/bronchiolar adenoma | | 2 (4%) | 1 (2%) | |
| Alveolar/bronchiolar carcinoma | | | 2 (4%) | 1 (2%) |
| Carcinoma, metastatic, uncertain primary site | 1 (2%) | | | |
| Hepatocellular carcinoma, metastatic, liver | | | | 1 (2%) |
| Osteosarcoma, metastatic, bone | 1 (2%) | | | |
| Osteosarcoma, metastatic, uncertain primary site | | 1 (2%) | | |
| Nose | (50) | (47) | (49) | (50) |
| Histiocytic sarcoma | | | | 1 (2%) |
| Respiratory epithelium, adenoma | | 1 (2%) | | |
| **Special Senses System** | | | | |
| Harderian gland | | | | (1) |
| Histiocytic sarcoma | | | | 1 (100%) |
| Zymbal's gland | (1) | (3) | (3) | |
| Carcinoma | 1 (100%) | 3 (100%) | 3 (100%) | |
| **Urinary System** | | | | |
| Kidney | (50) | (49) | (49) | (50) |
| Renal tubule, adenoma | | | 1 (2%) | 1 (2%) |
| Renal tubule, carcinoma | | | 1 (2%) | |
| Urinary bladder | (48) | (50) | (49) | (49) |

**TABLE A1**
**Summary of the Incidence of Neoplasms in Male Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 150 ppm | 325 ppm | 650 ppm |
|---|---|---|---|---|
| **Systemic Lesions** | | | | |
| Multiple organs[b] | (50) | (50) | (50) | (50) |
| Histiocytic sarcoma | | 1 (2%) | | 1 (2%) |
| Leukemia mononuclear | 32 (64%) | 33 (66%) | 30 (60%) | 31 (62%) |
| Mesothelioma malignant | 3 (6%) | | 1 (2%) | 2 (4%) |
| **Neoplasm Summary** | | | | |
| Total animals with primary neoplasms[c] | 48 | 50 | 50 | 50 |
| Total primary neoplasms | 141 | 148 | 156 | 161 |
| Total animals with benign neoplasms | 48 | 48 | 48 | 50 |
| Total benign neoplasms | 99 | 101 | 112 | 116 |
| Total animals with malignant neoplasms | 39 | 38 | 37 | 37 |
| Total malignant neoplasms | 42 | 47 | 44 | 45 |
| Total animals with metastatic neoplasms | 3 | 4 | | 1 |
| Total metastatic neoplasms | 3 | 5 | | 1 |
| Total animals with malignant neoplasms of uncertain primary site | 2 | 1 | | |

[a] Number of animals examined microscopically at the site and the number of animals with neoplasm
[b] Number of animals with any tissue examined microscopically
[c] Primary neoplasms: all neoplasms except metastatic neoplasms

**TABLE A2**
**Individual Animal Tumor Pathology of Male Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 0 ppm**

| Number of Days on Study | 3 6 2 | 4 4 5 | 4 9 4 | 5 0 2 | 5 2 9 | 5 3 2 | 5 5 1 | 5 7 8 | 5 7 9 | 5 7 9 | 5 8 0 | 5 8 5 | 5 9 9 | 6 1 1 | 6 1 6 | 6 2 9 | 6 3 5 | 6 3 7 | 6 5 5 | 6 5 8 | 6 7 3 | 6 8 7 | 6 9 3 | 6 9 3 | 6 9 7 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 0 0 0 7 | 0 0 8 | 0 0 4 | 0 3 2 | 0 1 3 | 0 2 2 | 0 1 9 | 0 4 6 | 0 1 8 | 0 4 2 | 0 0 1 | 0 0 9 | 0 3 3 | 0 0 5 | 0 2 8 | 0 1 1 | 0 4 8 | 0 0 3 | 0 3 4 | 0 2 1 | 0 3 5 | 0 1 5 | 0 4 5 | 0 4 9 | 0 1 7 |
| **Alimentary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Esophagus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Squamous cell carcinoma | | | | | | | | | | | | | | | | X | | | | | | | | | |
| Intestine large, colon | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | A |
| Intestine large, rectum | + | + | + | + | + | + | + | A | A | A | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + |
| Intestine large, cecum | + | + | + | + | + | + | + | A | A | A | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + |
| Intestine small, duodenum | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | A | + | + | + | A | + | + | + | + |
| Intestine small, jejunum | + | + | + | + | + | + | + | A | A | A | A | + | + | + | + | + | A | + | + | A | A | + | A | + | A |
| Intestine small, ileum | M | + | + | + | + | + | + | A | + | A | A | + | + | + | + | + | A | + | + | A | A | A | A | + | + |
| Liver | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Hepatocellular adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mesentery | | | | | | | | + | | | | | | | | + | | | | | + | | | + | |
| Oral mucosa | | + | | | | | | | | + | | | | | | | | | | | | | | | |
| Squamous cell papilloma | | | | | | | | | | X | | | | | | | | | | | | | | | |
| Pancreas | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Acinus, adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Salivary glands | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Stomach, forestomach | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Stomach, glandular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Cardiovascular System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Blood vessel | + | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + |
| Heart | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Endocrine System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Adrenal cortex | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Adrenal medulla | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Pheochromocytoma malignant | | | | | | | | | | | | | | | | | | | | | | | | X | |
| Pheochromocytoma benign | | | | | | | | | | | X | | | | | | | | | X | | | | | |
| Bilateral, pheochromocytoma benign | | | | | | | | | | | | | | | | | | | | | | | | | |
| Islets, pancreatic | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Adenoma | | | | | | | | | | | | | | | | | | X | | | | | | | |
| Parathyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | M | + |
| Pituitary gland | + | + | + | + | M | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Pars distalis, adenoma | | | | X | | | | | | | | | X | X | | | | | | | X | | X | X | |
| Thyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| C-cell, adenoma | | | | | | X | | | | | | | | | | | | | | | | | | | |
| Follicular cell, adenoma | | | | | | | | | | | | | | | | | | | | | | | | X | |
| **General Body System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Peritoneum | | | | | | | | + | | | | | | | | | | | | | + | | | | |
| Tissue NOS | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Genital System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Epididymis | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Penis | | | + | | | | | | | | | | | | | | | | | | | | | | |
| Preputial gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Prostate | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |

+: Tissue examined microscopically
A: Autolysis precludes examination
M: Missing tissue
I: Insufficient tissue
X: Lesion present
Blank: Not examined

**TABLE A2**
**Individual Animal Tumor Pathology of Male Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 0 ppm**

| Number of Days on Study | 7 0 3 | 7 0 9 | 7 1 4 | 7 2 6 | 7 2 6 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 0 2 3 | 0 4 3 | 0 3 7 | 0 0 2 | 0 0 5 | 0 0 6 | 0 1 0 | 0 1 2 | 0 1 4 | 0 1 6 | 0 2 0 | 0 2 4 | 0 2 5 | 0 2 6 | 0 2 7 | 0 2 9 | 0 3 0 | 0 3 1 | 0 3 6 | 0 3 8 | 0 3 9 | 0 4 0 | 0 4 1 | 0 4 4 | 0 4 7 | Total Tissues/ Tumors |
| **Alimentary System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Esophagus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Squamous cell carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Intestine large, colon | + | M | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 46 |
| Intestine large, rectum | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 45 |
| Intestine large, cecum | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 45 |
| Intestine small, duodenum | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 46 |
| Intestine small, jejunum | + | + | A | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 39 |
| Intestine small, ileum | + | A | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 39 |
| Liver | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Hepatocellular adenoma | | | | | | | | | | | | | | | | | | | | | | | X | | | 1 |
| Mesentery | | + | | | + | | | | | + | | | + | | | | | | + | | + | | | + | + | 12 |
| Oral mucosa | | | | | | | | | | | | | | | | | | | | | | | | | | 2 |
| Squamous cell papilloma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Pancreas | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 48 |
| Acinus, adenoma | | | | | | | | | | | | | | X | | | | | | | | | | | | 1 |
| Salivary glands | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Stomach, forestomach | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Stomach, glandular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Cardiovascular System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Blood vessel | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 48 |
| Heart | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Endocrine System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Adrenal cortex | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Adrenal medulla | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Pheochromocytoma malignant | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Pheochromocytoma benign | X | | X | | | | | | | | | X | X | | | | | | | | | | | X | | 7 |
| Bilateral, pheochromocytoma benign | | | | | X | X | | | | | | | | X | X | X | | | X | | | | | | | 6 |
| Islets, pancreatic | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Adenoma | | | | X | | | | | | | | | | | | | | | | | | | | | | 2 |
| Parathyroid gland | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 48 |
| Pituitary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 48 |
| Pars distalis, adenoma | | | | X | X | | X | X | | | X | | | | | | | X | X | X | | | | X | | 15 |
| Thyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| C-cell, adenoma | | | | | | X | | X | | | X | | | | | | | | | | X | | | | | 5 |
| Follicular cell, adenoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **General Body System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Peritoneum | | | | | | | | | | | | | | | | | | | | | + | | | | | 3 |
| Tissue NOS | | | | | | | | | | | + | | | | | | | | | | | | | | | 1 |
| **Genital System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Epididymis | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Penis | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Preputial gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Adenoma | | X | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Carcinoma | | | | | | | | | X | | | | | | | | | | | | | | | | | 1 |
| Prostate | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Adenoma | | | | | | | | | | | X | | | | | | | | | | | | | | | 1 |

**TABLE A2**
**Individual Animal Tumor Pathology of Male Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 0 ppm**

| Number of Days on Study | 3 6 2 | 4 4 5 | 4 9 4 | 5 0 2 | 5 2 9 | 5 3 2 | 5 5 1 | 5 7 8 | 5 7 9 | 5 7 9 | 5 8 0 | 5 8 5 | 5 9 9 | 6 1 1 | 6 1 6 | 6 2 9 | 6 3 5 | 6 3 7 | 6 5 5 | 6 5 8 | 6 7 3 | 6 8 7 | 6 9 3 | 6 9 3 | 6 9 7 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 0 0 0 7 | 0 0 8 | 0 0 4 | 0 3 2 | 0 1 3 | 0 2 2 | 0 1 9 | 0 4 6 | 0 1 8 | 0 4 2 | 0 0 1 | 0 0 9 | 0 3 3 | 0 0 5 | 0 2 8 | 0 1 1 | 0 4 8 | 0 0 3 | 0 3 4 | 0 2 1 | 0 3 5 | 0 1 5 | 0 4 5 | 0 4 9 | 0 1 7 |
| **Genital System** (continued) | | | | | | | | | | | | | | | | | | | | | | | | | |
| Seminal vesicle | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Testes | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Bilateral, interstitial cell, adenoma | | | | | | | X | X | X | X | | | | | X | | X | X | X | X | X | X | X | | X |
| Interstitial cell, adenoma | | X | | | X | X | | | | | X | X | X | | | X | | | | | | | | X | |
| **Hematopoietic System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone marrow | + | + | + | + | + | + | + | A | + | + | A | + | + | + | + | + | A | + | + | + | + | + | + | + | + |
| Lymph node | | + | | | | + | | + | | | + | | | | | + | | + | + | + | + | + | + | + | + |
| Lymph node, mandibular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Squamous cell carcinoma, metastatic, uncertain primary site | | | | | | | | | | X | | | | | | | | | | | | | | | |
| Lymph node, mesenteric | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Spleen | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Thymus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | M |
| **Integumentary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Fibroadenoma | | | | | | | | | | | | X | | | | | | | | | | X | | | |
| Skin | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Basal cell carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Keratoacanthoma | | | | | | | | | | | | | | | | | | | | | | | | | X |
| Subcutaneous tissue, fibroma | | | | | | | | | | | | | | | | | X | | | | | X | | | |
| Subcutaneous tissue, sarcoma | | | | | | | | | | | | | | | | | | | | | | | X | | |
| **Musculoskeletal System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Vertebra, osteosarcoma | | | | | | X | | | | | | | | | | | | | | | | | | | |
| Skeletal muscle | | | | | | | | | | | | | | | | | | | | | + | | | | |
| **Nervous System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Peripheral nerve | | | + | | | + | | | | | | | | | | | | | | | | | | | |
| Spinal cord | | | + | | | + | | | | | | | | | | | | | | | | | | | |
| **Respiratory System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Carcinoma, metastatic, uncertain primary site | | | | | | | | | | | | | | | | | | | | | | | | | |
| Osteosarcoma, metastatic, bone | | | | | | X | | | | | | | | | | | | | | | | | | | |
| Nose | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Trachea | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Special Senses System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zymbal's gland | | | | | | | | | | | | | + | | | | | | | | | | | | |
| Carcinoma | | | | | | | | | | | | | X | | | | | | | | | | | | |
| **Urinary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kidney | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Urinary bladder | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Systemic Lesions** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Multiple organs | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Leukemia mononuclear | | X | | | | | | X | X | | X | | | | X | | X | X | X | X | | X | | X | X |
| Mesothelioma malignant | | | | | | | | | | | | | | | | | | | | | X | | | | |

**TABLE A2**
**Individual Animal Tumor Pathology of Male Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 0 ppm**

| **Number of Days on Study** | 7 0 3 | 7 0 9 | 7 1 4 | 7 2 6 | 7 2 6 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 0 2 3 | 0 4 3 | 0 3 7 | 0 0 2 | 0 0 5 | 0 0 6 | 0 1 0 | 0 1 2 | 0 1 4 | 0 1 6 | 0 2 0 | 0 2 4 | 0 2 5 | 0 2 6 | 0 2 7 | 0 2 9 | 0 3 0 | 0 3 1 | 0 3 6 | 0 3 8 | 0 3 9 | 0 4 0 | 0 4 1 | 0 4 4 | 0 4 7 | Total Tissues/ Tumors |
| **Genital System** (continued) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Seminal vesicle | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Testes | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Bilateral, interstitial cell, adenoma | X | X | X | X | | X | | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | 36 |
| Interstitial cell, adenoma | | | | | X | | X | | | | | | | | | | | | | | | | | | | 10 |
| Hematopoietic System | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone marrow | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 47 |
| Lymph node | + | + | | | + | + | | | | + | | | | | | | + | | + | | + | + | | + | + | 24 |
| Lymph node, mandibular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Squamous cell carcinoma, metastatic, uncertain primary site | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Lymph node, mesenteric | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Spleen | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Thymus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| **Integumentary System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Fibroadenoma | | | | | | X | | X | | X | | X | | | | | | | | | | | | | X | 7 |
| Skin | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Basal cell carcinoma | | | | | | | | | | | | | | | | | | X | | | | | | | | 1 |
| Keratoacanthoma | | | | | | | | | | | | | | | | | | | X | | | | | | | 2 |
| Subcutaneous tissue, fibroma | | | | | | | | | | | | | X | | | | | | | | | | | | | 3 |
| Subcutaneous tissue, sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Musculoskeletal System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Vertebra, osteosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Skeletal muscle | | + | | | | | | | | | | | | | | | | | | | | | | | | 2 |
| **Nervous System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Peripheral nerve | | | | | | | | | | | | | | | | | | | | | | | | | | 2 |
| Spinal cord | | | | | | | | | | | | | | | | | | | | | | | | | | 2 |
| **Respiratory System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Carcinoma, metastatic, uncertain primary site | | | | | | | | | | | | | | X | | | | | | | | | | | | 1 |
| Osteosarcoma, metastatic, bone | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Nose | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Trachea | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Special Senses System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zymbal's gland | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Urinary System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kidney | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Urinary bladder | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 48 |
| **Systemic Lesions** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Multiple organs | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Leukemia mononuclear | X | X | X | X | X | X | X | | | | X | X | | X | X | X | X | | X | X | X | X | X | X | X | 32 |
| Mesothelioma malignant | | | | | | | | | | | X | | | | | | | | | | X | | | | | 3 |

**TABLE A2**
**Individual Animal Tumor Pathology of Male Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 150 ppm**

| Number of Days on Study | 3 8 8 | 5 0 2 | 5 4 4 | 5 4 8 | 5 5 5 | 5 5 5 | 5 9 2 | 5 9 3 | 6 0 9 | 6 1 1 | 6 1 3 | 6 3 0 | 6 3 6 | 6 4 3 | 6 5 5 | 6 5 7 | 6 7 5 | 6 9 3 | 6 9 7 | 7 0 6 | 7 0 7 | 7 1 1 | 7 1 6 | 7 1 8 | 7 2 1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 0 5 3 | 0 7 6 | 0 5 8 | 0 9 6 | 0 7 7 | 0 8 6 | 0 5 6 | 0 5 7 | 0 7 3 | 0 5 5 | 0 7 4 | 0 5 2 | 0 7 9 | 0 8 1 | 0 6 4 | 0 9 3 | 0 7 0 | 0 6 1 | 0 6 0 | 0 9 9 | 0 5 4 | 0 9 8 | 0 8 9 | 0 7 8 | 0 6 2 |
| **Alimentary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Esophagus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine large, colon | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | A | + | A | A | + | + | + | + | + |
| Squamous cell carcinoma, metastatic, skin | | | X | | | | | | | | | | | | | | | | | | | | | | |
| Intestine large, rectum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | A | + | + | A | + | + | + | + | + |
| Intestine large, cecum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | A | + | A | A | + | + | + | + | + |
| Intestine small, duodenum | + | + | + | + | + | + | + | + | A | + | A | + | + | + | + | A | A | + | + | + | + | + | + | + | + |
| Intestine small, jejunum | + | + | + | + | + | + | + | + | A | + | A | + | + | + | + | A | A | A | A | A | + | + | + | + | + |
| Intestine small, ileum | + | + | + | + | + | + | + | A | A | + | A | + | + | + | + | A | A | A | A | + | + | + | + | A | + |
| Liver | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Hepatocellular adenoma | | | | | | | | | | | | X | | | | | | | | | | | | | |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mesentery | | | + | + | | | | | | | + | | + | | | + | | | | + | | + | | | |
| Pancreas | + | + | + | + | + | + | + | + | A | + | A | + | + | + | + | A | A | + | + | + | + | + | + | + | + |
| Acinus, adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Salivary glands | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Stomach, forestomach | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + |
| Stomach, glandular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + |
| **Cardiovascular System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Blood vessel | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Heart | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Endocrine System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Adrenal cortex | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Adrenal medulla | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Pheochromocytoma benign | | | | | | | | | X | | | | | | | | | X | | X | | X | X | X | |
| Bilateral, pheochromocytoma benign | | | | | | | | | | | | | | | | | | | | | | | | | |
| Islets, pancreatic | + | + | + | + | + | + | + | + | A | + | A | + | + | + | + | A | A | + | + | + | + | + | + | + | + |
| Adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Parathyroid gland | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Pituitary gland | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Pars distalis, adenoma | | X | | | | | | | | X | | | | | | | X | X | | | X | | X | X | |
| Thyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| C-cell, adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| C-cell, carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| **General Body System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| None | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Genital System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Epididymis | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Preputial gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Prostate | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Seminal vesicle | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Testes | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Bilateral, interstitial cell, adenoma | | | | X | | | | | X | | X | | X | | X | | | X | X | X | | X | | X | X |
| Interstitial cell, adenoma | | | | | X | X | X | | | X | | X | | X | | X | X | | | | X | | | | |

**TABLE A2**
**Individual Animal Tumor Pathology of Male Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 150 ppm**

| **Number of Days on Study** | 723 | 728 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 06 5 | 09 1 | 05 1 | 05 9 | 06 3 | 06 6 | 06 7 | 06 8 | 06 9 | 07 1 | 07 2 | 07 5 | 08 0 | 08 2 | 08 3 | 08 4 | 08 5 | 08 7 | 08 8 | 09 0 | 09 2 | 09 4 | 09 5 | 09 7 | 10 0 | Total Tissues/ Tumors |
| **Alimentary System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Esophagus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Intestine large, colon | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 46 |
| Squamous cell carcinoma, metastatic, skin | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Intestine large, rectum | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 47 |
| Intestine large, cecum | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 46 |
| Intestine small, duodenum | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 45 |
| Intestine small, jejunum | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 42 |
| Intestine small, ileum | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 41 |
| Liver | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Hepatocellular adenoma | | | | | | | | | | X | | | | | | | | | X | | | | | | | 3 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | X | | | | | 1 |
| Mesentery | + | | + | | + | | | | | + | | | | | | | | | | | | | | | | 11 |
| Pancreas | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 45 |
| Acinus, adenoma | | | | | | | | | | | | | | | | X | | | | | | | | | | 1 |
| Salivary glands | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Stomach, forestomach | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Stomach, glandular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| **Cardiovascular System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Blood vessel | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Heart | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Endocrine System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Adrenal cortex | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Carcinoma | | | | | | | | | X | | | | | | | | | | | | | | | | | 1 |
| Adrenal medulla | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Pheochromocytoma benign | | | | | | | | | | | | | | | | X | | X | X | X | X | | X | X | | 13 |
| Bilateral, pheochromocytoma benign | | | | | | | X | | | | | | | | | | | | | | | | | | | 1 |
| Islets, pancreatic | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 45 |
| Adenoma | | | X | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Parathyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Pituitary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Pars distalis, adenoma | | X | X | | | | X | X | | X | | X | | X | | | X | X | | X | | X | X | | X | 20 |
| Thyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| C-cell, adenoma | | | | | | | | | | | | X | | | | | | | | | | | | | | 1 |
| C-cell, carcinoma | | | | | | | X | X | | | | | | | | | | | | | | | | | | 2 |
| **General Body System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| None | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Genital System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Epididymis | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Preputial gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Adenoma | | | | | | | | | | | | | X | | | | | | | | | | | | | 1 |
| Carcinoma | | | X | | | | | | | | | | | | | | X | | X | | X | | | | | 4 |
| Prostate | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Seminal vesicle | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Testes | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Bilateral, interstitial cell, adenoma | X | X | | X | X | | X | | X | X | X | X | X | | X | X | X | X | X | X | X | X | X | X | X | 32 |
| Interstitial cell, adenoma | | | | | | X | | | | | | | | X | | | | | | | | | | | | 11 |

**TABLE A2**
**Individual Animal Tumor Pathology of Male Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 150 ppm**

| Number of Days on Study | 3 8 8 | 5 0 2 | 5 4 4 | 5 4 8 | 5 5 5 | 5 5 5 | 5 9 2 | 5 9 3 | 6 0 9 | 6 1 1 | 6 1 3 | 6 3 0 | 6 3 6 | 6 4 3 | 6 5 5 | 6 5 7 | 6 7 5 | 6 9 3 | 6 9 7 | 7 0 6 | 7 0 7 | 7 1 1 | 7 1 6 | 7 1 8 | 7 2 1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 0 5 3 | 0 7 6 | 0 5 8 | 0 9 6 | 0 7 7 | 0 8 6 | 0 5 6 | 0 5 7 | 0 7 3 | 0 5 5 | 0 7 4 | 0 5 2 | 0 7 9 | 0 8 1 | 0 6 4 | 0 9 3 | 0 7 0 | 0 6 1 | 0 6 0 | 0 9 9 | 0 5 4 | 0 9 8 | 0 8 9 | 0 7 8 | 0 6 2 |
| **Hematopoietic System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone marrow | + | + | + | + | + | + | + | + | A | + | A | + | + | + | + | A | + | A | + | + | + | + | + | + | + |
| Lymph node | | | + | + | + | + | + | + | + | + | | + | + | | | + | | + | + | | + | + | | | |
| Iliac, squamous cell carcinoma, metastatic, skin | | | X | | | | | | | | | | | | | | | | | | | | | | |
| Lymph node, mandibular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Carcinoma, metastatic, Zymbal's gland | | | | | | | | | | | | | | | X | | | | | | | | | | |
| Lymph node, mesenteric | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Spleen | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Thymus | + | I | + | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Thymoma benign | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Integumentary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary gland | + | + | M | + | + | + | + | + | + | + | M | + | + | + | M | + | + | + | M | + | + | + | + | M | + |
| Skin | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Keratoacanthoma | | | | | | | | | | | | | X | | | | | | | | | | X | | |
| Keratoacanthoma, multiple | | | | | | | | | | | | | | | | | | | | | | | | | |
| Squamous cell carcinoma, multiple | | | X | | | | | | | | | | | | | | | | | | | | | | |
| Trichoepithelioma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Subcutaneous tissue, fibroma | | | | | X | | | | | X | | | | | | | | | X | | | X | | X | |
| Subcutaneous tissue, fibrosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | X |
| Subcutaneous tissue, histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Subcutaneous tissue, melanoma malignant | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Musculoskeletal System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Nervous System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Carcinoma, metastatic, Zymbal's gland | | | | | | | | | | | | | | X | | | | | | | | | | | |
| Peripheral nerve | | | | | | | | | | | | | | | | | | | | | | | | | |
| Spinal cord | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Respiratory System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Alveolar/bronchiolar adenoma | X | | | | | | | | | | | | | | | | | | | | | | | | |
| Osteosarcoma, metastatic, uncertain primary site | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nose | + | + | + | + | + | + | A | + | + | + | A | + | + | + | + | A | + | + | + | + | + | + | + | + | + |
| Respiratory epithelium, adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Trachea | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Special Senses System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ear | | + | | | | | | | | | | | | | | | | | | | | | | | |
| Eye | | | | | | | | | | + | | | | | | | | | | | | | | | |
| Zymbal's gland | + | | | | | | | | | | | | | + | + | | | | | | | | | | |
| Carcinoma | X | | | | | | | | | | | | | X | X | | | | | | | | | | |
| **Urinary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kidney | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Urinary bladder | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Systemic Lesions** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Multiple organs | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Leukemia mononuclear | | | | X | X | X | | X | X | | X | X | X | | X | X | | X | X | X | X | X | X | | |

**TABLE A2**
**Individual Animal Tumor Pathology of Male Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 150 ppm**

| Number of Days on Study | 723 | 728 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 00665 | 00991 | 00551 | 00559 | 00663 | 00666 | 00667 | 00668 | 00669 | 00671 | 00672 | 00675 | 00680 | 00682 | 00683 | 00684 | 00685 | 00687 | 00688 | 00690 | 00692 | 00694 | 00695 | 00697 | 00710 | Total Tissues/ Tumors |
| **Hematopoietic System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone marrow | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 45 |
| Lymph node | + | + | | + | | | | + | | | | + | + | + | | | | | | | | | + | | | 23 |
| Iliac, squamous cell carcinoma, metastatic, skin | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Lymph node, mandibular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Carcinoma, metastatic, Zymbal's gland | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Lymph node, mesenteric | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Spleen | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Thymus | + | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | 47 |
| Thymoma benign | | | | | | | | X | | | | | | | | | | | | | | | | | | 1 |
| **Integumentary System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 45 |
| Skin | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Keratoacanthoma | | | | | | | | | X | | | | | | | | | | | | | | | | | 3 |
| Keratoacanthoma, multiple | | | | | | | | | | | | | | | | | | | | | | | X | | | 1 |
| Squamous cell carcinoma, multiple | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Trichoepithelioma | | | | | | | | | | | | | | | | | | | | | | | | X | | 1 |
| Subcutaneous tissue, fibroma | X | | | | | | | | | X | | | | | | | | | X | | | | | | | 8 |
| Subcutaneous tissue, fibrosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Subcutaneous tissue, histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | X | | | | | 1 |
| Subcutaneous tissue, melanoma malignant | | | | | | | | | | | | | | | | | | | X | | | | | | | 1 |
| **Musculoskeletal System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Nervous System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Carcinoma, metastatic, Zymbal's gland | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Peripheral nerve | | | | | | | | | | | | | | | | | | | | | + | | | | | 1 |
| Spinal cord | | | | | | | | | | | | | | | | | | | | | + | | | | | 1 |
| **Respiratory System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Alveolar/bronchiolar adenoma | | | | | | | | | X | | | | | | | | | | | | | | | | | 2 |
| Osteosarcoma, metastatic, uncertain primary site | | | | | | | | | | | | | | | | | | | | | X | | | | | 1 |
| Nose | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 47 |
| Respiratory epithelium, adenoma | | | | | | | | | | | | | | | | | | | | X | | | | | | 1 |
| Trachea | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Special Senses System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ear | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Eye | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Zymbal's gland | | | | | | | | | | | | | | | | | | | | | | | | | | 3 |
| Carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | | 3 |
| **Urinary System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kidney | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Urinary bladder | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Systemic Lesions** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Multiple organs | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | X | | | | | 1 |
| Leukemia mononuclear | X | X | X | X | X | X | X | X | X | X | | | | X | X | X | X | | X | | | X | X | | | 33 |

**TABLE A2**
**Individual Animal Tumor Pathology of Male Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 325 ppm**

| Number of Days on Study | 4 0 8 | 4 5 7 | 5 3 3 | 5 5 9 | 5 6 4 | 5 7 1 | 5 7 2 | 5 7 3 | 5 8 2 | 5 9 2 | 6 0 3 | 6 0 6 | 6 2 7 | 6 3 9 | 6 4 1 | 6 4 8 | 6 5 3 | 6 6 7 | 6 6 8 | 6 8 6 | 6 9 0 | 6 9 5 | 7 1 0 | 7 1 4 | 7 2 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 1 3 8 | 1 1 3 | 1 4 3 | 1 0 2 | 1 2 5 | 1 2 3 | 1 1 6 | 1 0 8 | 1 0 6 | 1 4 4 | 1 3 2 | 1 3 1 | 1 0 1 | 1 0 9 | 1 2 2 | 1 4 6 | 1 1 5 | 1 4 1 | 1 2 7 | 1 2 1 | 1 2 9 | 1 0 5 | 1 5 0 | 1 4 9 | 1 3 9 |
| **Alimentary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Esophagus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine large, colon | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | A |
| Intestine large, rectum | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | A | + | + | A | A |
| Intestine large, cecum | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | A | + | + | A | A |
| Intestine small, duodenum | + | + | + | A | + | + | + | A | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | A |
| Intestine small, jejunum | + | A | + | A | + | A | A | A | A | + | + | + | + | + | + | + | + | + | + | + | A | + | + | A | A |
| Intestine small, ileum | + | A | + | A | + | + | A | A | A | + | + | + | + | + | + | + | + | + | + | + | A | + | + | A | A |
| Liver | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Hepatocellular carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hepatocellular adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mesentery | | + | | | | | | | | | | | | + | + | | | + | | | | + | | | |
| Pancreas | + | + | + | A | + | + | + | A | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | A |
| Acinus, adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Salivary glands | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Stomach, forestomach | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + |
| Stomach, glandular | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + |
| **Cardiovascular System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Blood vessel | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Heart | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Endocrine System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Adrenal cortex | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Adrenal medulla | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Pheochromocytoma malignant | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pheochromocytoma benign | | | | | | | | | | | | | X | | | | X | | | | X | | | | |
| Bilateral, pheochromocytoma benign | | | | | | | | | | | | | | | | | | | | | | | X | X | |
| Islets, pancreatic | + | + | + | A | + | + | + | A | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | A |
| Adenoma | | | | | | | | | | | | | | | | | | X | | | | | | | |
| Parathyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Pituitary gland | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Pars distalis, adenoma | | | | X | | X | | X | | | X | | X | X | | | X | | X | X | | | X | X | |
| Thyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| C-cell, adenoma | | | | | | | | | | X | | | | | | | | | | X | | X | X | | |
| **General Body System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| None | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Genital System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Epididymis | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Preputial gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carcinoma | | | | | | | | | | X | | | X | | | | | | | | X | | | | |
| Bilateral, carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Prostate | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Seminal vesicle | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Testes | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Bilateral, interstitial cell, adenoma | | | X | | | | | | X | | | X | | X | X | X | | X | X | | X | X | | X | X |
| Interstitial cell, adenoma | | X | | | X | | | | | X | | | | | | | | | | X | | | | | |

**TABLE A2**
**Individual Animal Tumor Pathology of Male Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 325 ppm**

| **Number of Days on Study** | 728 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 11014 | 10003 | 10004 | 10007 | 11010 | 11011 | 11012 | 11017 | 11018 | 11019 | 12020 | 12024 | 12026 | 12028 | 13030 | 13033 | 13034 | 13035 | 13036 | 13037 | 14040 | 14042 | 14045 | 14047 | 14048 | Total Tissues/ Tumors |
| **Alimentary System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Esophagus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Intestine large, colon | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 48 |
| Intestine large, rectum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 46 |
| Intestine large, cecum | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 45 |
| Intestine small, duodenum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 46 |
| Intestine small, jejunum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 41 |
| Intestine small, ileum | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 41 |
| Liver | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Hepatocellular carcinoma | | | | | | | | | | | | | | | | | | | | | X | | | | | 1 |
| Hepatocellular adenoma | | | | X | | | | | | | | | | | | | | | | | | | | | | 1 |
| Mesentery | | | + | | | | + | + | | | | | | | | | | | | | | | | + | + | 10 |
| Pancreas | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 46 |
| Acinus, adenoma | | | | | | | | | | | | | | | | | | | | | | | | X | | 1 |
| Salivary glands | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Stomach, forestomach | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 48 |
| Stomach, glandular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 48 |
| **Cardiovascular System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Blood vessel | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Heart | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Endocrine System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Adrenal cortex | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Adrenal medulla | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Pheochromocytoma malignant | | | | | | | X | | | | | | | | | | | | | | | | | | | 1 |
| Pheochromocytoma benign | | | | | X | | | X | | X | | | | | X | X | | | | X | | X | X | X | X | 13 |
| Bilateral, pheochromocytoma benign | X | | X | | | | | | | | | | | | | | | | | | | | | | | 4 |
| Islets, pancreatic | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 46 |
| Adenoma | | | | | | | | | | | | | | | | X | | | | | | | | | | 2 |
| Parathyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Pituitary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Pars distalis, adenoma | X | X | X | | | | | X | X | | X | X | X | X | X | | X | X | | X | | | | X | | 25 |
| Thyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| C-cell, adenoma | | | | | | | | X | | | | | | | | | X | | | | | | | | | 6 |
| **General Body System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| None | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Genital System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Epididymis | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Preputial gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Adenoma | | X | | | | | | | | | | | | | | | | | | | | X | | | | 2 |
| Carcinoma | | | | | | | X | | | | | | | | | | | | | | | | | | | 4 |
| Bilateral, carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | X | 1 |
| Prostate | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Seminal vesicle | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Testes | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Bilateral, interstitial cell, adenoma | X | | | X | X | X | X | | X | X | X | X | X | | | X | X | X | X | | X | X | X | X | X | 31 |
| Interstitial cell, adenoma | | X | X | | | | | | | | | | | X | X | | | | | X | | | | | | 9 |

**TABLE A2**
**Individual Animal Tumor Pathology of Male Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 325 ppm**

| Number of Days on Study | 4 0 8 | 4 5 7 | 5 3 3 | 5 5 9 | 5 6 4 | 5 7 1 | 5 7 2 | 5 7 3 | 5 8 2 | 5 9 2 | 6 0 3 | 6 0 6 | 6 2 7 | 6 3 9 | 6 4 1 | 6 4 8 | 6 5 3 | 6 6 7 | 6 6 8 | 6 8 6 | 6 9 0 | 6 9 5 | 7 1 0 | 7 1 4 | 7 2 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 1 3 8 | 1 1 3 | 1 4 3 | 1 0 2 | 1 2 5 | 1 2 3 | 1 1 6 | 1 0 8 | 1 0 6 | 1 4 4 | 1 3 2 | 1 3 1 | 1 0 1 | 1 0 9 | 1 2 2 | 1 4 6 | 1 1 5 | 1 4 1 | 1 2 7 | 1 2 1 | 1 2 9 | 1 0 5 | 1 5 0 | 1 4 9 | 1 3 9 |
| **Hematopoietic System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone marrow | + | + | + | A | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | A |
| Lymph node | | | + | | | | | + | + | + | | + | | + | + | + | | + | | | + | | + | + | + |
| Lymph node, mandibular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Lymph node, mesenteric | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Spleen | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Thymus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Integumentary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | M | M | + | + | + | + | + | + | + | + | + |
| Fibroadenoma | | | | | | | | X | | | | | | | | | | | | | | | | | |
| Fibroadenoma, multiple | | | | | | | | | | | | | | | | | | | | | | | | | |
| Skin | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Keratoacanthoma | | | | | | | | | | | | | | | | | | | | | | | | | X |
| Subcutaneous tissue, fibroma | | | | | | | | | | X | X | | | | | | | | X | | | | | | |
| **Musculoskeletal System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Nervous System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Peripheral nerve | | | + | | | | | | | | | | | | | | | | | | | | | | |
| Spinal cord | | | + | | | | | | | | | | | | | | | | | | | | | | |
| **Respiratory System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Alveolar/bronchiolar adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alveolar/bronchiolar carcinoma | | | | | | | | | | | | | | | | | | | | X | | | | | |
| Nose | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Trachea | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Special Senses System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zymbal's gland | + | | | | | | | | | | | | | | | | | | | | | | | | |
| Carcinoma | X | | | | | | | | | | | | | | | | | | | | | | | | |
| **Urinary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kidney | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Renal tubule, adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Renal tubule, carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Urinary bladder | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Systemic Lesions** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Multiple organs | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Leukemia mononuclear | | | X | X | | | X | | X | | X | X | X | X | X | X | | | X | X | X | X | X | X | X |
| Mesothelioma malignant | | | | | | | | | | | | | | | | | | X | | | | | | | |

**TABLE A2**
**Individual Animal Tumor Pathology of Male Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 325 ppm**

| Number of Days on Study | 728 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 11 4 | 10 3 | 10 4 | 10 7 | 11 0 | 11 1 | 11 2 | 11 7 | 11 8 | 11 9 | 12 0 | 12 4 | 12 6 | 12 8 | 13 0 | 13 3 | 13 4 | 13 5 | 13 6 | 13 7 | 14 0 | 14 2 | 14 5 | 14 7 | 14 8 | Total Tissues/ Tumors |
| **Hematopoietic System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone marrow | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 47 |
| Lymph node | + | + | + | | | | | + | + | + | | | + | | + | | | | | + | | | + | | | 23 |
| Lymph node, mandibular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Lymph node, mesenteric | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Spleen | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Thymus | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | I | + | + | + | + | 48 |
| **Integumentary System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 48 |
| Fibroadenoma | | | | X | | X | X | | | | X | | | | | | | | | | | | | | X | 5 |
| Fibroadenoma, multiple | | | | | | | | | | | | | | | | | | | | | | | | | X | 1 |
| Skin | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Keratoacanthoma | | X | | | | | | | | | | | | | | | | | | X | | | | | | 3 |
| Subcutaneous tissue, fibroma | | | X | X | | | | | X | | | | | | | | | | | | X | | | | | 7 |
| **Musculoskeletal System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Nervous System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Peripheral nerve | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Spinal cord | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Respiratory System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Alveolar/bronchiolar adenoma | | | | | | | | | | | | | | | | | | | | | X | | | | | 1 |
| Alveolar/bronchiolar carcinoma | | | | | | | | | | | | | | | | | | | | | | | | X | | 2 |
| Nose | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Trachea | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Special Senses System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zymbal's gland | + | | | | | | | | | | + | | | | | | | | | | | | | | | 3 |
| Carcinoma | X | | | | | | | | | | X | | | | | | | | | | | | | | | 3 |
| **Urinary System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kidney | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Renal tubule, adenoma | | | | | | | | | | | | X | | | | | | | | | | | | | | 1 |
| Renal tubule, carcinoma | | | | | | | | | | | X | | | | | | | | | | | | | | | 1 |
| Urinary bladder | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| **Systemic Lesions** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Multiple organs | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Leukemia mononuclear | X | | X | | X | X | | X | | X | X | X | X | | X | | | X | | X | | | X | | | 30 |
| Mesothelioma malignant | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |

**TABLE A2**
**Individual Animal Tumor Pathology of Male Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 650 ppm**

| Number of Days on Study | 5 0 2 | 5 2 0 | 5 2 0 | 5 6 4 | 5 6 9 | 5 6 9 | 5 8 2 | 5 8 5 | 5 9 7 | 6 0 5 | 6 3 0 | 6 4 8 | 6 4 8 | 6 6 3 | 6 7 2 | 6 7 6 | 6 7 6 | 6 8 2 | 6 8 3 | 6 8 6 | 6 9 0 | 6 9 7 | 7 0 7 | 7 0 9 | 7 1 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 1 7 1 | 1 6 6 | 1 9 0 | 1 5 8 | 1 8 8 | 1 9 3 | 1 5 1 | 2 0 0 | 1 9 8 | 1 1 8 7 | 1 8 9 | 1 5 5 | 1 7 4 | 1 9 6 | 1 8 3 | 1 8 6 | 1 9 7 | 1 7 2 | 1 9 5 | 1 5 7 | 1 5 9 | 1 6 5 | 1 6 9 | 1 8 4 | 1 9 1 |
| **Alimentary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Esophagus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine large, colon | + | + | + | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | A | A | + | + | + |
| Intestine large, rectum | + | + | + | + | A | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | A | + | + | + | + |
| Intestine large, cecum | + | + | + | + | + | + | + | + | + | + | + | + | + | A | + | + | + | A | + | + | A | A | A | + | + |
| Intestine small, duodenum | + | + | + | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | A | + | + | + | + |
| Intestine small, jejunum | + | + | + | + | A | + | + | A | + | + | + | + | + | A | + | + | + | + | A | + | A | A | + | A | + |
| Intestine small, ileum | + | + | + | + | A | + | + | A | + | + | + | + | + | A | + | + | + | + | + | + | A | A | + | A | + |
| Liver | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Hepatocellular carcinoma | | | | | X | | | | | | | | | | | | | | | | | | | | |
| Hepatocellular adenoma | | | | | | | | | | | | | | | | | X | | | | | | | | |
| Histiocytic sarcoma | | | | | | | | | | X | | | | | | | | | | | | | | | |
| Mesentery | | + | | | | | + | | | | | + | | | + | + | | | + | | + | + | | + | + |
| Lipoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pancreas | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | A | + | A | + | + |
| Acinus, adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Salivary glands | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | | | X | | | | | | | | | | | | | | | |
| Stomach, forestomach | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + |
| Stomach, glandular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Cardiovascular System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Blood vessel | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Heart | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Endocrine System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Adrenal cortex | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Adrenal medulla | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Pheochromocytoma malignant | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pheochromocytoma benign | | | | | | | | X | | | X | | | | | | | | X | | | | | | |
| Bilateral, pheochromocytoma benign | | | | | | | | | | | | | | | | | | | | | | | | | |
| Islets, pancreatic | + | + | + | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | A | + | A | + | + |
| Adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Parathyroid gland | + | M | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Pituitary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Pars distalis, adenoma | X | | | X | X | X | | X | | | | X | | | | X | X | | | | | | | | |
| Thyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| C-cell, adenoma | | | | | | | | | | | | | | | | X | | | | X | | | | | |
| C-cell, carcinoma | | | | | | | | | | | | X | | | | | | | | | | | | | |
| Follicular cell, adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| **General Body System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Peritoneum | | | | | | | | | | | | | | | | | | | + | | | | | | |
| **Genital System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Epididymis | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Preputial gland | + | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carcinoma | | | | | | | | X | | | | | | | | | | | | | | | | | |
| Prostate | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Seminal vesicle | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Testes | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Bilateral, interstitial cell, adenoma | | | | | X | | | | | X | X | | X | X | X | | | X | X | | X | X | X | X | X |
| Interstitial cell, adenoma | X | X | X | X | | | X | X | | | | X | | | | | X | | | X | | | | | |

**TABLE A2**
**Individual Animal Tumor Pathology of Male Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 650 ppm**

| Number of Days on Study | 721 | 728 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 179 | 173 | 152 | 153 | 154 | 156 | 160 | 161 | 162 | 163 | 164 | 167 | 168 | 170 | 175 | 176 | 177 | 178 | 180 | 181 | 182 | 185 | 192 | 194 | 199 | Total Tissues/ Tumors |
| **Alimentary System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Esophagus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Intestine large, colon | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 47 |
| Intestine large, rectum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 47 |
| Intestine large, cecum | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 44 |
| Intestine small, duodenum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 48 |
| Intestine small, jejunum | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 42 |
| Intestine small, ileum | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 43 |
| Liver | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Hepatocellular carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Hepatocellular adenoma | | | | | | | | | | | | | | | | X | | | | | | | | | | 2 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Mesentery | | | | | | | + | + | | | | | | | | | | | | + | + | | | | | 14 |
| Lipoma | | | | | | | X | | | | | | | | | | | | | | | | | | | 1 |
| Pancreas | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 48 |
| Acinus, adenoma | | | | | | | | | | | | | | | | | | | | | | | X | | | 1 |
| Salivary glands | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Stomach, forestomach | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Stomach, glandular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Cardiovascular System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Blood vessel | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Heart | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Endocrine System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Adrenal cortex | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Adrenal medulla | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Pheochromocytoma malignant | | | | | | | | | | | | | | | | | | | | | X | | X | | | 2 |
| Pheochromocytoma benign | X | | | | | X | X | | | | | X | | X | | | | X | X | | | | X | | | 11 |
| Bilateral, pheochromocytoma benign | | | | | | | | | | | | | | | | | | | | | | X | | | | 1 |
| Islets, pancreatic | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 47 |
| Adenoma | | | | | | | | | | | | | | | | | X | | | | | X | | X | | 3 |
| Carcinoma | | | | | | | | | | | | | | | | | | X | | | | | | | | 1 |
| Parathyroid gland | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 47 |
| Pituitary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Pars distalis, adenoma | X | | | X | X | X | X | | X | | | | X | | X | X | X | X | X | | X | X | | X | X | 24 |
| Thyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| C-cell, adenoma | | | | | | | | | | | | | | | | | | | | | X | | | | | 3 |
| C-cell, carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Follicular cell, adenoma | | | | | | | | | X | | | | | | | | | | | | | | | | | 1 |
| **General Body System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Peritoneum | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Genital System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Epididymis | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Preputial gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Adenoma | | | | | | | | | | | | | | | | X | | | | | X | | | | | 2 |
| Carcinoma | | | | | X | | | | | | | | | | | | | | | | | X | | | | 3 |
| Prostate | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Seminal vesicle | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Testes | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Bilateral, interstitial cell, adenoma | | X | X | X | | X | | X | X | X | X | X | | X | X | X | X | X | X | X | X | X | X | X | X | 34 |
| Interstitial cell, adenoma | X | | | | | | X | | | | | | X | | | | | | | | | | | | | 12 |

**TABLE A2**
**Individual Animal Tumor Pathology of Male Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 650 ppm**

| Number of Days on Study | 502 | 520 | 522 | 566 | 569 | 569 | 582 | 585 | 597 | 605 | 630 | 648 | 648 | 663 | 672 | 676 | 676 | 682 | 683 | 686 | 690 | 697 | 700 | 701 | 714 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 171 | 166 | 190 | 558 | 888 | 693 | 951 | 200 | 998 | 887 | 889 | 855 | 747 | 966 | 833 | 866 | 897 | 725 | 955 | 577 | 559 | 657 | 699 | 844 | 961 |
| **Hematopoietic System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone marrow | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | A | + |
| Lymph node | | | + | + | + | | | + | | | + | | | + | + | + | + | + | + | + | + | + | | + | + |
| Lymph node, mandibular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | | | X | | | | | | | | | | | | | | | |
| Lymph node, mesenteric | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Spleen | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Thymus | + | + | + | + | + | + | + | M | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Integumentary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary gland | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | M | + | + | + | + | M | + |
| Fibroadenoma | | | | | | | | | | | X | | | | | | | | | X | | | | | X |
| Skin | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Keratoacanthoma | | | | | | | X | | | | | | | | | | | | | | | X | | | |
| Squamous cell papilloma | | | | | | | | | | | | | | | | | | | | | | | | | X |
| Subcutaneous tissue, fibroma | | | X | | | | | | | | | | | | | | | | X | | | | | | |
| Subcutaneous tissue, fibrosarcoma | | | | | | | | X | | | | | | | | | | | | | | | | | |
| Subcutaneous tissue, lipoma | | | X | | | | | | | | | | | | | | | | | | | | | | |
| **Musculoskeletal System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Osteosarcoma | | | | | | | | | | | | | X | | | | | | | | | | | | |
| Skeletal muscle | | | | | | | | | | + | | | | | | | | | | | | | | | |
| Histiocytic sarcoma | | | | | | | | | | X | | | | | | | | | | | | | | | |
| **Nervous System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Respiratory System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Alveolar/bronchiolar carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hepatocellular carcinoma, metastatic, liver | | | | | X | | | | | | | | | | | | | | | | | | | | |
| Nose | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | | | X | | | | | | | | | | | | | | | |
| Trachea | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Special Senses System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Eye | | | | | | | | | | + | | | | | | | | | | | | | | | |
| Harderian gland | | | | | | | | | | + | | | | | | | | | | | | | | | |
| Histiocytic sarcoma | | | | | | | | | | X | | | | | | | | | | | | | | | |
| **Urinary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kidney | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Renal tubule, adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Urinary bladder | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | A | + | + | + |
| **Systemic Lesions** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Multiple organs | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | | | X | | | | | | | | | | | | | | | |
| Leukemia mononuclear | X | X | | X | X | | | X | | | X | | | X | X | | X | X | X | X | X | X | X | X | X |
| Mesothelioma malignant | | | | | | | | | | | | | | | | | | | X | | | | | | |

**TABLE A2**
**Individual Animal Tumor Pathology of Male Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 650 ppm**

| Number of Days on Study | 721 | 728 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 179 | 173 | 152 | 153 | 154 | 156 | 160 | 161 | 162 | 163 | 164 | 167 | 168 | 170 | 175 | 176 | 177 | 178 | 180 | 181 | 182 | 185 | 192 | 194 | 199 | Total Tissues/ Tumors |
| **Hematopoietic System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone marrow | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Lymph node | + | + | | | | + | | | | | | | | | + | + | + | | | | | + | + | | | 24 |
| Lymph node, mandibular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Lymph node, mesenteric | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Spleen | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Thymus | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 47 |
| **Integumentary System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 47 |
| Fibroadenoma | | | | | | | | | | | | X | | | | | | | | | X | X | | | | 6 |
| Skin | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Keratoacanthoma | X | | | | | | | | | | | X | | | | | | | | | | | X | | X | 6 |
| Squamous cell papilloma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Subcutaneous tissue, fibroma | X | | | X | | | | | | X | | | | | | | | | X | | | | | | | 6 |
| Subcutaneous tissue, fibrosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Subcutaneous tissue, lipoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Musculoskeletal System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Osteosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Skeletal muscle | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Nervous System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Respiratory System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Alveolar/bronchiolar carcinoma | | | | | | | | | | | | | | | | | | | | | X | | | | | 1 |
| Hepatocellular carcinoma, metastatic, liver | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Nose | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Trachea | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Special Senses System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Eye | | | | | | | | | | | | | | + | | | | | | | | | | | | 2 |
| Harderian gland | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Urinary System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kidney | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Renal tubule, adenoma | | | | | | | | | | X | | | | | | | | | | | | | | | | 1 |
| Urinary bladder | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| **Systemic Lesions** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Multiple organs | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Leukemia mononuclear | X | X | X | X | | X | X | | X | | X | X | | | | X | | X | X | X | | | X | | | 31 |
| Mesothelioma malignant | | | | | X | | | | | | | | | | | | | | | | | | | | | 2 |

**TABLE A3**
**Statistical Analysis of Primary Neoplasms in Male Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 150 ppm | 325 ppm | 650 ppm |
|---|---|---|---|---|
| **Adrenal Medulla: Benign Pheochromocytoma** | | | | |
| Overall rate[a] | 13/50 (26%) | 14/49 (29%) | 17/49 (35%) | 12/50 (24%) |
| Adjusted rate[b] | 32.7% | 33.5% | 41.4% | 28.1% |
| Terminal rate[c] | 8/20 (40%) | 8/23 (35%) | 11/24 (46%) | 8/23 (35%) |
| First incidence (days) | 580 | 609 | 627 | 585 |
| Poly-3 test[d] | P=0.375N | P=0.585 | P=0.295 | P=0.433N |
| **Adrenal Medulla: Benign or Malignant Pheochromocytoma** | | | | |
| Overall rate | 14/50 (28%) | 14/49 (29%) | 18/49 (37%) | 13/50 (26%) |
| Adjusted rate | 35.1% | 33.5% | 43.8% | 30.4% |
| Terminal rate | 8/20 (40%) | 8/23 (35%) | 12/24 (50%) | 9/23 (39%) |
| First incidence (days) | 580 | 609 | 627 | 585 |
| Poly-3 test | P=0.413N | P=0.552N | P=0.295 | P=0.432N |
| **Liver: Hepatocellular Adenoma** | | | | |
| Overall rate | 1/50 (2%) | 3/50 (6%) | 1/50 (2%) | 2/50 (4%) |
| Adjusted rate | 2.6% | 7.1% | 2.5% | 4.8% |
| Terminal rate | 1/20 (5%) | 2/23 (9%) | 1/24 (4%) | 1/23 (4%) |
| First incidence (days) | 729 (T) | 630 | 729 (T) | 676 |
| Poly-3 test | P=0.588 | P=0.379 | P=0.805N | P=0.583 |
| **Liver: Hepatocellular Adenoma or Carcinoma** | | | | |
| Overall rate | 1/50 (2%) | 3/50 (6%) | 2/50 (4%) | 3/50 (6%) |
| Adjusted rate | 2.6% | 7.1% | 4.9% | 7.1% |
| Terminal rate | 1/20 (5%) | 2/23 (9%) | 2/24 (8%) | 1/23 (4%) |
| First incidence (days) | 729 (T) | 630 | 729 (T) | 569 |
| Poly-3 test | P=0.360 | P=0.379 | P=0.576 | P=0.382 |
| **Lung: Alveolar/bronchiolar Adenoma or Carcinoma** | | | | |
| Overall rate | 0/50 (0%) | 2/50 (4%) | 3/50 (6%) | 1/50 (2%) |
| Adjusted rate | 0.0% | 4.7% | 7.3% | 2.4% |
| Terminal rate | 0/20 (0%) | 1/23 (4%) | 2/24 (8%) | 1/23 (4%) |
| First incidence (days) | —[e] | 388 | 686 | 729 (T) |
| Poly-3 test | P=0.509 | P=0.314 | P=0.161 | P=0.611 |
| **Mammary Gland: Fibroadenoma** | | | | |
| Overall rate | 7/50 (14%) | 0/50 (0%) | 6/50 (12%) | 6/50 (12%) |
| Adjusted rate | 17.7% | 0.0% | 14.6% | 14.2% |
| Terminal rate | 5/20 (25%) | 0/23 (0%) | 5/24 (21%) | 3/23 (13%) |
| First incidence (days) | 585 | — | 573 | 648 |
| Poly-3 test | P=0.394 | P=0.007N | P=0.496N | P=0.474N |
| **Pancreatic Islets: Adenoma** | | | | |
| Overall rate | 2/49 (4%) | 1/45 (2%) | 2/46 (4%) | 3/47 (6%) |
| Adjusted rate | 5.2% | 2.6% | 5.2% | 7.7% |
| Terminal rate | 0/20 (0%) | 1/23 (4%) | 1/24 (4%) | 3/23 (13%) |
| First incidence (days) | 637 | 729 (T) | 667 | 729 (T) |
| Poly-3 test | P=0.333 | P=0.557N | P=0.734N | P=0.555 |
| **Pancreatic Islets: Adenoma or Carcinoma** | | | | |
| Overall rate | 2/49 (4%) | 1/45 (2%) | 2/46 (4%) | 4/47 (9%) |
| Adjusted rate | 5.2% | 2.6% | 5.2% | 10.2% |
| Terminal rate | 0/20 (0%) | 1/23 (4%) | 1/24 (4%) | 4/23 (17%) |
| First incidence (days) | 637 | 729 (T) | 667 | 729 (T) |
| Poly-3 test | P=0.176 | P=0.557N | P=0.734N | P=0.386 |

**TABLE A3**
**Statistical Analysis of Primary Neoplasms in Male Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 150 ppm | 325 ppm | 650 ppm |
|---|---|---|---|---|
| **Pituitary Gland (Pars Distalis): Adenoma** | | | | |
| Overall rate | 15/48 (31%) | 20/49 (41%) | 25/49 (51%) | 24/50 (48%) |
| Adjusted rate | 37.4% | 46.9% | 57.2% | 53.2% |
| Terminal rate | 7/20 (35%) | 12/23 (52%) | 13/24 (54%) | 15/23 (65%) |
| First incidence (days) | 502 | 502 | 559 | 502 |
| Poly-3 test | P=0.090 | P=0.264 | P=0.052 | P=0.106 |
| **Preputial Gland: Carcinoma** | | | | |
| Overall rate | 1/50 (2%) | 4/50 (8%) | 5/50 (10%) | 3/49 (6%) |
| Adjusted rate | 2.6% | 9.6% | 12.0% | 7.2% |
| Terminal rate | 1/20 (5%) | 4/23 (17%) | 2/24 (8%) | 2/23 (9%) |
| First incidence (days) | 729 (T) | 729 (T) | 592 | 585 |
| Poly-3 test | P=0.394 | P=0.232 | P=0.138 | P=0.373 |
| **Preputial Gland: Adenoma or Carcinoma** | | | | |
| Overall rate | 2/50 (4%) | 5/50 (10%) | 7/50 (14%) | 5/49 (10%) |
| Adjusted rate | 5.1% | 12.0% | 16.8% | 12.0% |
| Terminal rate | 1/20 (5%) | 5/23 (22%) | 4/24 (17%) | 4/23 (17%) |
| First incidence (days) | 709 | 729 (T) | 592 | 585 |
| Poly-3 test | P=0.267 | P=0.273 | P=0.109 | P=0.271 |
| **Skin: Keratoacanthoma** | | | | |
| Overall rate | 2/50 (4%) | 4/50 (8%) | 3/50 (6%) | 6/50 (12%) |
| Adjusted rate | 5.1% | 9.5% | 7.4% | 14.2% |
| Terminal rate | 1/20 (5%) | 2/23 (9%) | 2/24 (8%) | 3/23 (13%) |
| First incidence (days) | 697 | 636 | 720 | 582 |
| Poly-3 test | P=0.138 | P=0.410 | P=0.567 | P=0.182 |
| **Skin: Squamous Cell Papilloma or Keratoacanthoma** | | | | |
| Overall rate | 2/50 (4%) | 4/50 (8%) | 3/50 (6%) | 7/50 (14%) |
| Adjusted rate | 5.1% | 9.5% | 7.4% | 16.5% |
| Terminal rate | 1/20 (5%) | 2/23 (9%) | 2/24 (8%) | 3/23 (13%) |
| First incidence (days) | 697 | 636 | 720 | 582 |
| Poly-3 test | P=0.072 | P=0.410 | P=0.567 | P=0.114 |
| **Skin: Squamous Cell Papilloma, Keratoacanthoma, or Squamous Cell Carcinoma** | | | | |
| Overall rate | 2/50 (4%) | 5/50 (10%) | 3/50 (6%) | 7/50 (14%) |
| Adjusted rate | 5.1% | 11.7% | 7.4% | 16.5% |
| Terminal rate | 1/20 (5%) | 2/23 (9%) | 2/24 (8%) | 3/23 (13%) |
| First incidence (days) | 697 | 544 | 720 | 582 |
| Poly-3 test | P=0.101 | P=0.282 | P=0.567 | P=0.114 |
| **Skin: Squamous Cell Papilloma, Keratoacanthoma, Trichoepithelioma, Basal Cell Carcinoma, or Squamous Cell Carcinoma** | | | | |
| Overall rate | 3/50 (6%) | 6/50 (12%) | 3/50 (6%) | 7/50 (14%) |
| Adjusted rate | 7.7% | 14.1% | 7.4% | 16.5% |
| Terminal rate | 2/20 (10%) | 3/23 (13%) | 2/24 (8%) | 3/23 (13%) |
| First incidence (days) | 697 | 544 | 720 | 582 |
| Poly-3 test | P=0.216 | P=0.314 | P=0.683N | P=0.214 |
| **Skin (Subcutaneous Tissue): Fibroma** | | | | |
| Overall rate | 3/50 (6%) | 8/50 (16%) | 7/50 (14%) | 6/50 (12%) |
| Adjusted rate | 7.6% | 18.7% | 16.7% | 14.1% |
| Terminal rate | 1/20 (5%) | 2/23 (9%) | 4/24 (17%) | 3/23 (13%) |
| First incidence (days) | 635 | 555 | 592 | 520 |
| Poly-3 test | P=0.406 | P=0.140 | P=0.202 | P=0.308 |

**TABLE A3**
**Statistical Analysis of Primary Neoplasms in Male Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 150 ppm | 325 ppm | 650 ppm |
|---|---|---|---|---|
| **Skin (Subcutaneous Tissue): Fibroma, Fibrosarcoma, or Sarcoma** | | | | |
| Overall rate | 4/50 (8%) | 9/50 (18%) | 7/50 (14%) | 7/50 (14%) |
| Adjusted rate | 10.1% | 21.0% | 16.7% | 16.3% |
| Terminal rate | 1/20 (5%) | 2/23 (9%) | 4/24 (17%) | 3/23 (13%) |
| First incidence (days) | 635 | 555 | 592 | 520 |
| Poly-3 test | P=0.436 | P=0.161 | P=0.318 | P=0.336 |
| **Testes: Adenoma** | | | | |
| Overall rate | 46/50 (92%) | 43/49 (88%) | 40/50 (80%) | 46/50 (92%) |
| Adjusted rate | 97.2% | 91.8% | 87.1% | 94.2% |
| Terminal rate | 20/20 (100%) | 21/23 (91%) | 23/24 (96%) | 22/23 (96%) |
| First incidence (days) | 445 | 548 | 457 | 502 |
| Poly-3 test | P=0.400N | P=0.221N | P=0.041N | P=0.411N |
| **Thyroid Gland (C-cell): Adenoma** | | | | |
| Overall rate | 5/50 (10%) | 1/50 (2%) | 6/50 (12%) | 3/50 (6%) |
| Adjusted rate | 12.7% | 2.4% | 14.5% | 7.1% |
| Terminal rate | 4/20 (20%) | 1/23 (4%) | 2/24 (8%) | 1/23 (4%) |
| First incidence (days) | 532 | 729 (T) | 592 | 676 |
| Poly-3 test | P=0.488N | P=0.105N | P=0.567 | P=0.351N |
| **Thyroid Gland (C-cell): Adenoma or Carcinoma** | | | | |
| Overall rate | 5/50 (10%) | 3/50 (6%) | 6/50 (12%) | 4/50 (8%) |
| Adjusted rate | 12.7% | 7.2% | 14.5% | 9.4% |
| Terminal rate | 4/20 (20%) | 3/23 (13%) | 2/24 (8%) | 1/23 (4%) |
| First incidence (days) | 532 | 729 (T) | 592 | 648 |
| Poly-3 test | P=0.517N | P=0.358N | P=0.567 | P=0.486N |
| **Zymbal's Gland: Carcinoma** | | | | |
| Overall rate | 1/50 (2%) | 3/50 (6%) | 3/50 (6%) | 0/50 (0%) |
| Adjusted rate | 2.5% | 7.0% | 7.2% | 0.0% |
| Terminal rate | 0/20 (0%) | 0/23 (0%) | 1/24 (4%) | 0/23 (0%) |
| First incidence (days) | 599 | 388 | 408 | — |
| Poly-3 test | P=0.264N | P=0.380 | P=0.370 | P=0.582N |
| **All Organs: Mononuclear Cell Leukemia** | | | | |
| Overall rate | 32/50 (64%) | 33/50 (66%) | 30/50 (60%) | 31/50 (62%) |
| Adjusted rate | 73.7% | 71.1% | 65.4% | 66.4% |
| Terminal rate | 15/20 (75%) | 15/23 (65%) | 12/24 (50%) | 12/23 (52%) |
| First incidence (days) | 445 | 548 | 533 | 502 |
| Poly-3 test | P=0.239N | P=0.494N | P=0.265N | P=0.299N |
| **All Organs: Malignant Mesothelioma** | | | | |
| Overall rate | 3/50 (6%) | 0/50 (0%) | 1/50 (2%) | 2/50 (4%) |
| Adjusted rate | 7.7% | 0.0% | 2.4% | 4.8% |
| Terminal rate | 2/20 (10%) | 0/23 (0%) | 0/24 (0%) | 1/23 (4%) |
| First incidence (days) | 673 | — | 667 | 683 |
| Poly-3 test | P=0.592N | P=0.136N | P=0.333N | P=0.511N |
| **All Organs: Benign Neoplasms** | | | | |
| Overall rate | 48/50 (96%) | 48/50 (96%) | 48/50 (96%) | 50/50 (100%) |
| Adjusted rate | 99.1% | 98.1% | 98.6% | 100.0% |
| Terminal rate | 20/20 (100%) | 23/23 (100%) | 24/24 (100%) | 23/23 (100%) |
| First incidence (days) | 445 | 388 | 457 | 502 |
| Poly-3 test | P=0.391 | P=0.749N | P=0.903N | P=0.957 |

**TABLE A3**
**Statistical Analysis of Primary Neoplasms in Male Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 150 ppm | 325 ppm | 650 ppm |
|---|---|---|---|---|
| **All Organs: Malignant Neoplasms** | | | | |
| Overall rate | 40/50 (80%) | 38/50 (76%) | 37/50 (74%) | 37/50 (74%) |
| Adjusted rate | 87.6% | 78.8% | 78.1% | 77.6% |
| Terminal rate | 17/20 (85%) | 16/23 (70%) | 16/24 (67%) | 15/23 (65%) |
| First incidence (days) | 445 | 388 | 408 | 502 |
| Poly-3 test | P=0.175N | P=0.187N | P=0.162N | P=0.147N |
| **All Organs: Benign or Malignant Neoplasms** | | | | |
| Overall rate | 48/50 (96%) | 50/50 (100%) | 50/50 (100%) | 50/50 (100%) |
| Adjusted rate | 99.1% | 100.0% | 100.0% | 100.0% |
| Terminal rate | 20/20 (100%) | 23/23 (100%) | 24/24 (100%) | 23/23 (100%) |
| First incidence (days) | 445 | 388 | 408 | 502 |
| Poly-3 test | P=0.702 | P=0.957 | P=0.957 | P=0.957 |

(T)Terminal sacrifice
[a] Number of neoplasm-bearing animals/number of animals examined. Denominator is number of animals examined microscopically for adrenal gland, liver, lung, pancreatic islets, pituitary gland, preputial gland, testis, and thyroid gland; for other tissues, denominator is number of animals necropsied.
[b] Poly-3 estimated neoplasm incidence after adjustment for intercurrent mortality
[c] Observed incidence at terminal kill
[d] Beneath the control incidence are the P values associated with the trend test. Beneath the exposed group incidence are the P values corresponding to pairwise comparisons between the controls and that exposed group. The Poly-3 test accounts for differential mortality in animals that do not reach terminal sacrifice. A negative trend or a lower incidence in an exposure group is indicated by **N**.
[e] Not applicable; no neoplasms in animal group

**TABLE A4**
**Historical Incidence of Mammary Gland Fibroadenoma in Untreated Male F344/N Rats**[a]

| Study | Incidence in Controls |
|---|---|
| **Historical Incidence at TSI Mason Research Institute: Feed Study** | |
| Phenolphthalein | 6/50 |
| **Overall Historical Incidence: Drinking Water Studies** | |
| Total | 13/281 (4.6%) |
| Standard deviation | 2.2% |
| Range | 2%-8% |
| **Overall Historical Incidence: Feed Studies** | |
| Total | 58/1,354 (4.3%) |
| Standard deviation | 3.3% |
| Range | 0%-12% |
| **Overall Historical Incidence: Gavage (Corn Oil) Studies** | |
| Total | 44/772 (5.7%) |
| Standard deviation | 2.5% |
| Range | 2%-12% |
| **Overall Historical Incidence: Inhalation Studies** | |
| Total | 17/905 (1.9%) |
| Standard deviation | 2.0% |
| Range | 0%-6% |

[a] Data as of 15 October 1996

**TABLE A5**
**Summary of the Incidence of Nonneoplastic Lesions in Male Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**[a]

| | 0 ppm | 150 ppm | 325 ppm | 650 ppm |
|---|---|---|---|---|
| **Disposition Summary** | | | | |
| Animals initially in study | 50 | 50 | 50 | 50 |
| Early deaths | | | | |
| Moribund | 12 | 13 | 7 | 10 |
| Natural deaths | 18 | 14 | 19 | 17 |
| Survivors | | | | |
| Died last week of study | 1 | | | |
| Terminal sacrifice | 19 | 23 | 24 | 23 |
| Animals examined microscopically | 50 | 50 | 50 | 50 |
| **Alimentary System** | | | | |
| Intestine large, colon | (46) | (46) | (48) | (47) |
| Hemorrhage | | | 1 (2%) | |
| Parasite metazoan | 1 (2%) | 3 (7%) | 1 (2%) | 2 (4%) |
| Intestine large, rectum | (45) | (47) | (46) | (47) |
| Parasite metazoan | 3 (7%) | 3 (6%) | 3 (7%) | 2 (4%) |
| Intestine large, cecum | (45) | (46) | (45) | (44) |
| Inflammation, chronic active | | | 1 (2%) | |
| Necrosis | | | | 1 (2%) |
| Parasite metazoan | | 1 (2%) | | |
| Intestine small, jejunum | (39) | (42) | (41) | (42) |
| Fibrosis | | | | 1 (2%) |
| Intestine small, ileum | (39) | (41) | (41) | (43) |
| Parasite metazoan | | 1 (2%) | | |
| Liver | (50) | (50) | (50) | (50) |
| Angiectasis | 5 (10%) | 11 (22%) | 7 (14%) | 9 (18%) |
| Basophilic focus | 3 (6%) | | | |
| Clear cell focus | 7 (14%) | 8 (16%) | 7 (14%) | 3 (6%) |
| Congestion | 2 (4%) | | | |
| Cyst | 1 (2%) | | | |
| Deformity | 1 (2%) | 2 (4%) | 1 (2%) | |
| Degeneration, cystic | 12 (24%) | 8 (16%) | 12 (24%) | 12 (24%) |
| Eosinophilic focus | 4 (8%) | 10 (20%) | 10 (20%) | 3 (6%) |
| Hemorrhage | | 2 (4%) | | |
| Hepatodiaphragmatic nodule | 2 (4%) | 3 (6%) | 5 (10%) | |
| Inflammation, chronic active | 1 (2%) | | 1 (2%) | |
| Mixed cell focus | 6 (12%) | 6 (12%) | 2 (4%) | 5 (10%) |
| Necrosis | | | 1 (2%) | 2 (4%) |
| Vacuolization cytoplasmic | 2 (4%) | | 4 (8%) | 1 (2%) |
| Bile duct, hyperplasia | 1 (2%) | 2 (4%) | 3 (6%) | |
| Centrilobular, congestion | | 1 (2%) | | |
| Centrilobular, degeneration | 1 (2%) | | 1 (2%) | |
| Centrilobular, vacuolization cytoplasmic | 1 (2%) | 2 (4%) | 1 (2%) | 1 (2%) |
| Kupffer cell, pigmentation | 1 (2%) | | | |
| Vein, dilatation | | 1 (2%) | | |
| Mesentery | (12) | (11) | (10) | (14) |
| Accessory spleen | | | | 1 (7%) |
| Inflammation, chronic active | | 1 (9%) | | |
| Necrosis | 1 (8%) | | | |
| Pigmentation | 1 (8%) | | | |
| Fat, necrosis | 9 (75%) | 10 (91%) | 9 (90%) | 12 (86%) |
| Fat, pigmentation | | | 1 (10%) | |

[a] Number of animals examined microscopically at the site and the number of animals with lesion

**TABLE A5**
**Summary of the Incidence of Nonneoplastic Lesions in Male Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 150 ppm | 325 ppm | 650 ppm |
|---|---|---|---|---|
| **Alimentary System** (continued) | | | | |
| Oral mucosa | (2) | | | |
| Hyperplasia | 1 (50%) | | | |
| Pancreas | (48) | (45) | (46) | (48) |
| Acinus, atrophy | 10 (21%) | 9 (20%) | 13 (28%) | 12 (25%) |
| Acinus, hyperplasia | | | 1 (2%) | 3 (6%) |
| Artery, hyperplasia | 2 (4%) | | | |
| Salivary glands | (50) | (50) | (49) | (50) |
| Atrophy | | 1 (2%) | | |
| Duct, hyperplasia | | 1 (2%) | | |
| Stomach, forestomach | (50) | (49) | (48) | (49) |
| Diverticulum | | | 1 (2%) | |
| Hemorrhage | | | | 1 (2%) |
| Inflammation, chronic active | 3 (6%) | 2 (4%) | 2 (4%) | |
| Ulcer | 10 (20%) | 10 (20%) | 8 (17%) | 13 (27%) |
| Epithelium, hyperplasia | 3 (6%) | 4 (8%) | 2 (4%) | 1 (2%) |
| Stomach, glandular | (50) | (49) | (48) | (50) |
| Atrophy | | | 1 (2%) | |
| Hyperplasia, lymphoid | 2 (4%) | 1 (2%) | | |
| Inflammation, chronic active | | | 1 (2%) | 1 (2%) |
| Mineralization | 1 (2%) | 1 (2%) | | |
| Necrosis | 17 (34%) | 14 (29%) | 13 (27%) | 17 (34%) |
| **Cardiovascular System** | | | | |
| Blood vessel | (48) | (50) | (50) | (50) |
| Aorta, inflammation, chronic active | | 1 (2%) | | |
| Aorta, mineralization | 1 (2%) | | | |
| Heart | (50) | (50) | (50) | (50) |
| Cardiomyopathy | 35 (70%) | 41 (82%) | 42 (84%) | 33 (66%) |
| Fibrosis | | | | 1 (2%) |
| Mineralization | 2 (4%) | | | 1 (2%) |
| Thrombosis | | 1 (2%) | | |
| Artery, inflammation, chronic active | 1 (2%) | | | |
| Atrium, thrombosis | 3 (6%) | | 6 (12%) | 4 (8%) |
| Ventricle, pigmentation | | | 1 (2%) | |
| **Endocrine System** | | | | |
| Adrenal cortex | (50) | (49) | (49) | (50) |
| Angiectasis | | | 1 (2%) | |
| Cytoplasmic alteration | | 2 (4%) | 2 (4%) | |
| Degeneration, cystic | | | 1 (2%) | |
| Hemorrhage | 1 (2%) | 1 (2%) | | 1 (2%) |
| Hyperplasia | | | 1 (2%) | |
| Necrosis | 1 (2%) | 1 (2%) | | |
| Vacuolization cytoplasmic | | | 3 (6%) | |
| Adrenal medulla | (50) | (49) | (49) | (50) |
| Angiectasis | | | | 1 (2%) |
| Hemorrhage | | | | 1 (2%) |
| Hyperplasia | 10 (20%) | 8 (16%) | 8 (16%) | 4 (8%) |
| Islets, pancreatic | (49) | (45) | (46) | (47) |
| Hyperplasia | | | | 1 (2%) |

**TABLE A5**
**Summary of the Incidence of Nonneoplastic Lesions in Male Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 150 ppm | 325 ppm | 650 ppm |
|---|---|---|---|---|
| **Endocrine System** (continued) | | | | |
| Parathyroid gland | (48) | (49) | (50) | (47) |
| Hyperplasia | 1 (2%) | 2 (4%) | 1 (2%) | |
| Pituitary gland | (48) | (49) | (49) | (50) |
| Pars distalis, angiectasis | 3 (6%) | 1 (2%) | 3 (6%) | 5 (10%) |
| Pars distalis, cyst | 1 (2%) | 3 (6%) | 2 (4%) | 2 (4%) |
| Pars distalis, hemorrhage | | 1 (2%) | | |
| Pars distalis, hyperplasia | 8 (17%) | 5 (10%) | 5 (10%) | 7 (14%) |
| Pars intermedia, cyst | | 1 (2%) | | 1 (2%) |
| Pars nervosa, hemorrhage | | 1 (2%) | | |
| Thyroid gland | (50) | (50) | (50) | (50) |
| Cyst | 1 (2%) | | | |
| C-cell, hyperplasia | 4 (8%) | 6 (12%) | 5 (10%) | 4 (8%) |
| Follicular cell, hyperplasia | | | 1 (2%) | |
| **General Body System** | | | | |
| Peritoneum | (3) | | | (1) |
| Necrosis | 1 (33%) | | | |
| Tissue NOS | (1) | | | |
| Abdominal, hemorrhage | 1 (100%) | | | |
| **Genital System** | | | | |
| Epididymis | (50) | (49) | (50) | (50) |
| Inflammation, chronic active | | | 1 (2%) | |
| Penis | (1) | | | |
| Inflammation, chronic active | 1 (100%) | | | |
| Preputial gland | (50) | (50) | (50) | (49) |
| Cyst | 3 (6%) | 1 (2%) | 2 (4%) | 3 (6%) |
| Fibrosis | | | | 1 (2%) |
| Inflammation, chronic | 1 (2%) | 1 (2%) | 1 (2%) | 1 (2%) |
| Inflammation, chronic active | 5 (10%) | 1 (2%) | 3 (6%) | 5 (10%) |
| Prostate | (50) | (50) | (50) | (50) |
| Hyperplasia | 1 (2%) | 2 (4%) | 1 (2%) | 2 (4%) |
| Inflammation, chronic active | 4 (8%) | 5 (10%) | 7 (14%) | 5 (10%) |
| Seminal vesicle | (50) | (50) | (50) | (50) |
| Hyperplasia | | | 1 (2%) | |
| Inflammation, chronic active | 1 (2%) | | | |
| Testes | (50) | (49) | (50) | (50) |
| Atrophy | 8 (16%) | 9 (18%) | 12 (24%) | 8 (16%) |
| Artery, inflammation, chronic active | | | 2 (4%) | 2 (4%) |
| Interstitial cell, hyperplasia | 8 (16%) | 11 (22%) | 10 (20%) | 8 (16%) |
| **Hematopoietic System** | | | | |
| Bone marrow | (47) | (45) | (47) | (49) |
| Atrophy | 4 (9%) | | 1 (2%) | 3 (6%) |
| Fibrosis | | | 2 (4%) | |
| Hyperplasia | 2 (4%) | 4 (9%) | 2 (4%) | 1 (2%) |
| Myeloid cell, hyperplasia | | 1 (2%) | | |

**TABLE A5**
**Summary of the Incidence of Nonneoplastic Lesions in Male Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 150 ppm | 325 ppm | 650 ppm |
|---|---|---|---|---|
| **Hematopoietic System** (continued) | | | | |
| Lymph node | (24) | (23) | (23) | (24) |
| Hemorrhage | 1 (4%) | 1 (4%) | | 1 (4%) |
| Iliac, hemorrhage | 1 (4%) | 1 (4%) | | |
| Iliac, hyperplasia, lymphoid | | | 1 (4%) | |
| Iliac, hyperplasia, plasma cell | | 1 (4%) | | |
| Mediastinal, congestion | | | 1 (4%) | |
| Mediastinal, ectasia | | | 1 (4%) | |
| Mediastinal, hemorrhage | 11 (46%) | 11 (48%) | 8 (35%) | 11 (46%) |
| Mediastinal, hyperplasia, lymphoid | 3 (13%) | 2 (9%) | | |
| Mediastinal, hyperplasia, plasma cell | | 1 (4%) | | |
| Mediastinal, infiltration cellular, histiocyte | | 1 (4%) | 1 (4%) | |
| Mediastinal, pigmentation | 3 (13%) | 2 (9%) | 1 (4%) | |
| Pancreatic, ectasia | | 1 (4%) | | |
| Pancreatic, hemorrhage | 1 (4%) | 4 (17%) | 2 (9%) | 5 (21%) |
| Pancreatic, hyperplasia, lymphoid | | | | 1 (4%) |
| Renal, ectasia | | 3 (13%) | | |
| Renal, hemorrhage | 3 (13%) | 3 (13%) | 1 (4%) | 8 (33%) |
| Renal, hyperplasia, lymphoid | | | | 1 (4%) |
| Renal, hyperplasia, plasma cell | 1 (4%) | | | |
| Renal, pigmentation | 3 (13%) | 4 (17%) | 2 (9%) | 7 (29%) |
| Lymph node, mandibular | (50) | (50) | (50) | (50) |
| Ectasia | 1 (2%) | 8 (16%) | 2 (4%) | 3 (6%) |
| Hemorrhage | 3 (6%) | 1 (2%) | 3 (6%) | 2 (4%) |
| Hyperplasia, lymphoid | 5 (10%) | 2 (4%) | 3 (6%) | 2 (4%) |
| Hyperplasia, plasma cell | 2 (4%) | 4 (8%) | 5 (10%) | 2 (4%) |
| Infiltration cellular, histiocyte | | 1 (2%) | | |
| Lymph node, mesenteric | (49) | (50) | (50) | (50) |
| Ectasia | 3 (6%) | 1 (2%) | 2 (4%) | 1 (2%) |
| Hemorrhage | 4 (8%) | 4 (8%) | 4 (8%) | 6 (12%) |
| Hyperplasia, lymphoid | 4 (8%) | 2 (4%) | | 2 (4%) |
| Inflammation, chronic active | | 1 (2%) | | |
| Spleen | (50) | (50) | (50) | (50) |
| Angiectasis | 2 (4%) | | | |
| Atrophy | | 1 (2%) | | |
| Congestion | 3 (6%) | | 2 (4%) | |
| Cyst | | | | 1 (2%) |
| Fibrosis | 10 (20%) | 16 (32%) | 19 (38%) | 14 (28%) |
| Hematopoietic cell proliferation | 3 (6%) | 5 (10%) | 2 (4%) | 2 (4%) |
| Necrosis | 3 (6%) | 1 (2%) | 2 (4%) | 1 (2%) |
| Pigmentation | 2 (4%) | | 2 (4%) | 2 (4%) |
| Capsule, fibrosis | 2 (4%) | 2 (4%) | 2 (4%) | |
| Capsule, pigmentation | 1 (2%) | | | 1 (2%) |
| Thymus | (49) | (47) | (48) | (47) |
| Atrophy | 30 (61%) | 19 (40%) | 18 (38%) | 27 (57%) |
| Hemorrhage | 3 (6%) | | 3 (6%) | 2 (4%) |
| Epithelial cell, hyperplasia | 5 (10%) | 3 (6%) | 2 (4%) | 3 (6%) |
| **Integumentary System** | | | | |
| Mammary gland | (50) | (45) | (48) | (47) |
| Dilatation | 8 (16%) | 13 (29%) | 9 (19%) | 6 (13%) |
| Hyperplasia | 1 (2%) | 3 (7%) | 5 (10%) | 6 (13%) |
| Inflammation, chronic active | | | | 2 (4%) |
| Pigmentation | 1 (2%) | | | |

**TABLE A5**
**Summary of the Incidence of Nonneoplastic Lesions in Male Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 150 ppm | 325 ppm | 650 ppm |
|---|---|---|---|---|
| **Integumentary System** (continued) | | | | |
| Skin | (50) | (50) | (50) | (50) |
| Cyst epithelial inclusion | 1 (2%) | | 1 (2%) | |
| Hyperkeratosis | 2 (4%) | | | 1 (2%) |
| Inflammation, chronic active | 2 (4%) | 1 (2%) | 1 (2%) | |
| Ulcer | | | | 2 (4%) |
| Epidermis, hyperplasia | | 1 (2%) | | |
| Hair follicle, atrophy | | | | 1 (2%) |
| Subcutaneous tissue, fibrosis | | | | 1 (2%) |
| Subcutaneous tissue, foreign body | | | | 1 (2%) |
| Subcutaneous tissue, inflammation, chronic active | | | | 1 (2%) |
| **Musculoskeletal System** | | | | |
| Bone | (50) | (50) | (50) | (50) |
| Hyperostosis | 1 (2%) | 1 (2%) | | 1 (2%) |
| **Nervous System** | | | | |
| Brain | (50) | (50) | (50) | (50) |
| Hemorrhage | 1 (2%) | 2 (4%) | 1 (2%) | 4 (8%) |
| Mineralization | 1 (2%) | | | |
| Necrosis | | | | 1 (2%) |
| Meninges, angiectasis | 1 (2%) | | | |
| **Respiratory System** | | | | |
| Lung | (50) | (50) | (50) | (50) |
| Hemorrhage | | 1 (2%) | 1 (2%) | 4 (8%) |
| Inflammation, acute | 1 (2%) | | | 1 (2%) |
| Inflammation, chronic active | | | 3 (6%) | 1 (2%) |
| Alveolar epithelium, hyperplasia | 4 (8%) | 1 (2%) | 6 (12%) | 1 (2%) |
| Alveolus, metaplasia, squamous | | | 1 (2%) | |
| Nose | (50) | (47) | (49) | (50) |
| Foreign body | | 2 (4%) | | 1 (2%) |
| Nasopharyngeal duct, inflammation, chronic active | 1 (2%) | | | |
| Olfactory epithelium, degeneration, hyaline | 1 (2%) | | | 2 (4%) |
| Olfactory epithelium, foreign body | 1 (2%) | | | 1 (2%) |
| Olfactory epithelium, hyperplasia | 1 (2%) | | | |
| Olfactory epithelium, inflammation, chronic active | 10 (20%) | 2 (4%) | 6 (12%) | 5 (10%) |
| Olfactory epithelium, metaplasia | 1 (2%) | | | |
| Respiratory epithelium, degeneration, hyaline | | 2 (4%) | 1 (2%) | |
| Respiratory epithelium, foreign body | 3 (6%) | | | |
| Respiratory epithelium, hyperplasia | 22 (44%) | 20 (43%) | 16 (33%) | 28 (56%) |
| Respiratory epithelium, inflammation | | | 1 (2%) | |
| Respiratory epithelium, inflammation, chronic | 1 (2%) | | 1 (2%) | 1 (2%) |
| Respiratory epithelium, inflammation, chronic active | 22 (44%) | 15 (32%) | 22 (45%) | 27 (54%) |
| Respiratory epithelium, metaplasia | | | | 1 (2%) |
| Respiratory epithelium, metaplasia, squamous | 2 (4%) | | | 1 (2%) |
| Respiratory epithelium, thrombosis | 4 (8%) | | | 1 (2%) |

**TABLE A5**
**Summary of the Incidence of Nonneoplastic Lesions in Male Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 150 ppm | 325 ppm | 650 ppm |
|---|---|---|---|---|
| **Special Senses System** | | | | |
| Eye | | (1) | | (2) |
| Atrophy | | | | 2 (100%) |
| Hemorrhage | | 1 (100%) | | |
| Lens, cataract | | 1 (100%) | | |
| **Urinary System** | | | | |
| Kidney | (50) | (49) | (49) | (50) |
| Angiectasis | | | 1 (2%) | |
| Atrophy | | | | 1 (2%) |
| Cyst | 3 (6%) | | 2 (4%) | 3 (6%) |
| Fibrosis | | 1 (2%) | | |
| Hemorrhage | 1 (2%) | | | |
| Hydronephrosis | 1 (2%) | | | |
| Infiltration cellular, polymorphonuclear | | 1 (2%) | | |
| Mineralization | 2 (4%) | | | 1 (2%) |
| Necrosis | | 1 (2%) | | |
| Nephropathy | 46 (92%) | 46 (94%) | 46 (94%) | 49 (98%) |
| Renal tubule, hyperplasia | | 1 (2%) | 1 (2%) | |
| Renal tubule, pigmentation | 4 (8%) | 3 (6%) | 4 (8%) | 3 (6%) |
| Urinary bladder | (48) | (50) | (49) | (49) |
| Hemorrhage | | | 1 (2%) | 1 (2%) |
| Inflammation, acute | 1 (2%) | | | |
| Inflammation, chronic active | | 1 (2%) | | |

# APPENDIX B
# SUMMARY OF LESIONS IN FEMALE RATS IN THE 2-YEAR DRINKING WATER STUDY OF 1-CHLORO-2-PROPANOL

**TABLE B1**
**Summary of the Incidence of Neoplasms in Female Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol[a]**

| | 0 ppm | 150 ppm | 325 ppm | 650 ppm |
|---|---|---|---|---|
| **Disposition Summary** | | | | |
| Animals initially in study | 50 | 50 | 50 | 50 |
| Early deaths | | | | |
| Moribund | 12 | 7 | 7 | 5 |
| Natural deaths | 13 | 10 | 13 | 14 |
| Survivors | | | | |
| Terminal sacrifice | 25 | 33 | 30 | 31 |
| Animals examined microscopically | 50 | 50 | 50 | 50 |
| **Alimentary System** | | | | |
| Intestine large, cecum | (47) | (49) | (48) | (48) |
| Intestine small, jejunum | (44) | (44) | (43) | (46) |
| Intestine small, ileum | (42) | (45) | (43) | (45) |
| Liver | (50) | (50) | (50) | (50) |
| Hepatocellular adenoma | | | 1 (2%) | 1 (2%) |
| Histiocytic sarcoma | 1 (2%) | | 1 (2%) | |
| Mesentery | (9) | (11) | (12) | (10) |
| Histiocytic sarcoma | 1 (11%) | | | |
| Oral mucosa | | (1) | (1) | |
| Squamous cell carcinoma | | 1 (100%) | | |
| Squamous cell papilloma | | | 1 (100%) | |
| Pancreas | (47) | (49) | (49) | (48) |
| Histiocytic sarcoma | | | 1 (2%) | |
| Acinus, adenoma | | | | 1 (2%) |
| Salivary glands | (50) | (50) | (50) | (50) |
| Stomach, forestomach | (50) | (50) | (50) | (50) |
| Stomach, glandular | (50) | (50) | (50) | (50) |
| Tongue | (2) | (2) | | (1) |
| Squamous cell carcinoma, metastatic, oral mucosa | | 1 (50%) | | |
| Squamous cell papilloma | 2 (100%) | 1 (50%) | | 1 (100%) |
| **Cardiovascular System** | | | | |
| Heart | (50) | (50) | (50) | (50) |
| Histiocytic sarcoma | | | 1 (2%) | |
| **Endocrine System** | | | | |
| Adrenal cortex | (49) | (50) | (50) | (50) |
| Carcinoma | 1 (2%) | | | |
| Adrenal medulla | (49) | (50) | (50) | (50) |
| Ganglioneuroma | | | | 1 (2%) |
| Pheochromocytoma malignant | 1 (2%) | 1 (2%) | | 1 (2%) |
| Pheochromocytoma complex | 1 (2%) | | | |
| Pheochromocytoma benign | 2 (4%) | 4 (8%) | 1 (2%) | 4 (8%) |
| Bilateral, pheochromocytoma benign | | 1 (2%) | | |
| Islets, pancreatic | (46) | (49) | (48) | (48) |
| Adenoma | 1 (2%) | 1 (2%) | 1 (2%) | |
| Carcinoma | | 1 (2%) | | |
| Pituitary gland | (49) | (50) | (50) | (50) |
| Pars distalis, adenoma | 29 (59%) | 30 (60%) | 32 (64%) | 35 (70%) |
| Pars distalis, carcinoma | 1 (2%) | | | |
| Pars distalis, histiocytic sarcoma | | | 1 (2%) | |

**TABLE B1**
**Summary of the Incidence of Neoplasms in Female Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 150 ppm | 325 ppm | 650 ppm |
|---|---|---|---|---|
| **Endocrine System** (continued) | | | | |
| Thyroid gland | (50) | (50) | (50) | (50) |
| Histiocytic sarcoma | 1 (2%) | | | |
| C-cell, adenoma | 2 (4%) | 8 (16%) | 5 (10%) | 3 (6%) |
| C-cell, carcinoma | | | 1 (2%) | 2 (4%) |
| Follicular cell, adenoma | | | | 1 (2%) |
| **General Body System** | | | | |
| Tissue NOS | (1) | | | |
| Abdominal, sarcoma | 1 (100%) | | | |
| **Genital System** | | | | |
| Clitoral gland | (49) | (49) | (49) | (49) |
| Adenoma | 1 (2%) | | 2 (4%) | 4 (8%) |
| Carcinoma | 2 (4%) | 3 (6%) | 2 (4%) | 3 (6%) |
| Histiocytic sarcoma | 1 (2%) | | 1 (2%) | |
| Bilateral, carcinoma | 2 (4%) | 1 (2%) | | |
| Ovary | (50) | (50) | (50) | (50) |
| Cystadenoma | | | 1 (2%) | |
| Granulosa cell tumor benign | | | 1 (2%) | |
| Granulosa-theca tumor malignant | | | 1 (2%) | |
| Histiocytic sarcoma | | | 1 (2%) | |
| Uterus | (50) | (50) | (50) | (50) |
| Histiocytic sarcoma | | | 1 (2%) | |
| Polyp stromal | 6 (12%) | 6 (12%) | 6 (12%) | 4 (8%) |
| Bilateral, polyp stromal | 1 (2%) | | | |
| **Hematopoietic System** | | | | |
| Bone marrow | (47) | (50) | (47) | (49) |
| Histiocytic sarcoma | | 1 (2%) | | 1 (2%) |
| Lymph node | (11) | (9) | (15) | (7) |
| Mediastinal, histiocytic sarcoma | | | 1 (7%) | |
| Pancreatic, histiocytic sarcoma | | | 1 (7%) | |
| Lymph node, mandibular | (50) | (50) | (50) | (49) |
| Histiocytic sarcoma | | | 1 (2%) | |
| Lymph node, mesenteric | (50) | (50) | (49) | (50) |
| Histiocytic sarcoma | | | 1 (2%) | |
| Spleen | (50) | (50) | (50) | (49) |
| Histiocytic sarcoma | | | 1 (2%) | |
| Thymus | (48) | (49) | (50) | (50) |
| Histiocytic sarcoma | | | 1 (2%) | |
| Thymoma benign | | 1 (2%) | | 1 (2%) |
| **Integumentary System** | | | | |
| Mammary gland | (50) | (50) | (49) | (50) |
| Adenoma | | 1 (2%) | | |
| Carcinoma | 1 (2%) | 1 (2%) | 1 (2%) | |
| Fibroadenoma | 21 (42%) | 21 (42%) | 26 (53%) | 14 (28%) |
| Fibroadenoma, multiple | 8 (16%) | 7 (14%) | 5 (10%) | 9 (18%) |
| Histiocytic sarcoma | | | 1 (2%) | |

**TABLE B1**
**Summary of the Incidence of Neoplasms in Female Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 150 ppm | 325 ppm | 650 ppm |
|---|---|---|---|---|
| **Integumentary System** (continued) | | | | |
| Skin | (50) | (50) | (50) | (50) |
| Squamous cell papilloma | 1 (2%) | | | |
| Subcutaneous tissue, fibroma | 1 (2%) | | 1 (2%) | 2 (4%) |
| Subcutaneous tissue, fibrous histiocytoma | | | | 1 (2%) |
| Subcutaneous tissue, histiocytic sarcoma | 1 (2%) | | 1 (2%) | |
| Subcutaneous tissue, melanoma malignant | | 1 (2%) | 1 (2%) | |
| Subcutaneous tissue, sarcoma | 1 (2%) | | 1 (2%) | |
| Subcutaneous tissue, schwannoma malignant | | 1 (2%) | | |
| **Musculoskeletal System** | | | | |
| Bone | (50) | (50) | (50) | (50) |
| Osteosarcoma | | | 1 (2%) | |
| **Nervous System** | | | | |
| None | | | | |
| **Respiratory System** | | | | |
| Lung | (50) | (50) | (50) | (50) |
| Alveolar/bronchiolar adenoma | | | | 1 (2%) |
| Histiocytic sarcoma | 1 (2%) | | 1 (2%) | |
| Melanoma malignant, metastatic, skin | | 1 (2%) | | |
| Osteosarcoma, metastatic, bone | | | 1 (2%) | |
| Pheochromocytoma complex, metastatic, adrenal medulla | 1 (2%) | | | |
| Nose | (50) | (48) | (49) | (49) |
| Respiratory epithelium, histiocytic sarcoma | | | 1 (2%) | |
| **Special Senses System** | | | | |
| Zymbal's gland | | (1) | (1) | |
| Carcinoma | | | 1 (100%) | |
| **Urinary System** | | | | |
| Kidney | (46) | (49) | (50) | (50) |
| Mesenchymal tumor malignant | | | 1 (2%) | |
| Transitional epithelium, papilloma | 1 (2%) | | | |
| Urinary bladder | (49) | (50) | (50) | (49) |
| Histiocytic sarcoma | | | 1 (2%) | |
| Papilloma | | | | 1 (2%) |
| **Systemic Lesions** | | | | |
| Multiple organs[b] | (50) | (50) | (50) | (50) |
| Histiocytic sarcoma | 1 (2%) | 1 (2%) | 1 (2%) | 1 (2%) |
| Leukemia mononuclear | 19 (38%) | 19 (38%) | 18 (36%) | 13 (26%) |

**TABLE B1**
**Summary of the Incidence of Neoplasms in Female Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 150 ppm | 325 ppm | 650 ppm |
|---|---|---|---|---|
| **Neoplasm Summary** | | | | |
| Total animals with primary neoplasms[c] | 48 | 46 | 49 | 48 |
| Total primary neoplasms | 107 | 111 | 112 | 104 |
| Total animals with benign neoplasms | 43 | 42 | 48 | 42 |
| Total benign neoplasms | 76 | 81 | 83 | 83 |
| Total animals with malignant neoplasms | 26 | 24 | 26 | 18 |
| Total malignant neoplasms | 31 | 30 | 29 | 21 |
| Total animals with metastatic neoplasms | 1 | 2 | 1 | |
| Total metastatic neoplasms | 1 | 2 | 1 | |

[a] Number of animals examined microscopically at the site and the number of animals with neoplasm
[b] Number of animals with any tissue examined microscopically
[c] Primary neoplasms: all neoplasms except metastatic neoplasms

**TABLE B2**
**Individual Animal Tumor Pathology of Female Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 0 ppm**

| Number of Days on Study | 5 1 9 | 5 4 1 | 5 8 2 | 5 9 7 | 6 0 9 | 6 2 9 | 6 3 5 | 6 4 1 | 6 4 6 | 6 5 3 | 6 5 9 | 6 7 0 | 6 7 2 | 6 7 2 | 6 8 0 | 6 9 8 | 7 0 1 | 7 0 9 | 7 1 2 | 7 1 9 | 7 2 0 | 7 2 2 | 7 2 7 | 7 2 9 | 7 2 9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 2 5 0 | 2 5 4 | 2 6 5 | 2 3 7 | 2 4 3 | 2 4 7 | 2 4 9 | 2 6 1 | 2 6 4 | 2 4 5 | 2 5 7 | 2 2 1 | 2 2 6 | 2 2 7 | 2 2 8 | 2 5 2 | 2 5 9 | 2 3 4 | 2 1 9 | 2 6 0 | 2 2 9 | 2 5 6 | 2 4 8 | 2 3 0 | 2 4 4 |
| **Alimentary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Esophagus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine large, colon | + | + | + | + | + | A | + | + | + | + | + | A | + | + | + | A | + | + | + | + | + | + | + | + | + |
| Intestine large, rectum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + |
| Intestine large, cecum | + | + | + | + | + | A | + | + | + | + | + | A | + | + | + | A | + | + | + | + | + | + | + | + | + |
| Intestine small, duodenum | + | + | + | + | + | A | + | A | + | + | + | A | + | + | + | A | + | + | + | + | + | + | + | + | + |
| Intestine small, jejunum | + | + | + | + | + | A | + | A | + | + | + | A | + | + | + | A | A | A | + | + | + | + | + | + | + |
| Intestine small, ileum | + | + | + | + | + | A | + | A | + | + | + | A | + | + | A | A | A | A | + | A | + | + | + | + | + |
| Liver | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | | | | | | | X | | | | | | | | | | | |
| Mesentery | | | | | | | + | | + | | + | | + | + | + | | + | | | | | | | | |
| Histiocytic sarcoma | | | | | | | | | | | | | | X | | | | | | | | | | | |
| Pancreas | + | + | + | + | + | A | + | + | + | + | + | A | + | + | + | A | + | + | + | + | + | + | + | + | + |
| Salivary glands | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Stomach, forestomach | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Stomach, glandular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Tongue | | | | | | | | | | | | | | | | | | | | | | | | | |
| Squamous cell papilloma | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Cardiovascular System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Blood vessel | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Heart | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Endocrine System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Adrenal cortex | + | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Carcinoma | | | | | | | | | | | | | | | | | X | | | | | | | | |
| Adrenal medulla | + | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Pheochromocytoma malignant | | | | | | | | | | | | | | | | | X | | | | | | | | |
| Pheochromocytoma complex | | | | | | X | | | | | | | | | | | | | | | | | | | |
| Pheochromocytoma benign | | | | | | | | | | | X | | | | | | | | X | | | | | | |
| Islets, pancreatic | + | + | + | + | + | A | + | + | + | + | + | A | + | + | A | A | + | + | + | + | + | + | + | + | + |
| Adenoma | | | | | | | | | | | | | | | | | | | | | | | | X | |
| Parathyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Pituitary gland | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Pars distalis, adenoma | | X | | X | X | | | X | X | X | | | | | X | | | X | | X | X | | X | | X |
| Pars distalis, carcinoma | | | | | | | | | | | | | | | | | | | X | | | | | | |
| Thyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | | | | | | | X | | | | | | | | | | | |
| C-cell, adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| **General Body System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tissue NOS | | | | | | | | | | | | | | | | | | | | | | | + | | |
| Abdominal, sarcoma | | | | | | | | | | | | | | | | | | | | | | | X | | |
| **Genital System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Clitoral gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + | + |
| Adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Histiocytic sarcoma | | | | | | | | | | | | | | X | | | | | | | | | | | |
| Bilateral, carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | |

+: Tissue examined microscopically
A: Autolysis precludes examination
M: Missing tissue
I: Insufficient tissue
X: Lesion present
Blank: Not examined

**TABLE B2**
**Individual Animal Tumor Pathology of Female Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 0 ppm**

| **Number of Days on Study** | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 2 1 7 | 2 1 8 | 2 2 0 | 2 2 3 | 2 2 4 | 2 3 1 | 2 4 0 | 2 4 1 | 2 4 2 | 2 4 6 | 2 5 3 | 2 5 5 | 2 5 8 | 2 6 2 | 2 6 3 | 2 6 6 | 2 1 6 | 2 2 2 | 2 2 5 | 2 3 2 | 2 3 3 | 2 3 5 | 2 3 6 | 2 3 8 | 2 3 9 | 2 5 1 | Total Tissues/ Tumors |
| **Alimentary System** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Esophagus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Intestine large, colon | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 47 |
| Intestine large, rectum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Intestine large, cecum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 47 |
| Intestine small, duodenum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 46 |
| Intestine small, jejunum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 44 |
| Intestine small, ileum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 42 |
| Liver | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Mesentery | | | | | | | | | | | | | | | | | | + | | | | | + | | | | 9 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Pancreas | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 47 |
| Salivary glands | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Stomach, forestomach | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Stomach, glandular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Tongue | | | | | | | | | | | | | | | + | | | | | + | | | | | | | 2 |
| Squamous cell papilloma | | | | | | | | | | | | | | | X | | | | | X | | | | | | | 2 |
| **Cardiovascular System** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Blood vessel | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Heart | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Endocrine System** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Adrenal cortex | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Adrenal medulla | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Pheochromocytoma malignant | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Pheochromocytoma complex | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Pheochromocytoma benign | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 |
| Islets, pancreatic | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 46 |
| Adenoma | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Parathyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Pituitary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Pars distalis, adenoma | | X | X | X | | X | | X | | X | X | | | X | | X | X | X | X | X | X | X | | X | X | | 29 |
| Pars distalis, carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Thyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| C-cell, adenoma | | | | | | X | | | | | | | | | | | | | X | | | | | | | | 2 |
| **General Body System** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tissue NOS | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Abdominal, sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Genital System** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Clitoral gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Adenoma | X | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Carcinoma | | | | | | | | | | X | | | | | | | | | X | | | | | | | | 2 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Bilateral, carcinoma | | | | | | | | | | | | | | | | | | | | | X | | | | X | | 2 |

**TABLE B2**
**Individual Animal Tumor Pathology of Female Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 0 ppm**

| Number of Days on Study | 5 1 9 | 5 4 1 | 5 8 2 | 5 9 7 | 6 0 9 | 6 2 9 | 6 3 5 | 6 4 1 | 6 4 6 | 6 5 3 | 6 5 9 | 6 7 0 | 7 7 2 | 7 7 2 | 6 8 0 | 6 9 8 | 7 0 1 | 7 0 9 | 7 1 2 | 7 1 9 | 7 2 0 | 7 2 2 | 7 2 7 | 7 2 9 | 7 2 9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 2 5 0 | 2 5 4 | 2 6 5 | 2 3 7 | 2 4 3 | 2 4 7 | 2 4 9 | 2 6 1 | 2 6 4 | 2 4 5 | 2 5 7 | 2 2 1 | 2 2 6 | 2 2 7 | 2 2 8 | 2 5 2 | 2 5 9 | 2 3 4 | 2 1 9 | 2 6 0 | 2 2 9 | 2 5 6 | 2 4 8 | 2 3 0 | 2 4 4 |
| **Genital System** (continued) | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ovary | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Uterus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Polyp stromal | | | | | | | X | | X | | | | | | | | X | | | X | | | X | | |
| Bilateral, polyp stromal | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Hematopoietic System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone marrow | + | + | + | + | + | A | + | + | + | + | + | A | + | + | + | A | + | + | + | + | + | + | + | + | + |
| Lymph node | + | | + | | | | + | | | | + | + | | | + | + | + | | | | | | | | |
| Lymph node, mandibular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Lymph node, mesenteric | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Spleen | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Thymus | + | + | + | + | + | + | + | + | M | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Integumentary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | X |
| Fibroadenoma | | | | | X | X | | X | | | | | X | | X | | | X | X | | | X | | X | |
| Fibroadenoma, multiple | | X | | | | | | | | X | | | | | | | X | | | X | | | | | |
| Skin | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Squamous cell papilloma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Subcutaneous tissue, fibroma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Subcutaneous tissue, histiocytic sarcoma | | | | | | | | | | | | | | X | | | | | | | | | | | |
| Subcutaneous tissue, sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Musculoskeletal System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Nervous System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Peripheral nerve | + | | | | | | | | | | | | | | | | | | | | | | + | | |
| Spinal cord | + | | | | | | | | | | | | | | | | | | | | | | + | | |
| **Respiratory System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | | | | | | | X | | | | | | | | | | | |
| Pheochromocytoma complex, metastatic, adrenal medulla | | | | | | X | | | | | | | | | | | | | | | | | | | |
| Nose | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Trachea | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Special Senses System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| None | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Urinary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kidney | + | + | + | + | + | A | + | + | + | + | + | A | + | + | A | A | + | + | + | + | + | + | + | + | + |
| Transitional epithelium, papilloma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Urinary bladder | + | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Systemic Lesions** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Multiple organs | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | | | | | | | X | | | | | | | | | | | |
| Leukemia mononuclear | X | | X | | | | X | | | | X | X | X | X | X | X | X | | | | | X | | X | |

**TABLE B2**
**Individual Animal Tumor Pathology of Female Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 0 ppm**

| Number of Days on Study | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 2 1 7 | 2 1 8 | 2 2 0 | 2 2 3 | 2 2 4 | 2 3 1 | 2 4 0 | 2 4 1 | 2 4 2 | 2 4 6 | 2 5 3 | 2 5 5 | 2 5 8 | 2 6 2 | 2 6 3 | 2 1 6 | 2 2 2 | 2 2 5 | 2 3 2 | 2 3 3 | 2 3 5 | 2 3 6 | 2 3 8 | 2 3 9 | 2 5 1 | Total Tissues/ Tumors |
| **Genital System** (continued) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ovary | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Uterus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Polyp stromal | | | | | | | | | | | | | | | | | | | | | | X | | | | 6 |
| Bilateral, polyp stromal | | | | | | | | | | | | | | | | X | | | | | | | | | | 1 |
| **Hematopoietic System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone marrow | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 47 |
| Lymph node | | | | | | | | | | | | + | | | | | | | + | + | | | | | | 11 |
| Lymph node, mandibular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Lymph node, mesenteric | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Spleen | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Thymus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 48 |
| **Integumentary System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Fibroadenoma | X | X | | | | | | X | X | | X | X | | | | X | | X | X | X | X | | | X | | 21 |
| Fibroadenoma, multiple | | | X | | | | | | | | | | X | | | | X | | | | | | X | | | 8 |
| Skin | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Squamous cell papilloma | X | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Subcutaneous tissue, fibroma | | | | | | | | | | | | | | | | | | X | | | | | | | | 1 |
| Subcutaneous tissue, histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Subcutaneous tissue, sarcoma | | | | | | | | | | | | | X | | | | | | | | | | | | | 1 |
| **Musculoskeletal System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Nervous System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Peripheral nerve | | | | | | | | | | | | | | | | | | | | | | | | | | 2 |
| Spinal cord | | | | | | | | | | | | | | | | | | | | | | | | | | 2 |
| **Respiratory System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Pheochromocytoma complex, metastatic, adrenal medulla | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Nose | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Trachea | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Special Senses System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| None | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Urinary System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kidney | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 46 |
| Transitional epithelium, papilloma | | | | | | | | | | | | | | | | | | | | | | | X | | | 1 |
| Urinary bladder | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| **Systemic Lesions** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Multiple organs | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Leukemia mononuclear | | X | | | | | | | | | | | X | X | | | X | X | X | | X | | | | | 19 |

**TABLE B2**
**Individual Animal Tumor Pathology of Female Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 150 ppm**

| Number of Days on Study | 2 1 7 | 4 8 4 | 6 2 7 | 6 3 6 | 6 7 6 | 6 7 7 | 6 7 8 | 6 7 8 | 6 8 2 | 6 9 1 | 6 9 9 | 7 0 8 | 7 0 8 | 7 1 2 | 7 1 2 | 7 1 6 | 7 2 8 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 2 9 3 | 3 0 6 | 2 8 0 | 2 9 9 | 2 7 1 | 2 6 6 | 2 9 7 | 2 9 8 | 2 7 3 | 2 9 1 | 2 6 9 | 2 7 6 | 2 8 1 | 2 6 8 | 2 8 4 | 2 9 6 | 2 8 3 | 2 6 7 | 2 7 0 | 2 7 2 | 2 7 4 | 2 7 5 | 2 7 7 | 2 7 8 | 2 7 9 |
| **Alimentary System** | | | | | | | | | | | | | | | | | | | | | | | | |
| Esophagus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine large, colon | + | + | + | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + |
| Intestine large, rectum | + | + | + | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + |
| Intestine large, cecum | + | + | + | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + |
| Intestine small, duodenum | + | + | + | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + |
| Intestine small, jejunum | + | + | A | + | + | + | + | + | + | A | A | + | + | A | A | + | A | + | + | + | + | + | + | + |
| Intestine small, ileum | + | + | + | + | + | + | + | + | + | A | A | + | + | A | A | + | A | + | + | + | + | + | + | + |
| Liver | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Mesentery | | | + | | | | | + | | | | | | | | | | | | | + | | | |
| Oral mucosa | | | | | | | | | | | | + | | | | | | | | | | | | |
| Squamous cell carcinoma | | | | | | | | | | | | X | | | | | | | | | | | | |
| Pancreas | + | + | + | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + |
| Salivary glands | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Stomach, forestomach | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Stomach, glandular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Tongue | | | | | | | | | | | | + | | | | | | | | | | | | |
| Squamous cell carcinoma, metastatic, oral mucosa | | | | | | | | | | | | X | | | | | | | | | | | | |
| Squamous cell papilloma | | | | | | | | | | | | | | | | | | | | | | | | |
| Tooth | | | | | | | | | | | | | | | | | | | | | | | | |
| **Cardiovascular System** | | | | | | | | | | | | | | | | | | | | | | | | |
| Blood vessel | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Heart | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Endocrine System** | | | | | | | | | | | | | | | | | | | | | | | | |
| Adrenal cortex | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Adrenal medulla | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Pheochromocytoma malignant | | | | | | | | | | | | | | | | | | | | | | X | | |
| Pheochromocytoma benign | | | X | | | | | | | | | | | | | | | | | | | X | | |
| Bilateral, pheochromocytoma benign | | | | | | | X | | | | | | | | | | | | | | | | | |
| Islets, pancreatic | + | + | + | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + |
| Adenoma | | | | | | | | | | | | | | | | | | | | | | | | |
| Carcinoma | | | | | | | | | | | | | | | | | | | | | | | | |
| Parathyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Pituitary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Pars distalis, adenoma | | | | | X | X | X | X | X | X | | | X | | | X | X | | X | | X | | | X | X |
| Thyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| C-cell, adenoma | | | | | | | X | | | | | | X | | | X | | | | | X | X | | | |
| **General Body System** | | | | | | | | | | | | | | | | | | | | | | | | |
| None | | | | | | | | | | | | | | | | | | | | | | | | |
| **Genital System** | | | | | | | | | | | | | | | | | | | | | | | | |
| Clitoral gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Carcinoma | | | | | | | | | | | | | X | | X | | | | | | | | | |
| Bilateral, carcinoma | | | | | | | | | | | | | | | | | | | | | | X | | |
| Ovary | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Uterus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Polyp stromal | | | | X | | | | X | | | | | | | | | | | | | X | | | |
| Vagina | | | | | | | | + | | + | | | | | | | | | | | | | | |

**TABLE B2**
**Individual Animal Tumor Pathology of Female Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 150 ppm**

| Number of Days on Study | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 2 8 2 | 2 8 5 | 2 8 6 | 2 8 7 | 2 8 8 | 2 8 9 | 2 9 0 | 2 9 2 | 2 9 4 | 2 9 5 | 3 0 0 | 3 0 1 | 3 0 2 | 3 0 3 | 3 0 4 | 3 0 5 | 3 0 7 | 3 0 8 | 3 0 9 | 3 1 0 | 3 1 1 | 3 1 2 | 3 1 3 | 3 1 4 | 3 1 5 | Total Tissues/ Tumors |
| **Alimentary System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Esophagus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Intestine large, colon | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Intestine large, rectum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Intestine large, cecum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Intestine small, duodenum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Intestine small, jejunum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 44 |
| Intestine small, ileum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 45 |
| Liver | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Mesentery | + | | | | | | | + | + | + | + | | + | | | | + | | | | | | | | + | 11 |
| Oral mucosa | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Squamous cell carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Pancreas | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Salivary glands | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Stomach, forestomach | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Stomach, glandular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Tongue | | | | | | | | | | | | | | | | | | | | | | + | | | | 2 |
| Squamous cell carcinoma, metastatic, oral mucosa | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Squamous cell papilloma | | | | | | | | | | | | | | | | | | | | | | X | | | | 1 |
| Tooth | | | | | | | | | | | | | + | | | | | | | | | | | | | 1 |
| **Cardiovascular System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Blood vessel | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Heart | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Endocrine System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Adrenal cortex | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Adrenal medulla | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Pheochromocytoma malignant | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Pheochromocytoma benign | | | | | | | | | | | | | | | | | X | | | | X | | | | | 4 |
| Bilateral, pheochromocytoma benign | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Islets, pancreatic | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Adenoma | | | | | | | | X | | | | | | | | | | | | | | | | | | 1 |
| Carcinoma | | | | | X | | | | | | | | | | | | | | | | | | | | | 1 |
| Parathyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Pituitary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Pars distalis, adenoma | | | X | | X | X | X | X | X | X | X | | X | X | X | | X | X | | X | X | X | | X | | 30 |
| Thyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| C-cell, adenoma | | | X | | | | | | | | X | | | | | | | | | | X | | | | | 8 |
| **General Body System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| None | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Genital System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Clitoral gland | + | + | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Carcinoma | | | | | X | | | | | | | | | | | | | | | | | | | | | 3 |
| Bilateral, carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Ovary | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Uterus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Polyp stromal | | | | | | | | | | | | | | X | | | | | | X | | | | | X | 6 |
| Vagina | | | | | | | | | | | | | | | | | | | | | | | | | | 2 |

**TABLE B2**
**Individual Animal Tumor Pathology of Female Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 150 ppm**

| Number of Days on Study | 2 1 7 | 4 8 4 | 6 2 7 | 6 3 6 | 6 7 6 | 6 7 7 | 6 7 8 | 6 7 8 | 6 8 2 | 6 9 1 | 6 9 9 | 7 0 8 | 7 0 8 | 7 1 2 | 7 1 2 | 7 1 6 | 7 2 8 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 2 9 3 | 3 0 6 | 2 8 0 | 2 9 9 | 2 7 1 | 2 6 6 | 2 9 7 | 2 9 8 | 2 7 3 | 2 9 1 | 2 6 9 | 2 7 6 | 2 8 1 | 2 6 8 | 2 8 4 | 2 9 6 | 2 8 3 | 2 6 7 | 2 7 0 | 2 7 2 | 2 7 4 | 2 7 5 | 2 7 7 | 2 7 8 | 2 7 9 |
| **Hematopoietic System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone marrow | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lymph node | | | + | | | | + | | | + | + | | | + | + | | | | | | + | | | | |
| Lymph node, mandibular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Lymph node, mesenteric | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Spleen | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Thymus | + | + | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + |
| Thymoma benign | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Integumentary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carcinoma | | | X | | | | | | | | | | | | | | | | | | | | | | |
| Fibroadenoma | | | X | X | | | | X | | | X | | | | | X | | | | X | | | X | | |
| Fibroadenoma, multiple | | | | | | X | | | | | | X | | | | | | | | | | | | | |
| Skin | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Subcutaneous tissue, melanoma malignant | | | | | | | | | | | | | | | | | | | | | | | | | |
| Subcutaneous tissue, schwannoma malignant | X | | | | | | | | | | | | | | | | | | | | | | | | |
| **Musculoskeletal System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Skeletal muscle | + | | | | | | | | | | | | | | | | | | | | | | | | |
| **Nervous System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Peripheral nerve | + | | | | | | | | | | | | | | | | | | | | | | | | |
| Spinal cord | + | | | | | | | | | | | | | | | | | | | | | | | | |
| **Respiratory System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Melanoma malignant, metastatic, skin | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nose | + | + | + | + | + | A | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + |
| Trachea | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Special Senses System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ear | | | | | | | | | | | | | | | | + | | | | | | | | | |
| Zymbal's gland | | | | | | | | | | | | | | | | + | | | | | | | | | |
| **Urinary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kidney | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Urinary bladder | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Systemic Lesions** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Multiple organs | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Leukemia mononuclear | | | X | X | X | | X | | | | X | X | | X | X | | | X | | | X | | | X | |

**TABLE B2**
**Individual Animal Tumor Pathology of Female Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 150 ppm**

| Number of Days on Study | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 2 8 2 | 2 8 5 | 2 8 6 | 2 8 7 | 2 8 8 | 2 8 9 | 2 9 0 | 2 9 2 | 2 9 4 | 2 9 5 | 3 0 0 | 3 0 1 | 3 0 2 | 3 0 3 | 3 0 4 | 3 0 5 | 3 0 7 | 3 0 8 | 3 0 9 | 3 1 0 | 3 1 1 | 3 1 2 | 3 1 3 | 3 1 4 | 3 1 5 | Total Tissues/ Tumors |
| **Hematopoietic System** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone marrow | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | X | | | | | | | | | 1 |
| Lymph node | | | | | | | | | | | | | | | | | | | + | | | | + | | | | | 9 |
| Lymph node, mandibular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Lymph node, mesenteric | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Spleen | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Thymus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Thymoma benign | | | | | | | | | | | | | | | | | | | | | X | | | | | | | 1 |
| **Integumentary System** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Adenoma | | | | | | | | X | | | | | | | | | | | | | | | | | | | | 1 |
| Carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Fibroadenoma | X | | X | | | X | X | X | | | X | | X | | X | | X | X | X | | X | | | | X | | | 21 |
| Fibroadenoma, multiple | | X | | | X | | | | | X | | | | X | | X | | | | | | | | | | | | 7 |
| Skin | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Subcutaneous tissue, melanoma malignant | | | | | | | | | | | | | | | | | | X | | | | | | | | | | 1 |
| Subcutaneous tissue, schwannoma malignant | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Musculoskeletal System** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Skeletal muscle | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Nervous System** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Peripheral nerve | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Spinal cord | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Respiratory System** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Melanoma malignant, metastatic, skin | | | | | | | | | | | | | | | | | | X | | | | | | | | | | 1 |
| Nose | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 48 |
| Trachea | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Special Senses System** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ear | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Zymbal's gland | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Urinary System** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kidney | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Urinary bladder | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Systemic Lesions** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Multiple organs | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | X | | | | | | | | | 1 |
| Leukemia mononuclear | X | | | | X | | | | X | | | | | X | | | | X | | X | | | | X | | X | | 19 |

**TABLE B2**
**Individual Animal Tumor Pathology of Female Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 325 ppm**

| Number of Days on Study | 5 0 6 | 5 2 5 | 5 2 8 | 5 7 1 | 5 9 7 | 6 0 8 | 6 1 3 | 6 5 5 | 6 5 9 | 6 6 1 | 6 6 3 | 6 6 8 | 6 9 4 | 6 9 7 | 7 0 8 | 7 1 4 | 7 1 7 | 7 1 8 | 7 2 1 | 7 3 3 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 3 4 8 | 3 5 3 | 3 3 4 | 3 3 3 | 3 5 4 | 3 2 2 | 3 4 1 | 3 2 3 | 3 5 8 | 3 6 1 | 3 1 6 | 3 1 3 1 | 3 6 2 | 3 4 2 | 3 6 0 | 3 5 1 | 3 2 4 | 3 2 0 | 3 6 3 | 3 5 0 | 3 1 7 | 3 1 8 | 3 1 9 | 3 2 1 | 3 2 5 |
| **Alimentary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Esophagus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine large, colon | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine large, rectum | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + |
| Intestine large, cecum | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + |
| Intestine small, duodenum | + | + | + | + | + | + | A | + | + | + | A | + | + | A | + | + | A | + | + | + | + | + | + | + | + |
| Intestine small, jejunum | + | A | + | + | + | + | A | + | + | + | A | + | + | A | + | + | A | A | + | A | + | + | + | + | + |
| Intestine small, ileum | + | A | + | + | + | + | A | + | + | + | A | + | + | A | + | + | A | A | + | A | + | + | + | + | + |
| Liver | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Hepatocellular adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Histiocytic sarcoma | | | | | | | | | | X | | | | | | | | | | | | | | | |
| Mesentery | | | + | | | | | + | | + | | | + | + | | | | | | | | | + | | + |
| Oral mucosa | | | | | | | | | | | | | | | | | | | | | | | | | |
| Squamous cell papilloma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pancreas | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | | | X | | | | | | | | | | | | | | | |
| Salivary glands | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Stomach, forestomach | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Stomach, glandular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Cardiovascular System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Blood vessel | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Heart | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | | | X | | | | | | | | | | | | | | | |
| **Endocrine System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Adrenal cortex | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Adrenal medulla | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Pheochromocytoma benign | | | | | | | | | | | | | | | | | | | | | | X | | | |
| Islets, pancreatic | + | + | + | + | + | + | A | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Parathyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Pituitary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Pars distalis, adenoma | X | X | | X | X | X | X | | X | | | | X | | X | X | X | X | | X | X | X | X | | X |
| Pars distalis, histiocytic sarcoma | | | | | | | | | | X | | | | | | | | | | | | | | | |
| Thyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| C-cell, adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| C-cell, carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| **General Body System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| None | | | | | | | | | | | | | | | | | | | | | | | | | |

**TABLE B2**
**Individual Animal Tumor Pathology of Female Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 325 ppm**

| **Number of Days on Study** | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 5 | 7 3 5 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 3 2 6 | 3 2 7 | 3 2 8 | 3 2 9 | 3 3 0 | 3 3 2 | 3 3 5 | 3 3 6 | 3 3 7 | 3 3 8 | 3 3 9 | 3 4 0 | 3 4 3 | 3 4 4 | 3 4 5 | 3 4 6 | 3 5 2 | 3 5 5 | 3 5 6 | 3 5 7 | 3 5 9 | 3 6 4 | 3 6 5 | 3 4 7 | 3 4 9 | Total Tissues/ Tumors |
| **Alimentary System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Esophagus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Intestine large, colon | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Intestine large, rectum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 48 |
| Intestine large, cecum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 48 |
| Intestine small, duodenum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 46 |
| Intestine small, jejunum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 43 |
| Intestine small, ileum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 43 |
| Liver | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Hepatocellular adenoma | | | | | | | | | | | | | | | | | | | | X | | | | | | 1 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Mesentery | + | | | | | | | | | | | | | | + | + | | | | + | | + | | | | 12 |
| Oral mucosa | | | | | | | | | | | | | | + | | | | | | | | | | | | 1 |
| Squamous cell papilloma | | | | | | | | | | | | | | X | | | | | | | | | | | | 1 |
| Pancreas | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Salivary glands | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Stomach, forestomach | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Stomach, glandular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Cardiovascular System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Blood vessel | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Heart | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Endocrine System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Adrenal cortex | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Adrenal medulla | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Pheochromocytoma benign | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Islets, pancreatic | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 48 |
| Adenoma | X | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Parathyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Pituitary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Pars distalis, adenoma | X | X | X | X | X | X | | | | X | X | | X | | X | X | X | X | | | X | | | X | | 32 |
| Pars distalis, histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Thyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| C-cell, adenoma | | | | X | | X | | | | | | X | | | | | | | X | | | | | | X | 5 |
| C-cell, carcinoma | | | | | | | | | | | | | | | | | | | | X | | | | | | 1 |
| **General Body System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| None | | | | | | | | | | | | | | | | | | | | | | | | | | |

**TABLE B2**
**Individual Animal Tumor Pathology of Female Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 325 ppm**

| Number of Days on Study | 5 0 6 | 5 2 5 | 5 2 8 | 5 7 1 | 5 9 7 | 6 0 8 | 6 1 3 | 6 1 5 | 6 5 9 | 6 6 1 | 6 6 3 | 6 6 8 | 6 9 4 | 6 9 7 | 7 0 8 | 7 1 4 | 7 1 7 | 7 1 8 | 7 2 1 | 7 3 3 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 3 4 8 | 3 5 3 | 3 3 4 | 3 3 3 | 3 5 4 | 3 2 2 | 3 4 1 | 3 2 3 | 3 5 8 | 3 6 1 | 3 1 6 | 3 3 1 | 3 6 2 | 3 4 2 | 3 6 0 | 3 5 1 | 3 2 4 | 3 2 0 | 3 6 3 | 3 5 0 | 3 1 7 | 3 1 8 | 3 1 9 | 3 2 1 | 3 2 5 |
| **Genital System** | | | | | | | | | | | | | | | | | | | | | | | | |
| Clitoral gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | M | + | + |
| Adenoma | | | | | | X | | | | | | | | | | | | | | | | | | | |
| Carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Histiocytic sarcoma | | | | | | | | | | X | | | | | | | | | | | | | | | |
| Ovary | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Cystadenoma | | | | | | | | | | | | | | X | | | | | | | | | | | |
| Granulosa cell tumor benign | | | | | | | | | | | | | | | | | X | | | | | | | | |
| Granulosa-theca tumor malignant | | | | | | | | | | | | | | | | | | | | | | | | | |
| Histiocytic sarcoma | | | | | | | | | | X | | | | | | | | | | | | | | | |
| Uterus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | | | X | | | | | | | | | | | | | | | |
| Polyp stromal | | | X | | | | | | | | X | | | | | | | | | | | X | | | X |
| **Hematopoietic System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone marrow | + | + | + | A | + | + | + | + | + | A | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + |
| Lymph node | | + | + | + | | | | + | + | + | + | + | + | | | + | | | + | | + | | | | |
| Mediastinal, histiocytic sarcoma | | | | | | | | | | X | | | | | | | | | | | | | | | |
| Pancreatic, histiocytic sarcoma | | | | | | | | | | X | | | | | | | | | | | | | | | |
| Lymph node, mandibular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | | | X | | | | | | | | | | | | | | | |
| Lymph node, mesenteric | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | | | X | | | | | | | | | | | | | | | |
| Spleen | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | | | X | | | | | | | | | | | | | | | |
| Thymus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | | | X | | | | | | | | | | | | | | | |
| **Integumentary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary gland | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Carcinoma | | | | | | X | | | | | | | | | | | | | | | | | | | |
| Fibroadenoma | | | | | | X | | | X | X | | X | X | | X | | X | X | | | X | | | | X |
| Fibroadenoma, multiple | | | | | | | | | | | | | | | | | | | X | | | X | X | | |
| Histiocytic sarcoma | | | | | | | | | | X | | | | | | | | | | | | | | | |
| Skin | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Subcutaneous tissue, fibroma | | | | | | | | | X | | | | | | | | | | | | | | | | |
| Subcutaneous tissue, histiocytic sarcoma | | | | | | | | | | X | | | | | | | | | | | | | | | |
| Subcutaneous tissue, melanoma malignant | | | | | | | | | | | | | | X | | | | | | | | | | | |
| Subcutaneous tissue, sarcoma | | | | | | | | | | | | | X | | | | | | | | | | | | |
| **Musculoskeletal System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Osteosarcoma | | X | | | | | | | | | | | | | | | | | | | | | | | |
| **Nervous System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |

**TABLE B2**
**Individual Animal Tumor Pathology of Female Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 325 ppm**

| Number of Days on Study | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 5 | 7 3 5 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 3 2 6 | 3 2 7 | 3 2 8 | 3 2 9 | 3 3 0 | 3 3 2 | 3 3 5 | 3 3 6 | 3 3 7 | 3 3 8 | 3 3 9 | 3 4 0 | 3 4 3 | 3 4 4 | 3 4 5 | 3 4 6 | 3 5 2 | 3 5 5 | 3 5 6 | 3 5 7 | 3 5 9 | 3 6 4 | 3 6 5 | 3 4 7 | 3 4 9 | Total Tissues/ Tumors |
| **Genital System** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Clitoral gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Adenoma | | | | | | | | | | | | X | | | | | | | | | | | | | | | | | 2 |
| Carcinoma | | | | | | | | | | | X | | | | | | | | X | | | | | | | | | | 2 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Ovary | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Cystadenoma | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Granulosa cell tumor benign | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Granulosa-theca tumor malignant | | | | | | | | | | | | | | | | | | X | | | | | | | | | | | 1 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Uterus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Polyp stromal | | | | | | | X | | | | | | | | | | | | | | | X | | | | | | | 6 |
| **Hematopoietic System** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone marrow | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 47 |
| Lymph node | | | | | | | | | | | | | | | | + | + | | | | | + | | | | | | | 15 |
| Mediastinal, histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Pancreatic, histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Lymph node, mandibular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Lymph node, mesenteric | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Spleen | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Thymus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Integumentary System** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Fibroadenoma | | X | X | | X | X | | | X | X | | X | X | | X | | X | X | X | X | | X | X | X | | | | | 26 |
| Fibroadenoma, multiple | | | | | | | X | X | | | | | | | | | | | | | | | | | | | | | 5 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Skin | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Subcutaneous tissue, fibroma | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Subcutaneous tissue, histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Subcutaneous tissue, melanoma malignant | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Subcutaneous tissue, sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Musculoskeletal System** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Osteosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Nervous System** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |

**TABLE B2**
**Individual Animal Tumor Pathology of Female Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 325 ppm**

| Number of Days on Study | 5 0 6 | 5 2 5 | 5 2 8 | 5 7 1 | 5 9 7 | 6 0 8 | 6 1 3 | 6 5 5 | 6 5 9 | 6 6 1 | 6 6 3 | 6 6 8 | 6 9 4 | 6 9 7 | 7 0 8 | 7 1 4 | 7 1 7 | 7 1 8 | 7 2 1 | 7 3 3 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 3 4 8 | 3 5 3 | 3 3 4 | 3 3 3 | 3 5 4 | 3 2 2 | 3 4 1 | 3 2 3 | 3 5 8 | 3 6 1 | 3 1 6 | 3 3 1 | 3 6 2 | 3 4 2 | 3 6 0 | 3 5 1 | 3 2 4 | 3 2 0 | 3 6 3 | 3 5 0 | 3 1 7 | 3 1 8 | 3 1 9 | 3 2 1 | 3 2 5 |
| **Respiratory System** | | | | | | | | | | | | | | | | | | | | | | | | |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | | | X | | | | | | | | | | | | | | |
| Osteosarcoma, metastatic, bone | | X | | | | | | | | | | | | | | | | | | | | | | |
| Nose | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Respiratory epithelium, histiocytic sarcoma | | | | | | | | | | X | | | | | | | | | | | | | | |
| Pleura | | | | | | | | | | | | | | | | | | | | | | | | |
| Trachea | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Special Senses System** | | | | | | | | | | | | | | | | | | | | | | | | |
| Zymbal's gland | | | | | | | | + | | | | | | | | | | | | | | | | |
| Carcinoma | | | | | | | | X | | | | | | | | | | | | | | | | |
| **Urinary System** | | | | | | | | | | | | | | | | | | | | | | | | |
| Kidney | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Mesenchymal tumor malignant | | | | | | | | | | | | | | | | | | | | | | | | |
| Urinary bladder | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | | | X | | | | | | | | | | | | | | |
| **Systemic Lesions** | | | | | | | | | | | | | | | | | | | | | | | | |
| Multiple organs | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | | | X | | | | | | | | | | | | | | |
| Leukemia mononuclear | | | X | X | | | | X | X | | X | X | X | | | | | X | X | | X | | | |

**TABLE B2**
**Individual Animal Tumor Pathology of Female Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 325 ppm**

| Number of Days on Study | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 5 | 7 3 5 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 3 2 6 | 3 2 7 | 3 2 8 | 3 2 9 | 3 3 0 | 3 3 2 | 3 3 5 | 3 3 6 | 3 3 7 | 3 3 8 | 3 3 9 | 3 4 0 | 3 4 3 | 3 4 4 | 3 4 5 | 3 4 6 | 3 5 2 | 3 5 5 | 3 5 6 | 3 5 7 | 3 5 9 | 3 6 4 | 3 6 5 | 3 4 7 | 3 4 9 | Total Tissues/ Tumors |
| **Respiratory System** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Osteosarcoma, metastatic, bone | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Nose | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Respiratory epithelium, histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Pleura | | | + | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Trachea | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Special Senses System** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zymbal's gland | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Urinary System** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kidney | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Mesenchymal tumor malignant | | | | | | | | | | | | | | | | | | | | | | | | | | | X | 1 |
| Urinary bladder | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Systemic Lesions** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Multiple organs | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Leukemia mononuclear | X | | | | | X | X | | X | | | X | | X | | X | | | X | | | | | | | | | 18 |

**TABLE B2**
**Individual Animal Tumor Pathology of Female Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 650 ppm**

| Number of Days on Study | 4 4 9 | 4 8 9 | 5 6 1 | 5 6 2 | 5 9 2 | 6 3 4 | 6 3 9 | 6 4 9 | 6 5 6 | 6 6 8 | 6 9 1 | 6 9 3 | 6 9 8 | 7 0 0 | 7 0 8 | 7 1 4 | 7 2 2 | 7 3 1 | 7 3 3 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 3 9 4 | 4 0 7 | 3 8 7 | 3 7 5 | 3 8 3 | 4 0 6 | 3 8 0 | 4 1 0 | 3 8 1 | 3 9 6 | 3 9 9 | 3 9 2 | 3 7 1 | 3 6 6 | 3 8 4 | 4 1 4 | 3 6 9 | 3 9 5 | 3 7 2 | 3 7 0 | 3 7 4 | 3 7 6 | 3 7 7 | 3 7 8 | 3 7 9 |
| **Alimentary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Esophagus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine large, colon | + | + | + | + | A | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + |
| Intestine large, rectum | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine large, cecum | + | + | + | + | A | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine small, duodenum | A | A | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine small, jejunum | + | A | A | + | A | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine small, ileum | A | + | + | + | A | + | A | + | + | + | A | + | + | + | + | + | + | + | A | + | + | + | + | + | + |
| Liver | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Hepatocellular adenoma | | | | | | | | | | | | | | | | | | | | | | | | | X |
| Mesentery | | | | | + | + | | | + | | | | | + | | + | | + | | | + | | | | + |
| Pancreas | + | A | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Acinus, adenoma | | | | | | | | | | X | | | | | | | | | | | | | | | |
| Salivary glands | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Stomach, forestomach | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Stomach, glandular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Tongue | | | | | | | | | | | | | | | | | | | | | | | | | |
| Squamous cell papilloma | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Cardiovascular System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Blood vessel | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Heart | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Endocrine System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Adrenal cortex | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Adrenal medulla | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Ganglioneuroma | | | X | | | | | | | | | | | | | | | | | | | | | | |
| Pheochromocytoma malignant | | | | | | | | | | | | | | | | | | | | | | | | X | |
| Pheochromocytoma benign | | | | | | | | | | | | X | | | | | | | | | | | | | |
| Islets, pancreatic | + | A | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Parathyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + |
| Pituitary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Pars distalis, adenoma | | X | X | | | X | X | X | | X | | X | | X | X | X | X | | X | X | X | X | X | X | X |
| Thyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| C-cell, adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| C-cell, carcinoma | | | | | | | | | | X | | | | | | | | | | | | | | | |
| Follicular cell, adenoma | | | | | | | | | | | | | | | | | X | | | | | | | | |
| **General Body System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| None | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Genital System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Clitoral gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + |
| Adenoma | | | | | | | | X | | | | | | | | | | | | | | | | | |
| Carcinoma | | | | | | | | | | | | X | | | | | | | | | | | | | |
| Ovary | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Uterus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Polyp stromal | | | | | | | | | | | | | | | | | | X | | | | | | | |

**TABLE B2**
**Individual Animal Tumor Pathology of Female Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 650 ppm**

| Number of Days on Study | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 3 8 2 | 3 8 8 | 3 9 0 | 3 9 1 | 3 9 3 | 3 9 7 | 3 9 8 | 4 0 0 | 4 0 1 | 4 0 2 | 4 0 3 | 4 0 4 | 4 0 5 | 4 0 8 | 4 0 9 | 4 1 1 | 4 1 2 | 4 1 3 | 4 1 5 | 3 6 7 | 3 6 8 | 3 7 3 | 3 8 5 | 3 8 6 | 3 8 9 | Total Tissues/ Tumors |
| **Alimentary System** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Esophagus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Intestine large, colon | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 48 |
| Intestine large, rectum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Intestine large, cecum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 48 |
| Intestine small, duodenum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 47 |
| Intestine small, jejunum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 46 |
| Intestine small, ileum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 45 |
| Liver | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Hepatocellular adenoma | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Mesentery | | | | | | | | | + | | + | | | | | | | | | | | | | | | | 10 |
| Pancreas | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 48 |
| Acinus, adenoma | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Salivary glands | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Stomach, forestomach | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Stomach, glandular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Tongue | + | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Squamous cell papilloma | X | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Cardiovascular System** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Blood vessel | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Heart | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Endocrine System** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Adrenal cortex | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Adrenal medulla | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Ganglioneuroma | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Pheochromocytoma malignant | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Pheochromocytoma benign | | | | | | | | | | | | | | | | | | | | X | X | | | | X | | 4 |
| Islets, pancreatic | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 48 |
| Parathyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Pituitary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Pars distalis, adenoma | | X | X | X | X | X | X | X | X | X | X | X | | | | X | X | X | | | X | | | X | X | | 35 |
| Thyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| C-cell, adenoma | | | | | | | | | | | | X | | | | | | | | | | X | X | | | | 3 |
| C-cell, carcinoma | | | | | | | | | | | | | | | | | | | X | | | | | | | | 2 |
| Follicular cell, adenoma | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **General Body System** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| None | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Genital System** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Clitoral gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Adenoma | | | X | | | | | | X | | | | | | | | | | | X | | | | | | | 4 |
| Carcinoma | | | | | | X | | | | | | | | | | | X | | | | | | | | | | 3 |
| Ovary | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Uterus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Polyp stromal | X | X | | | | | | | X | | | | | | | | | | | | | | | | | | 4 |

**TABLE B2**
**Individual Animal Tumor Pathology of Female Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 650 ppm**

| Number of Days on Study | 4 4 9 | 4 8 9 | 5 6 1 | 5 6 2 | 5 9 2 | 6 3 4 | 6 3 9 | 6 4 9 | 6 5 6 | 6 6 8 | 6 9 1 | 6 9 3 | 6 9 8 | 7 0 0 | 7 0 8 | 7 1 4 | 7 2 2 | 7 3 1 | 7 3 3 | 7 3 4 | 7 3 4 | 7 3 4 | 7 4 4 | 7 4 4 | 7 4 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 3 9 4 | 4 0 7 | 3 8 7 | 3 7 5 | 3 8 3 | 4 0 6 | 3 8 0 | 4 1 0 | 3 8 1 | 3 9 6 | 3 9 9 | 3 9 2 | 3 7 1 | 3 6 6 | 3 8 4 | 4 1 4 | 3 6 9 | 3 9 5 | 3 7 2 | 3 7 0 | 3 7 4 | 3 7 6 | 3 7 7 | 3 7 8 | 3 7 9 |
| **Hematopoietic System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone marrow | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lymph node | | | | | + | | | | + | | + | + | + | + | | | | + | | | | | | | |
| Lymph node, mandibular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + |
| Lymph node, mesenteric | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Spleen | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Thymus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Thymoma benign | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Integumentary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Fibroadenoma | | | X | | | | | | | | | X | | | | | X | | X | X | | X | | X | |
| Fibroadenoma, multiple | | | | | | | | | | | | | | X | | | | X | | | | | X | | |
| Skin | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Subcutaneous tissue, fibroma | | | | | | | | | | | | | | | X | | | | | | X | | | | |
| Subcutaneous tissue, fibrous histiocytoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Musculoskeletal System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Nervous System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Respiratory System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Alveolar/bronchiolar adenoma | | | | | | | | | | | | | | | | | | | | | | | X | | |
| Nose | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Trachea | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Special Senses System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ear | | | | | | | | | | | | | | | | + | | | | | | | | | |
| **Urinary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kidney | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Urinary bladder | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Papilloma | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Systemic Lesions** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Multiple organs | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Leukemia mononuclear | | | | X | X | | | | X | X | X | X | X | X | | | | X | | | | | | | |

**TABLE B2**
**Individual Animal Tumor Pathology of Female Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 650 ppm**

| **Number of Days on Study** | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 4 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 3 8 2 | 3 8 8 | 3 9 0 | 3 9 1 | 3 9 3 | 3 9 7 | 3 9 8 | 4 0 0 | 4 0 1 | 4 0 2 | 4 0 3 | 4 0 4 | 4 0 5 | 4 0 8 | 4 0 9 | 4 1 1 | 4 1 2 | 4 1 3 | 4 1 5 | 3 6 7 | 3 6 8 | 3 7 3 | 3 8 5 | 3 8 6 | 3 8 9 | Total Tissues/ Tumors |
| **Hematopoietic System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone marrow | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Histiocytic sarcoma | | | | | | | | | | | | | X | | | | | | | | | | | | 1 |
| Lymph node | | | | | | | | | | | | | | | | | | | | | | | | | 7 |
| Lymph node, mandibular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Lymph node, mesenteric | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Spleen | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Thymus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Thymoma benign | | | | X | | | | | | | | | | | | | | | | | | | | | 1 |
| **Integumentary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Fibroadenoma | | X | | | | | | | | | X | | X | X | | X | | | | | | | | X | 14 |
| Fibroadenoma, multiple | | | | | X | | X | X | X | | | X | | | | | X | | | | | | | | 9 |
| Skin | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Subcutaneous tissue, fibroma | | | | | | | | | | | | | | | | | | | | | | | | | 2 |
| Subcutaneous tissue, fibrous histiocytoma | | | | | | | | | | | | | | | | | | | | X | | | | | 1 |
| **Musculoskeletal System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Nervous System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Respiratory System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Alveolar/bronchiolar adenoma | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Nose | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Trachea | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Special Senses System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ear | | | | | | | | | | | | | | | | | | + | | | | | | | 2 |
| **Urinary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kidney | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Urinary bladder | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Papilloma | | | | | | | | | | | X | | | | | | | | | | | | | | 1 |
| **Systemic Lesions** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Multiple organs | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Histiocytic sarcoma | | | | | | | | | | | | | X | | | | | | | | | | | | 1 |
| Leukemia mononuclear | | | | | | X | | X | | | | | | | | | | X | | | | | | X | 13 |

**TABLE B3**
**Statistical Analysis of Primary Neoplasms in Female Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 150 ppm | 325 ppm | 650 ppm |
|---|---|---|---|---|
| **Adrenal Medulla: Benign Pheochromocytoma** | | | | |
| Overall rate[a] | 2/49 (4%) | 5/50 (10%) | 1/50 (2%) | 4/50 (8%) |
| Adjusted rate[b] | 4.6% | 10.8% | 2.3% | 8.9% |
| Terminal rate[c] | 0/25 (0%) | 3/33 (9%) | 1/30 (3%) | 3/31 (10%) |
| First incidence (days) | 659 | 627 | 734 (T) | 693 |
| Poly-3 test[d] | P=0.451 | P=0.256 | P=0.524N | P=0.370 |
| **Adrenal Medulla: Benign, Complex, or Malignant Pheochromocytoma** | | | | |
| Overall rate | 4/49 (8%) | 5/50 (10%) | 1/50 (2%) | 5/50 (10%) |
| Adjusted rate | 9.1% | 10.8% | 2.3% | 11.2% |
| Terminal rate | 0/25 (0%) | 3/33 (9%) | 1/30 (3%) | 4/31 (13%) |
| First incidence (days) | 629 | 627 | 734 (T) | 693 |
| Poly-3 test | P=0.535 | P=0.547 | P=0.191N | P=0.528 |
| **Clitoral Gland: Adenoma** | | | | |
| Overall rate | 1/49 (2%) | 0/49 (0%) | 2/49 (4%) | 4/49 (8%) |
| Adjusted rate | 2.3% | 0.0% | 4.6% | 9.1% |
| Terminal rate | 1/25 (4%) | 0/32 (0%) | 1/29 (3%) | 3/31 (10%) |
| First incidence (days) | 734 (T) | —[e] | 608 | 649 |
| Poly-3 test | P=0.039 | P=0.539N | P=0.537 | P=0.202 |
| **Clitoral Gland: Carcinoma** | | | | |
| Overall rate | 4/49 (8%) | 4/49 (8%) | 2/49 (4%) | 3/49 (6%) |
| Adjusted rate | 9.3% | 8.9% | 4.6% | 6.9% |
| Terminal rate | 4/25 (16%) | 2/32 (6%) | 2/29 (7%) | 2/31 (7%) |
| First incidence (days) | 734 (T) | 708 | 734 (T) | 693 |
| Poly-3 test | P=0.371N | P=0.634N | P=0.354N | P=0.510N |
| **Clitoral Gland: Adenoma or Carcinoma** | | | | |
| Overall rate | 5/49 (10%) | 4/49 (8%) | 4/49 (8%) | 7/49 (14%) |
| Adjusted rate | 11.7% | 8.9% | 9.2% | 15.9% |
| Terminal rate | 5/25 (20%) | 2/32 (6%) | 3/29 (10%) | 5/31 (16%) |
| First incidence (days) | 734 (T) | 708 | 608 | 649 |
| Poly-3 test | P=0.268 | P=0.487N | P=0.507N | P=0.413 |
| **Mammary Gland: Fibroadenoma** | | | | |
| Overall rate | 29/50 (58%) | 28/50 (56%) | 31/50 (62%) | 23/50 (46%) |
| Adjusted rate | 62.1% | 59.3% | 67.6% | 50.6% |
| Terminal rate | 16/25 (64%) | 21/33 (64%) | 22/30 (73%) | 17/31 (55%) |
| First incidence (days) | 541 | 627 | 608 | 561 |
| Poly-3 test | P=0.175N | P=0.479N | P=0.371 | P=0.182N |
| **Mammary Gland: Fibroadenoma, Adenoma, or Carcinoma** | | | | |
| Overall rate | 30/50 (60%) | 28/50 (56%) | 31/50 (62%) | 23/50 (46%) |
| Adjusted rate | 64.2% | 59.3% | 67.6% | 50.6% |
| Terminal rate | 16/25 (64%) | 21/33 (64%) | 22/30 (73%) | 17/31 (55%) |
| First incidence (days) | 541 | 627 | 608 | 561 |
| Poly-3 test | P=0.133N | P=0.395N | P=0.456 | P=0.130N |
| **Pituitary Gland (Pars Distalis): Adenoma** | | | | |
| Overall rate | 29/49 (59%) | 30/50 (60%) | 32/50 (64%) | 35/50 (70%) |
| Adjusted rate | 62.9% | 63.6% | 66.5% | 73.5% |
| Terminal rate | 17/25 (68%) | 21/33 (64%) | 19/30 (63%) | 23/31 (74%) |
| First incidence (days) | 541 | 676 | 506 | 489 |
| Poly-3 test | P=0.132 | P=0.565 | P=0.444 | P=0.185 |

**TABLE B3**
**Statistical Analysis of Primary Neoplasms in Female Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 150 ppm | 325 ppm | 650 ppm |
|---|---|---|---|---|
| **Pituitary Gland (Pars Distalis): Adenoma or Carcinoma** | | | | |
| Overall rate | 30/49 (61%) | 30/50 (60%) | 32/50 (64%) | 35/50 (70%) |
| Adjusted rate | 65.0% | 63.6% | 66.5% | 73.5% |
| Terminal rate | 17/25 (68%) | 21/33 (64%) | 19/30 (63%) | 23/31 (74%) |
| First incidence (days) | 541 | 676 | 506 | 489 |
| Poly-3 test | P=0.173 | P=0.537N | P=0.528 | P=0.247 |
| **Skin (Subcutaneous Tissue): Fibroma, Fibrous Histiocytoma, or Sarcoma** | | | | |
| Overall rate | 2/50 (4%) | 0/50 (0%) | 2/50 (4%) | 3/50 (6%) |
| Adjusted rate | 4.6% | 0.0% | 4.5% | 6.7% |
| Terminal rate | 2/25 (8%) | 0/33 (0%) | 0/30 (0%) | 2/31 (6%) |
| First incidence (days) | 734 (T) | — | 659 | 708 |
| Poly-3 test | P=0.235 | P=0.254N | P=0.710N | P=0.533 |
| **Thyroid Gland (C-cell): Adenoma** | | | | |
| Overall rate | 2/50 (4%) | 8/50 (16%) | 5/50 (10%) | 3/50 (6%) |
| Adjusted rate | 4.6% | 17.3% | 11.3% | 6.7% |
| Terminal rate | 2/25 (8%) | 5/33 (15%) | 5/30 (17%) | 3/31 (10%) |
| First incidence (days) | 734 (T) | 678 | 734 (T) | 734 (T) |
| Poly-3 test | P=0.446N | P=0.058 | P=0.235 | P=0.532 |
| **Thyroid Gland (C-cell): Adenoma or Carcinoma** | | | | |
| Overall rate | 2/50 (4%) | 8/50 (16%) | 6/50 (12%) | 5/50 (10%) |
| Adjusted rate | 4.6% | 17.3% | 13.6% | 11.2% |
| Terminal rate | 2/25 (8%) | 5/33 (15%) | 6/30 (20%) | 4/31 (13%) |
| First incidence (days) | 734 (T) | 678 | 734 (T) | 668 |
| Poly-3 test | P=0.396 | P=0.058 | P=0.146 | P=0.240 |
| **Uterus: Stromal Polyp** | | | | |
| Overall rate | 7/50 (14%) | 6/50 (12%) | 6/50 (12%) | 4/50 (8%) |
| Adjusted rate | 15.7% | 13.0% | 13.3% | 9.0% |
| Terminal rate | 2/25 (8%) | 4/33 (12%) | 4/30 (13%) | 3/31 (10%) |
| First incidence (days) | 635 | 636 | 528 | 731 |
| Poly-3 test | P=0.230N | P=0.484N | P=0.507N | P=0.274N |
| **All Organs: Mononuclear Cell Leukemia** | | | | |
| Overall rate | 19/50 (38%) | 19/50 (38%) | 18/50 (36%) | 13/50 (26%) |
| Adjusted rate | 40.6% | 40.1% | 38.5% | 27.8% |
| Terminal rate | 7/25 (28%) | 11/33 (33%) | 9/30 (30%) | 4/31 (13%) |
| First incidence (days) | 519 | 627 | 528 | 562 |
| Poly-3 test | P=0.099N | P=0.572N | P=0.510N | P=0.141N |
| **All Organs: Benign Neoplasms** | | | | |
| Overall rate | 43/50 (86%) | 42/50 (84%) | 48/50 (96%) | 42/50 (84%) |
| Adjusted rate | 89.1% | 87.1% | 96.6% | 88.2% |
| Terminal rate | 23/25 (92%) | 28/33 (85%) | 29/30 (97%) | 29/31 (94%) |
| First incidence (days) | 541 | 627 | 506 | 489 |
| Poly-3 test | P=0.512 | P=0.506N | P=0.131 | P=0.584N |
| **All Organs: Malignant Neoplasms** | | | | |
| Overall rate | 26/50 (52%) | 24/50 (48%) | 26/50 (52%) | 18/50 (36%) |
| Adjusted rate | 54.9% | 49.6% | 53.9% | 38.5% |
| Terminal rate | 10/25 (40%) | 14/33 (42%) | 13/30 (43%) | 9/31 (29%) |
| First incidence (days) | 519 | 217 | 525 | 562 |
| Poly-3 test | P=0.078N | P=0.378N | P=0.548N | P=0.081N |

**TABLE B3**
**Statistical Analysis of Primary Neoplasms in Female Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 150 ppm | 325 ppm | 650 ppm |
|---|---|---|---|---|
| **All Organs: Benign or Malignant Neoplasms** | | | | |
| Overall rate | 48/50 (96%) | 46/50 (92%) | 49/50 (98%) | 48/50 (96%) |
| Adjusted rate | 96.0% | 93.3% | 98.0% | 97.5% |
| Terminal rate | 23/25 (92%) | 30/33 (91%) | 29/30 (97%) | 30/31 (97%) |
| First incidence (days) | 519 | 217 | 506 | 489 |
| Poly-3 test | P=0.306 | P=0.443N | P=0.500 | P=0.560 |

(T)Terminal sacrifice
[a] Number of neoplasm-bearing animals/number of animals examined. Denominator is number of animals examined microscopically for adrenal gland, clitoral gland, pituitary gland, thyroid gland, and uterus; for other tissues, denominator is number of animals necropsied.
[b] Poly-3 estimated neoplasm incidence after adjustment for intercurrent mortality
[c] Observed incidence at terminal kill
[d] Beneath the control incidence are the P values associated with the trend test. Beneath the exposed group incidence are the P values corresponding to pairwise comparisons between the controls and that exposed group. The Poly-3 test accounts for differential mortality in animals that do not reach terminal sacrifice. A negative trend or a lower incidence in an exposure group is indicated by **N**.
[e] Not applicable; no neoplasms in animal group

**TABLE B4**
**Summary of the Incidence of Nonneoplastic Lesions in Female Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**[a]

| | 0 ppm | 150 ppm | 325 ppm | 650 ppm |
|---|---|---|---|---|
| **Disposition Summary** | | | | |
| Animals initially in study | 50 | 50 | 50 | 50 |
| Early deaths | | | | |
| Moribund | 12 | 7 | 7 | 5 |
| Natural deaths | 13 | 10 | 13 | 14 |
| Survivors | | | | |
| Terminal sacrifice | 25 | 33 | 30 | 31 |
| Animals examined microscopically | 50 | 50 | 50 | 50 |
| **Alimentary System** | | | | |
| Intestine large, colon | (47) | (49) | (49) | (48) |
| Dilatation | | 1 (2%) | | |
| Inflammation, chronic active | | | 1 (2%) | |
| Parasite metazoan | 3 (6%) | 2 (4%) | 2 (4%) | 1 (2%) |
| Intestine large, rectum | (49) | (49) | (48) | (49) |
| Parasite metazoan | 6 (12%) | 4 (8%) | 3 (6%) | 7 (14%) |
| Intestine large, cecum | (47) | (49) | (48) | (48) |
| Dilatation | | 1 (2%) | | |
| Hemorrhage | | 1 (2%) | | |
| Inflammation, chronic active | | | 1 (2%) | |
| Mineralization | 1 (2%) | | | |
| Parasite metazoan | | | | 1 (2%) |
| Ulcer | | | 1 (2%) | |
| Intestine small, jejunum | (44) | (44) | (43) | (46) |
| Hemorrhage | | 1 (2%) | | |
| Intestine small, ileum | (42) | (45) | (43) | (45) |
| Hemorrhage | | 1 (2%) | | |
| Liver | (50) | (50) | (50) | (50) |
| Angiectasis | 1 (2%) | 5 (10%) | 3 (6%) | 7 (14%) |
| Basophilic focus | 29 (58%) | 33 (66%) | 27 (54%) | 32 (64%) |
| Clear cell focus | 3 (6%) | 7 (14%) | 7 (14%) | 2 (4%) |
| Congestion | | 2 (4%) | | |
| Deformity | 3 (6%) | 6 (12%) | 3 (6%) | |
| Eosinophilic focus | 6 (12%) | 3 (6%) | 7 (14%) | 4 (8%) |
| Fibrosis | | | | 1 (2%) |
| Hemorrhage | 2 (4%) | | | |
| Hepatodiaphragmatic nodule | 2 (4%) | 3 (6%) | 12 (24%) | 4 (8%) |
| Infiltration cellular, lymphocyte | 1 (2%) | 1 (2%) | 1 (2%) | |
| Inflammation, granulomatous | 12 (24%) | 5 (10%) | 9 (18%) | 11 (22%) |
| Mixed cell focus | 4 (8%) | 8 (16%) | 5 (10%) | 6 (12%) |
| Necrosis | 3 (6%) | 2 (4%) | 5 (10%) | 1 (2%) |
| Pigmentation, bile | 1 (2%) | | | |
| Vacuolization cytoplasmic | 1 (2%) | 2 (4%) | 3 (6%) | 3 (6%) |
| Artery, thrombosis | 1 (2%) | | | |
| Bile duct, hyperplasia | 1 (2%) | | | |
| Centrilobular, necrosis | 1 (2%) | | | |
| Kupffer cell, pigmentation | | 1 (2%) | | |
| Mesentery | (9) | (11) | (12) | (10) |
| Hemorrhage | 1 (11%) | | | |
| Fat, necrosis | 8 (89%) | 10 (91%) | 11 (92%) | 9 (90%) |

[a] Number of animals examined microscopically at the site and the number of animals with lesion

**TABLE B4**
**Summary of the Incidence of Nonneoplastic Lesions in Female Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 150 ppm | 325 ppm | 650 ppm |
|---|---|---|---|---|
| **Alimentary System** (continued) | | | | |
| Pancreas | (47) | (49) | (49) | (48) |
| Infiltration cellular, mixed cell | | | 1 (2%) | |
| Inflammation, acute | | 1 (2%) | | |
| Acinus, atrophy | 12 (26%) | 4 (8%) | 3 (6%) | 5 (10%) |
| Acinus, hyperplasia | | 1 (2%) | 1 (2%) | |
| Salivary glands | (50) | (50) | (50) | (50) |
| Atrophy | | 1 (2%) | | |
| Stomach, forestomach | (50) | (50) | (50) | (50) |
| Inflammation, chronic active | 5 (10%) | 1 (2%) | | 3 (6%) |
| Ulcer | 2 (4%) | 2 (4%) | 3 (6%) | 4 (8%) |
| Epithelium, hyperplasia | 4 (8%) | 3 (6%) | 3 (6%) | 3 (6%) |
| Stomach, glandular | (50) | (50) | (50) | (50) |
| Inflammation, chronic active | 1 (2%) | | | |
| Necrosis | 12 (24%) | 6 (12%) | 7 (14%) | 7 (14%) |
| Ulcer | | | 2 (4%) | |
| Tooth | | (1) | | |
| Developmental malformation | | 1 (100%) | | |
| **Cardiovascular System** | | | | |
| Heart | (50) | (50) | (50) | (50) |
| Cardiomyopathy | 18 (36%) | 21 (42%) | 15 (30%) | 11 (22%) |
| Hemorrhage | | | | 1 (2%) |
| Inflammation, chronic active | 1 (2%) | | | |
| Artery, inflammation, chronic active | 1 (2%) | | | |
| Atrium, inflammation, chronic active | | 1 (2%) | | |
| Atrium, thrombosis | 4 (8%) | 2 (4%) | 3 (6%) | 3 (6%) |
| **Endocrine System** | | | | |
| Adrenal cortex | (49) | (50) | (50) | (50) |
| Angiectasis | 7 (14%) | 8 (16%) | 9 (18%) | 10 (20%) |
| Cytoplasmic alteration | 5 (10%) | 3 (6%) | 1 (2%) | 4 (8%) |
| Degeneration, cystic | | 1 (2%) | 1 (2%) | |
| Hemorrhage | 2 (4%) | 3 (6%) | | |
| Vacuolization cytoplasmic | 4 (8%) | 5 (10%) | 7 (14%) | 8 (16%) |
| Adrenal medulla | (49) | (50) | (50) | (50) |
| Hyperplasia | 5 (10%) | | 1 (2%) | 2 (4%) |
| Infiltration cellular, lymphocyte | 1 (2%) | | | |
| Necrosis | | 1 (2%) | | |
| Islets, pancreatic | (46) | (49) | (48) | (48) |
| Hyperplasia | | 1 (2%) | | |
| Metaplasia | 1 (2%) | | | |
| Parathyroid gland | (50) | (50) | (50) | (49) |
| Angiectasis | | 1 (2%) | | |
| Hyperplasia | | 1 (2%) | | |
| Pituitary gland | (49) | (50) | (50) | (50) |
| Necrosis | | | | 1 (2%) |
| Pars distalis, angiectasis | 1 (2%) | | 4 (8%) | 1 (2%) |
| Pars distalis, cyst | 13 (27%) | 11 (22%) | 11 (22%) | 13 (26%) |
| Pars distalis, hemorrhage | 2 (4%) | 1 (2%) | | |
| Pars distalis, hyperplasia | 4 (8%) | 6 (12%) | 6 (12%) | |
| Pars distalis, pigmentation | | | | 1 (2%) |
| Pars nervosa, cyst | | 1 (2%) | | |

**TABLE B4**
**Summary of the Incidence of Nonneoplastic Lesions in Female Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 150 ppm | 325 ppm | 650 ppm |
|---|---|---|---|---|
| **Endocrine System** (continued) | | | | |
| Thyroid gland | (50) | (50) | (50) | (50) |
| Infiltration cellular, mixed cell | 1 (2%) | | | |
| Inflammation, chronic active | 1 (2%) | | | |
| C-cell, hyperplasia | 10 (20%) | 11 (22%) | 6 (12%) | 8 (16%) |
| Follicle, cyst | | | | 1 (2%) |
| **General Body System** | | | | |
| None | | | | |
| **Genital System** | | | | |
| Clitoral gland | (49) | (49) | (49) | (49) |
| Atrophy | | | | 2 (4%) |
| Cyst | 4 (8%) | 4 (8%) | 4 (8%) | 6 (12%) |
| Hyperplasia | 1 (2%) | 1 (2%) | 1 (2%) | |
| Inflammation, chronic active | 3 (6%) | | 1 (2%) | |
| Bilateral, cyst | | | 1 (2%) | |
| Ovary | (50) | (50) | (50) | (50) |
| Angiectasis | 1 (2%) | | | |
| Cyst | 6 (12%) | 4 (8%) | 10 (20%) | 8 (16%) |
| Hyperplasia, histiocytic | | 1 (2%) | | |
| Inflammation, granulomatous | | | 1 (2%) | |
| Bilateral, cyst | 1 (2%) | | | |
| Interstitial cell, hyperplasia | | | | 1 (2%) |
| Uterus | (50) | (50) | (50) | (50) |
| Abscess | | | 1 (2%) | |
| Cyst | | 1 (2%) | 2 (4%) | |
| Fibrosis | 1 (2%) | | | |
| Hemorrhage | 1 (2%) | 1 (2%) | 1 (2%) | |
| Hydrometra | 4 (8%) | | 3 (6%) | 4 (8%) |
| Hyperplasia, cystic | 1 (2%) | | 1 (2%) | 1 (2%) |
| Inflammation, chronic active | | 1 (2%) | 3 (6%) | |
| Bilateral, hydrometra | | | | 1 (2%) |
| Epithelium, hyperplasia | | 1 (2%) | | |
| Vagina | | (2) | | |
| Hemorrhage | | 1 (50%) | | |
| Infiltration cellular, polymorphonuclear | | 1 (50%) | | |
| Inflammation, chronic active | | 1 (50%) | | |
| Pigmentation | | 1 (50%) | | |
| **Hematopoietic System** | | | | |
| Bone marrow | (47) | (50) | (47) | (49) |
| Atrophy | | | | 2 (4%) |
| Fibrosis | | | | 1 (2%) |
| Hyperplasia | 1 (2%) | 3 (6%) | | 1 (2%) |
| Inflammation, chronic active | 1 (2%) | | | |
| Myeloid cell, hyperplasia | 3 (6%) | | | |

**TABLE B4**
**Summary of the Incidence of Nonneoplastic Lesions in Female Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 150 ppm | 325 ppm | 650 ppm |
|---|---|---|---|---|
| **Hematopoietic System** (continued) | | | | |
| Lymph node | (11) | (9) | (15) | (7) |
| Hemorrhage | 1 (9%) | 2 (22%) | 1 (7%) | |
| Hyperplasia, lymphoid | | | 1 (7%) | |
| Pigmentation | | | 1 (7%) | |
| Deep cervical, hemorrhage | 1 (9%) | | 1 (7%) | |
| Deep cervical, hyperplasia, plasma cell | | | 1 (7%) | |
| Deep cervical, pigmentation | | | 1 (7%) | |
| Iliac, amyloid deposition | | 1 (11%) | | |
| Iliac, hemorrhage | 2 (18%) | 1 (11%) | | |
| Iliac, pigmentation | | 1 (11%) | | |
| Mediastinal, hemorrhage | 4 (36%) | 2 (22%) | 7 (47%) | 1 (14%) |
| Mediastinal, hyperplasia, lymphoid | | | 1 (7%) | |
| Mediastinal, hyperplasia, plasma cell | | | 1 (7%) | |
| Mediastinal, inflammation, acute | | 1 (11%) | | |
| Mediastinal, pigmentation | 2 (18%) | | 5 (33%) | |
| Pancreatic, hemorrhage | 2 (18%) | | 2 (13%) | 1 (14%) |
| Pancreatic, hyperplasia, histiocytic | 1 (9%) | | 1 (7%) | |
| Pancreatic, hyperplasia, lymphoid | | | 1 (7%) | |
| Renal, hemorrhage | 3 (27%) | 2 (22%) | 4 (27%) | 1 (14%) |
| Renal, hyperplasia, histiocytic | 1 (9%) | | | |
| Renal, pigmentation | 1 (9%) | 2 (22%) | 1 (7%) | 1 (14%) |
| Lymph node, mandibular | (50) | (50) | (50) | (49) |
| Amyloid deposition | | 1 (2%) | | |
| Atrophy | 1 (2%) | | | |
| Ectasia | 1 (2%) | | 1 (2%) | |
| Hemorrhage | 6 (12%) | 4 (8%) | 4 (8%) | 2 (4%) |
| Hyperplasia, lymphoid | 1 (2%) | | 2 (4%) | |
| Hyperplasia, plasma cell | 1 (2%) | | 4 (8%) | 1 (2%) |
| Inflammation, chronic active | | | 1 (2%) | |
| Pigmentation | 1 (2%) | 1 (2%) | | 1 (2%) |
| Lymph node, mesenteric | (50) | (50) | (49) | (50) |
| Atrophy | 2 (4%) | | | |
| Hemorrhage | 7 (14%) | 3 (6%) | 6 (12%) | 5 (10%) |
| Hyperplasia, histiocytic | | 3 (6%) | 4 (8%) | 2 (4%) |
| Hyperplasia, lymphoid | | 1 (2%) | | |
| Pigmentation | | 1 (2%) | 1 (2%) | |
| Spleen | (50) | (50) | (50) | (49) |
| Accessory spleen | | | 1 (2%) | |
| Atrophy | 1 (2%) | | | |
| Congestion | 1 (2%) | | | |
| Fibrosis | 3 (6%) | 2 (4%) | 2 (4%) | 1 (2%) |
| Hematopoietic cell proliferation | 7 (14%) | 2 (4%) | 3 (6%) | 1 (2%) |
| Hyperplasia, histiocytic | | 1 (2%) | | |
| Necrosis | | | | 1 (2%) |
| Pigmentation | 7 (14%) | 11 (22%) | 8 (16%) | 10 (20%) |
| Capsule, cyst | | | | 1 (2%) |
| Capsule, fibrosis | | | | 2 (4%) |
| Thymus | (48) | (49) | (50) | (50) |
| Atrophy | 16 (33%) | 10 (20%) | 17 (34%) | 14 (28%) |
| Ectopic parathyroid gland | 1 (2%) | | | |
| Hemorrhage | 1 (2%) | 1 (2%) | 1 (2%) | 3 (6%) |
| Epithelial cell, hyperplasia | 7 (15%) | 6 (12%) | 9 (18%) | 4 (8%) |

**TABLE B4**
**Summary of the Incidence of Nonneoplastic Lesions in Female Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 150 ppm | 325 ppm | 650 ppm |
|---|---|---|---|---|
| **Integumentary System** | | | | |
| Mammary gland | (50) | (50) | (49) | (50) |
| Dilatation | 34 (68%) | 33 (66%) | 25 (51%) | 27 (54%) |
| Hyperplasia | 20 (40%) | 23 (46%) | 14 (29%) | 19 (38%) |
| Inflammation, chronic active | 1 (2%) | | | |
| Pigmentation | | 1 (2%) | | |
| Skin | (50) | (50) | (50) | (50) |
| Exudate | | 1 (2%) | | |
| Inflammation, chronic active | | 1 (2%) | | 1 (2%) |
| Ulcer | 1 (2%) | | | 1 (2%) |
| Subcutaneous tissue, edema | | 1 (2%) | | |
| **Musculoskeletal System** | | | | |
| Bone | (50) | (50) | (50) | (50) |
| Hyperostosis | 6 (12%) | 7 (14%) | 7 (14%) | 4 (8%) |
| Malformation | | | 1 (2%) | |
| Femur, callus | 1 (2%) | | | |
| Femur, hyperostosis | 2 (4%) | | 1 (2%) | |
| **Nervous System** | | | | |
| Brain | (50) | (50) | (50) | (50) |
| Hemorrhage | 2 (4%) | 2 (4%) | 3 (6%) | 2 (4%) |
| Spinal cord | (2) | (1) | | |
| Hemorrhage | 1 (50%) | | | |
| **Respiratory System** | | | | |
| Lung | (50) | (50) | (50) | (50) |
| Congestion | | 1 (2%) | | |
| Hemorrhage | 1 (2%) | | 2 (4%) | 2 (4%) |
| Inflammation, acute | | | 1 (2%) | |
| Inflammation, chronic active | 3 (6%) | | 1 (2%) | 2 (4%) |
| Alveolus, infiltration cellular, histiocyte | 1 (2%) | | 3 (6%) | 2 (4%) |
| Artery, inflammation, chronic active | 1 (2%) | 1 (2%) | | |
| Mediastinum, necrosis | | | | 1 (2%) |
| Nose | (50) | (48) | (49) | (49) |
| Foreign body | | | 1 (2%) | |
| Olfactory epithelium, atrophy | | | 1 (2%) | |
| Olfactory epithelium, degeneration, hyaline | 2 (4%) | 9 (19%) | 4 (8%) | 3 (6%) |
| Olfactory epithelium, inflammation, chronic active | 2 (4%) | 2 (4%) | | |
| Respiratory epithelium, degeneration, hyaline | 6 (12%) | 3 (6%) | 8 (16%) | 12 (24%) |
| Respiratory epithelium, hyperplasia | 1 (2%) | 10 (21%) | 1 (2%) | 5 (10%) |
| Respiratory epithelium, inflammation, chronic active | 13 (26%) | 9 (19%) | 18 (37%) | 6 (12%) |
| Respiratory epithelium, thrombosis | | 1 (2%) | | |
| **Special Senses System** | | | | |
| Ear | | (1) | | (2) |
| External ear, hyperplasia | | | | 1 (50%) |
| Zymbal's gland | | (1) | (1) | |
| Hyperplasia | | 1 (100%) | | |

**TABLE B4**
**Summary of the Incidence of Nonneoplastic Lesions in Female Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 150 ppm | 325 ppm | 650 ppm |
|---|---|---|---|---|
| **Urinary System** | | | | |
| Kidney | (46) | (49) | (50) | (50) |
| Casts | | | 1 (2%) | |
| Cyst | 1 (2%) | | | 2 (4%) |
| Hydronephrosis | | 1 (2%) | | |
| Infarct | 1 (2%) | | | |
| Inflammation, acute | | | 1 (2%) | |
| Inflammation, chronic active | 1 (2%) | | | 1 (2%) |
| Mineralization | 24 (52%) | 28 (57%) | 26 (52%) | 30 (60%) |
| Nephropathy | 23 (50%) | 23 (47%) | 15 (30%) | 20 (40%) |
| Pelvis, mineralization | 1 (2%) | | | |
| Renal tubule, degeneration, hyaline | 1 (2%) | | 1 (2%) | |
| Renal tubule, pigmentation | 2 (4%) | 2 (4%) | 4 (8%) | 1 (2%) |
| Transitional epithelium, hyperplasia | 1 (2%) | | | |
| Urinary bladder | (49) | (50) | (50) | (49) |
| Dilatation | | 1 (2%) | | |

# APPENDIX C
# SUMMARY OF LESIONS IN MALE MICE IN THE 2-YEAR DRINKING WATER STUDY OF 1-CHLORO-2-PROPANOL

**TABLE C1**
**Summary of the Incidence of Neoplasms in Male Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**[a]

| | 0 ppm | 250 ppm | 500 ppm | 1,000 ppm |
|---|---|---|---|---|
| **Disposition Summary** | | | | |
| Animals initially in study | 50 | 50 | 50 | 50 |
| Early deaths | | | | |
| Accidental deaths | | | 5 | 3 |
| Moribund | 8 | | 7 | 4 |
| Natural deaths | 2 | 6 | 9 | 4 |
| Survivors | | | | |
| Terminal sacrifice | 40 | 44 | 29 | 39 |
| Animals examined microscopically | 50 | 50 | 50 | 50 |
| **Alimentary System** | | | | |
| Gallbladder | (45) | (45) | (42) | (47) |
| Adenoma | | 1 (2%) | | |
| Intestine large, rectum | (50) | (50) | (50) | (50) |
| Fibrous histiocytoma, metastatic, skin | 1 (2%) | | | |
| Fibrous histiocytoma, metastatic, uncertain primary site | | 1 (2%) | | |
| Intestine large, cecum | (49) | (50) | (48) | (47) |
| Intestine small, duodenum | (49) | (49) | (47) | (47) |
| Intestine small, jejunum | (49) | (49) | (44) | (47) |
| Liver | (50) | (50) | (50) | (50) |
| Fibrous histiocytoma | | 1 (2%) | | |
| Hemangiosarcoma | 2 (4%) | | 1 (2%) | 2 (4%) |
| Hemangiosarcoma, multiple | 1 (2%) | | 1 (2%) | |
| Hepatoblastoma | 6 (12%) | 2 (4%) | | 6 (12%) |
| Hepatoblastoma, multiple | | 1 (2%) | | |
| Hepatocellular carcinoma | 12 (24%) | 6 (12%) | 5 (10%) | 7 (14%) |
| Hepatocellular carcinoma, multiple | 1 (2%) | | 1 (2%) | 1 (2%) |
| Hepatocellular adenoma | 7 (14%) | 13 (26%) | 21 (42%) | 11 (22%) |
| Hepatocellular adenoma, multiple | 28 (56%) | 22 (44%) | 13 (26%) | 19 (38%) |
| Histiocytic sarcoma | 2 (4%) | 1 (2%) | | |
| Pancreas | (50) | (50) | (50) | (50) |
| Fibrous histiocytoma | | | | 1 (2%) |
| Fibrous histiocytoma, metastatic, uncertain primary site | | 1 (2%) | | |
| Salivary glands | (50) | (50) | (50) | (50) |
| Stomach, forestomach | (49) | (50) | (49) | (50) |
| Squamous cell papilloma | 1 (2%) | | 1 (2%) | 1 (2%) |
| Stomach, glandular | (49) | (50) | (50) | (49) |
| Mast cell tumor benign | | | 1 (2%) | |
| **Cardiovascular System** | | | | |
| Heart | (50) | (50) | (50) | (50) |
| Fibrous histiocytoma, metastatic, uncertain primary site | | 1 (2%) | | |
| Hemangiosarcoma | | | 1 (2%) | 1 (2%) |

**TABLE C1**
**Summary of the Incidence of Neoplasms in Male Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 250 ppm | 500 ppm | 1,000 ppm |
|---|---|---|---|---|
| **Endocrine System** | | | | |
| Adrenal cortex | (50) | (50) | (50) | (50) |
| Adenoma | | | | 1 (2%) |
| Capsule, adenoma | | 1 (2%) | 2 (4%) | 1 (2%) |
| Islets, pancreatic | (50) | (50) | (50) | (50) |
| Adenoma | 1 (2%) | | | 2 (4%) |
| Pituitary gland | (50) | (49) | (49) | (47) |
| Pars distalis, adenoma | | 1 (2%) | | |
| Thyroid gland | (50) | (50) | (50) | (50) |
| C-cell, carcinoma | 1 (2%) | | | |
| Follicular cell, adenoma | 1 (2%) | 1 (2%) | 1 (2%) | 1 (2%) |
| **General Body System** | | | | |
| None | | | | |
| **Genital System** | | | | |
| Epididymis | (50) | (50) | (50) | (50) |
| Histiocytic sarcoma | 1 (2%) | | | |
| Prostate | (50) | (50) | (49) | (50) |
| Hemangiosarcoma | 1 (2%) | | | |
| Seminal vesicle | (50) | (50) | (50) | (50) |
| Testes | (50) | (50) | (50) | (50) |
| Interstitial cell, adenoma | | | 2 (4%) | |
| **Hematopoietic System** | | | | |
| Bone marrow | (50) | (50) | (50) | (50) |
| Hemangiosarcoma | 1 (2%) | | 1 (2%) | 1 (2%) |
| Lymph node | (4) | (5) | (2) | (3) |
| Fibrous histiocytoma | | 1 (20%) | | |
| Iliac, fibrous histiocytoma | | 1 (20%) | | |
| Mediastinal, fibrous histiocytoma | | 1 (20%) | | |
| Pancreatic, fibrous histiocytoma | | 1 (20%) | | |
| Renal, fibrous histiocytoma | | 1 (20%) | | 1 (33%) |
| Lymph node, mandibular | (50) | (50) | (50) | (50) |
| Carcinoma, metastatic, harderian gland | | | 1 (2%) | |
| Fibrous histiocytoma | | 1 (2%) | | |
| Lymph node, mesenteric | (49) | (50) | (50) | (50) |
| Fibrous histiocytoma | | 1 (2%) | | |
| Hemangiosarcoma | | | 1 (2%) | |
| Histiocytic sarcoma | 1 (2%) | | | |
| Spleen | (50) | (50) | (50) | (50) |
| Fibrous histiocytoma | | 1 (2%) | | 1 (2%) |
| Hemangiosarcoma | | 1 (2%) | 1 (2%) | 1 (2%) |
| Histiocytic sarcoma | 1 (2%) | | | |
| Thymus | (37) | (47) | (45) | (41) |
| Thymoma benign | | 1 (2%) | | |
| Thymoma malignant | | | | 1 (2%) |

**TABLE C1**
**Summary of the Incidence of Neoplasms in Male Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 250 ppm | 500 ppm | 1,000 ppm |
|---|---|---|---|---|
| **Integumentary System** | | | | |
| Skin | (50) | (50) | (50) | (50) |
| Subcutaneous tissue, fibrous histiocytoma | 1 (2%) | | | |
| Subcutaneous tissue, hemangioma | 1 (2%) | | | |
| Subcutaneous tissue, hemangiosarcoma | 1 (2%) | 1 (2%) | | |
| **Musculoskeletal System** | | | | |
| Bone | (50) | (50) | (50) | (50) |
| Osteosarcoma | 1 (2%) | | | |
| Skeletal muscle | | (1) | | (1) |
| Hemangiosarcoma | | 1 (100%) | | |
| Sarcoma | | | | 1 (100%) |
| **Nervous System** | | | | |
| None | | | | |
| **Respiratory System** | | | | |
| Lung | (50) | (50) | (50) | (50) |
| Alveolar/bronchiolar adenoma | 11 (22%) | 5 (10%) | 4 (8%) | 4 (8%) |
| Alveolar/bronchiolar adenoma, multiple | 1 (2%) | 3 (6%) | | 1 (2%) |
| Alveolar/bronchiolar carcinoma | 4 (8%) | 2 (4%) | 4 (8%) | 4 (8%) |
| Alveolar/bronchiolar carcinoma, multiple | | 1 (2%) | 1 (2%) | |
| Carcinoma, metastatic, harderian gland | | | 1 (2%) | |
| Fibrous histiocytoma | | 1 (2%) | | |
| Hepatoblastoma, metastatic, liver | | 1 (2%) | | 1 (2%) |
| Hepatocellular carcinoma, metastatic, liver | 6 (12%) | 2 (4%) | 1 (2%) | 2 (4%) |
| Histiocytic sarcoma | | 1 (2%) | | |
| Nose | (50) | (50) | (50) | (50) |
| Carcinoma, metastatic, harderian gland | 1 (2%) | | 1 (2%) | |
| Hemangiosarcoma | 1 (2%) | | | |
| **Special Senses System** | | | | |
| Harderian gland | (1) | (5) | (3) | (1) |
| Adenoma | 1 (100%) | 4 (80%) | 2 (67%) | 1 (100%) |
| Carcinoma | 1 (100%) | 1 (20%) | 1 (33%) | |
| **Urinary System** | | | | |
| Kidney | (50) | (50) | (50) | (50) |
| Renal tubule, adenoma | | | | 1 (2%) |
| Urinary bladder | (50) | (50) | (49) | (50) |
| Fibrous histiocytoma, metastatic, uncertain primary site | | 1 (2%) | | |
| Hemangioma | 1 (2%) | | | |
| **Systemic Lesions** | | | | |
| Multiple organs[b] | (50) | (50) | (50) | (50) |
| Histiocytic sarcoma | 2 (4%) | 1 (2%) | | |
| Lymphoma malignant | 1 (2%) | 1 (2%) | | 4 (8%) |

**TABLE C1**
**Summary of the Incidence of Neoplasms in Male Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 250 ppm | 500 ppm | 1,000 ppm |
|---|---|---|---|---|
| **Neoplasm Summary** | | | | |
| Total animals with primary neoplasms[c] | 48 | 44 | 40 | 42 |
| Total primary neoplasms | 90 | 80 | 65 | 75 |
| Total animals with benign neoplasms | 41 | 39 | 36 | 34 |
| Total benign neoplasms | 53 | 52 | 47 | 43 |
| Total animals with malignant neoplasms | 32 | 17 | 15 | 24 |
| Total malignant neoplasms | 37 | 28 | 18 | 32 |
| Total animals with metastatic neoplasms | 8 | 4 | 2 | 3 |
| Total metastatic neoplasms | 8 | 7 | 4 | 3 |
| Total animals with malignant neoplasms of uncertain primary site | | 1 | | |

[a] Number of animals examined microscopically at the site and the number of animals with neoplasm
[b] Number of animals with any tissue examined microscopically
[c] Primary neoplasms: all neoplasms except metastatic neoplasms

**TABLE C2**
**Individual Animal Tumor Pathology of Male Mice in 2-Year Drinking Water Study of 1-Chloro-2-propanol: 0 ppm**

| Number of Days on Study | 2 2 0 | 3 8 0 | 4 6 4 | 5 0 1 | 5 1 8 | 5 4 7 | 5 7 8 | 6 4 6 | 7 0 8 | 7 1 4 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 0 0 3 | 0 2 5 | 0 2 4 | 0 3 4 | 0 4 1 | 0 4 9 | 0 2 3 | 0 1 6 | 0 4 5 | 0 4 4 | 0 0 1 | 0 0 4 | 0 0 5 | 0 0 7 | 0 0 8 | 0 0 9 | 0 1 0 | 0 1 1 | 0 1 2 | 0 1 3 | 0 1 4 | 0 1 7 | 0 1 8 | 0 1 9 | 0 2 0 |
| **Alimentary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Esophagus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Gallbladder | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | M |
| Intestine large, colon | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine large, rectum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Fibrous histiocytoma, metastatic, skin | | | | | | | | | | | | | | | | | | | | | | | | | |
| Intestine large, cecum | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine small, duodenum | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine small, jejunum | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine small, ileum | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Liver | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Hemangiosarcoma | | | | | | | | | | | | | | | X | | | | | | | | | | X |
| Hemangiosarcoma, multiple | | | | X | | | | | | | | | | | | | | | | | | | | | |
| Hepatoblastoma | | | | | X | X | | | | | | | | | | | | | | | | | | | |
| Hepatocellular carcinoma | | | | | | | | X | | | | X | X | | | | | | | | X | | | | |
| Hepatocellular carcinoma, multiple | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hepatocellular adenoma | | | X | | X | | | | | X | | | X | | | | | | | | X | | | | |
| Hepatocellular adenoma, multiple | | | | | | | | | | | X | | | X | X | X | X | X | | X | | X | X | X | |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mesentery | | + | | | | | | | | | | | | | | | + | | | | | | | | |
| Pancreas | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Salivary glands | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Stomach, forestomach | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Squamous cell papilloma | | | | | | | | | | | | | | | | | | | | | | | | X | |
| Stomach, glandular | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Tooth | | | | | | | | | | | | | | | | | | | | | | | | + | |
| **Cardiovascular System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Heart | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Endocrine System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Adrenal cortex | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Adrenal medulla | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Islets, pancreatic | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Parathyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Pituitary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Thyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| C-cell, carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Follicular cell, adenoma | | | | | | | | | | | | | | | | | | X | | | | | | | |
| **General Body System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| None | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Genital System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Epididymis | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Preputial gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Prostate | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Hemangiosarcoma | | | | | | | | | X | | | | | | | | | | | | | | | | |
| Seminal vesicle | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Testes | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |

+: Tissue examined microscopically
A: Autolysis precludes examination
M: Missing tissue
I: Insufficient tissue
X: Lesion present
Blank: Not examined

**TABLE C2**
**Individual Animal Tumor Pathology of Male Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 0 ppm**

| Number of Days on Study | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 730 | 730 | 730 | 730 | 730 | 730 | 730 | 730 | 730 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 0021 | 0022 | 0027 | 0029 | 0030 | 0031 | 0032 | 0033 | 0035 | 0038 | 0039 | 0040 | 0042 | 0043 | 0046 | 0047 | 0002 | 0006 | 0015 | 0026 | 0028 | 0036 | 0037 | 0048 | 0050 | Total Tissues/ Tumors |
| **Alimentary System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Esophagus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Gallbladder | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + | 45 |
| Intestine large, colon | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Intestine large, rectum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Fibrous histiocytoma, metastatic, skin | | | | | | | | | | | | | | | | | X | | | | | | | | | 1 |
| Intestine large, cecum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Intestine small, duodenum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Intestine small, jejunum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Intestine small, ileum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Liver | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Hemangiosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 2 |
| Hemangiosarcoma, multiple | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Hepatoblastoma | | | | | | | X | X | | X | | | | | | | | | | | | | X | | | 6 |
| Hepatocellular carcinoma | | X | X | X | | X | | | | X | | X | | | | | | | | | X | X | | | | 12 |
| Hepatocellular carcinoma, multiple | | | | | | | | | | | | | | | | | | | | | | | | | X | 1 |
| Hepatocellular adenoma | | | | | | | | | | | | | X | X | | | | | | | | | | | | 7 |
| Hepatocellular adenoma, multiple | X | X | | X | X | X | X | X | X | X | | X | | | | X | X | X | | X | X | | X | X | X | 28 |
| Histiocytic sarcoma | | | | | | | | | | | X | | | | | | | | X | | | | | | | 2 |
| Mesentery | | | | | | | | | | + | | | | + | | | | | | | | | | | | 4 |
| Pancreas | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Salivary glands | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Stomach, forestomach | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Squamous cell papilloma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Stomach, glandular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Tooth | | | + | | | | | | + | | | | | | | | + | | | | | | | | | 4 |
| **Cardiovascular System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Heart | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Endocrine System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Adrenal cortex | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Adrenal medulla | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Islets, pancreatic | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Adenoma | | | | | | | X | | | | | | | | | | | | | | | | | | | 1 |
| Parathyroid gland | + | + | + | + | + | + | + | + | + | + | M | + | M | + | + | + | + | + | + | + | + | + | + | + | + | 48 |
| Pituitary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Thyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| C-cell, carcinoma | | | | | | | | | | | | | X | | | | | | | | | | | | | 1 |
| Follicular cell, adenoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **General Body System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| None | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Genital System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Epididymis | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | X | | | | | | | 1 |
| Preputial gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Prostate | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Hemangiosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Seminal vesicle | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Testes | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |

**TABLE C2**
**Individual Animal Tumor Pathology of Male Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 0 ppm**

| Number of Days on Study | 2 2 0 | 3 8 0 | 4 6 4 | 5 0 1 | 5 1 8 | 5 4 7 | 5 7 8 | 6 4 6 | 7 0 8 | 7 1 4 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 0 0 3 | 0 2 5 | 0 2 4 | 0 3 4 | 0 4 1 | 0 4 9 | 0 2 3 | 0 1 6 | 0 4 5 | 0 4 4 | 0 0 1 | 0 0 4 | 0 0 5 | 0 0 7 | 0 0 8 | 0 0 9 | 0 1 0 | 0 1 1 | 0 1 2 | 0 1 3 | 0 1 4 | 0 1 7 | 0 1 8 | 0 1 9 | 0 2 0 |
| **Hematopoietic System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone marrow | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Hemangiosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | X |
| Lymph node | | + | | | | | | | | | | | | | | | | | | | | | | + | |
| Lymph node, mandibular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Lymph node, mesenteric | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Spleen | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Thymus | + | + | + | + | M | + | + | + | + | + | + | + | + | M | + | + | + | + | + | M | + | + | + | + | M |
| **Integumentary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary gland | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M |
| Skin | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Subcutaneous tissue, fibrous histiocytoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Subcutaneous tissue, hemangioma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Subcutaneous tissue, hemangiosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Musculoskeletal System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Osteosarcoma | X | | | | | | | | | | | | | | | | | | | | | | | | |
| **Nervous System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Spinal cord | + | | | | | | | | | | | | | | | | | | | | | | | | |
| **Respiratory System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Alveolar/bronchiolar adenoma | X | | | | | | | | X | | | X | | X | | | | | X | | | X | | | X |
| Alveolar/bronchiolar adenoma, multiple | | | | | | | | | | | | | | | | | | | | X | | | | | |
| Alveolar/bronchiolar carcinoma | | | | | | | | | | | | | | | | X | | | | | | | | | |
| Hepatocellular carcinoma, metastatic, liver | | | | | | | | X | | | | X | | | | | | | | | | | | | |
| Nose | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Carcinoma, metastatic, harderian gland | | | | | | | | | | | | | | | | | X | | | | | | | | |
| Hemangiosarcoma | | | | | | | | | X | | | | | | | | | | | | | | | | |
| Trachea | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Special Senses System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ear | + | | | | | | | | | | | | | | | | | | | | | | | | |
| Harderian gland | | | | | | | | | | | | | | | | | + | | | | | | | | |
| Adenoma | | | | | | | | | | | | | | | | | X | | | | | | | | |
| Carcinoma | | | | | | | | | | | | | | | | | X | | | | | | | | |
| **Urinary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kidney | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Urethra | | | | | | | + | | | | | | | | | | | | | | | | | | |
| Urinary bladder | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Hemangioma | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Systemic Lesions** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Multiple organs | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lymphoma malignant | | | | | | | | | | | | | | | | | | | | | | | | | |

**TABLE C2**
**Individual Animal Tumor Pathology of Male Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 0 ppm**

| Number of Days on Study | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 3 0 | 7 3 0 | 7 3 0 | 7 3 0 | 7 3 0 | 7 3 0 | 7 3 0 | 7 3 0 | 7 3 0 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 0 2 1 | 0 2 2 | 0 2 7 | 0 2 9 | 0 3 0 | 0 3 1 | 0 3 2 | 0 3 3 | 0 3 5 | 0 3 8 | 0 3 9 | 0 4 0 | 0 4 2 | 0 4 3 | 0 4 6 | 0 4 7 | 0 0 2 | 0 0 6 | 0 1 5 | 0 2 6 | 0 2 8 | 0 3 6 | 0 3 7 | 0 4 8 | 0 5 0 | Total Tissues/ Tumors |
| **Hematopoietic System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone marrow | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Hemangiosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Lymph node | | | | | + | | | | | | | | | | | | | | | | | | | + | | 4 |
| Lymph node, mandibular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Lymph node, mesenteric | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Histiocytic sarcoma | | | | | | | | | | | X | | | | | | | | | | | | | | | 1 |
| Spleen | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Histiocytic sarcoma | | | | | | | | | | | X | | | | | | | | | | | | | | | 1 |
| Thymus | + | M | M | + | + | + | M | M | + | M | M | M | + | + | + | M | + | + | M | + | + | + | + | + | + | 37 |
| **Integumentary System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary gland | M | M | M | M | + | M | M | M | M | M | + | M | M | M | M | M | M | M | M | M | M | M | M | M | M | 2 |
| Skin | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Subcutaneous tissue, fibrous histiocytoma | | | | | | | | | | | | | | | | | X | | | | | | | | | 1 |
| Subcutaneous tissue, hemangioma | | | | | | | | | | | | | | | | | | | | | | | | X | | 1 |
| Subcutaneous tissue, hemangiosarcoma | | | | | | | | | | | | | | | | | | X | | | | | | | | 1 |
| **Musculoskeletal System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Osteosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Nervous System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Spinal cord | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Respiratory System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Alveolar/bronchiolar adenoma | | | | | | | X | | | | | | | | X | | | | | X | | | X | | | 11 |
| Alveolar/bronchiolar adenoma, multiple | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Alveolar/bronchiolar carcinoma | | X | | | | | | | | | | | X | X | | | | | | | | | | | | 4 |
| Hepatocellular carcinoma, metastatic, liver | | | X | | | X | | | | | | X | | | | | | | | | | | | | X | 6 |
| Nose | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Carcinoma, metastatic, harderian gland | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Hemangiosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Trachea | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Special Senses System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ear | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Harderian gland | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Adenoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Urinary System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kidney | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Urethra | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Urinary bladder | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Hemangioma | | | | | | X | | | | | | | | | | | | | | | | | | | | 1 |
| **Systemic Lesions** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Multiple organs | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Histiocytic sarcoma | | | | | | | | | | | X | | | | | | | | X | | | | | | | 2 |
| Lymphoma malignant | | | | | X | | | | | | | | | | | | | | | | | | | | | 1 |

**TABLE C2**
**Individual Animal Tumor Pathology of Male Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 250 ppm**

| Number of Days on Study | 3 3 5 | 4 7 1 | 6 4 5 | 6 6 5 | 7 0 0 | 7 1 0 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 0 7 4 | 0 6 9 | 0 9 5 | 0 5 7 | 0 8 3 | 0 8 9 | 0 5 4 | 0 5 5 | 0 5 6 | 0 5 8 | 0 5 9 | 0 6 0 | 0 6 2 | 0 6 3 | 0 6 5 | 0 6 6 | 0 7 0 | 0 7 1 | 0 7 2 | 0 7 3 | 0 7 6 | 0 7 7 | 0 7 8 | 0 8 0 | 0 8 2 |
| **Alimentary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Esophagus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Gallbladder | M | A | + | A | A | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Intestine large, colon | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine large, rectum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Fibrous histiocytoma, metastatic, uncertain primary site | | | | | | | | | | | | | | | | | | | | | | | | | |
| Intestine large, cecum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine small, duodenum | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine small, jejunum | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine small, ileum | + | + | A | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Liver | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Fibrous histiocytoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hepatoblastoma | | | | | | | | | | | | | X | | | | | | | | | | | | |
| Hepatoblastoma, multiple | | | | | | | | | | | | | | | | | | | | | | | X | | |
| Hepatocellular carcinoma | X | X | | | | | | | | X | | | | | | | | | | | | | | | |
| Hepatocellular adenoma | | | X | | | | | X | | | | | X | | X | | X | | | | X | | | | X |
| Hepatocellular adenoma, multiple | | | | | | X | X | | X | | | X | | X | | | | | X | X | | X | X | X | |
| Histiocytic sarcoma | | | | X | | | | | | | | | | | | | | | | | | | | | |
| Mesentery | | | | | + | | | | | | | | | | | | | | | + | | | | | |
| Pancreas | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Fibrous histiocytoma, metastatic, uncertain primary site | | | | | | | | | | | | | | | | | | | | | | | | | |
| Salivary glands | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Stomach, forestomach | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Stomach, glandular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Tooth | | | | | | | + | | | | | | | | | | | | | | | | | | |
| **Cardiovascular System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Heart | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Fibrous histiocytoma, metastatic, uncertain primary site | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Endocrine System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Adrenal cortex | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Capsule, adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Adrenal medulla | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Islets, pancreatic | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Parathyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + |
| Pituitary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + |
| Pars distalis, adenoma | | | | | | | | | | | | | | | | | | X | | | | | | | |
| Thyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Follicular cell, adenoma | | | | | | | | | | | | | | | | | | | | X | | | | | |
| **General Body System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| None | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Genital System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Epididymis | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Preputial gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Prostate | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Seminal vesicle | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Testes | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |

**TABLE C2**
**Individual Animal Tumor Pathology of Male Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 250 ppm**

| Number of Days on Study | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 3 0 | 7 3 0 | 7 3 0 | 7 3 0 | 7 3 0 | 7 3 0 | 7 3 0 | 7 3 0 | 7 3 0 | 7 3 0 | 7 3 0 | 7 3 0 | 7 3 0 | 7 3 0 | 7 3 0 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 0 8 4 | 0 8 5 | 0 8 7 | 0 9 0 | 0 9 1 | 0 9 2 | 0 9 3 | 0 9 7 | 0 9 8 | 0 9 9 | 0 5 1 | 0 5 2 | 0 5 3 | 0 6 1 | 0 6 4 | 0 6 7 | 0 6 8 | 0 7 5 | 0 7 9 | 0 8 1 | 0 8 6 | 0 8 8 | 0 9 4 | 0 9 6 | 1 0 0 | Total Tissues/ Tumors |
| **Alimentary System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Esophagus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Gallbladder | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 45 |
| Adenoma | | | | | X | | | | | | | | | | | | | | | | | | | | | 1 |
| Intestine large, colon | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Intestine large, rectum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Fibrous histiocytoma, metastatic, uncertain primary site | | | | | | | | | | | | | | | | | | X | | | | | | | | 1 |
| Intestine large, cecum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Intestine small, duodenum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Intestine small, jejunum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Intestine small, ileum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 48 |
| Liver | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Fibrous histiocytoma | | | | | | | | | | | | | | | | | | X | | | | | | | | 1 |
| Hepatoblastoma | | | | X | | | | | | | | | | | | | | | | | | | | | | 2 |
| Hepatoblastoma, multiple | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Hepatocellular carcinoma | | | | | | | | | | X | | | | | | X | | | X | | | | | | | 6 |
| Hepatocellular adenoma | | | | | | X | X | | | | X | | | | | X | | | | | | X | | X | | 13 |
| Hepatocellular adenoma, multiple | X | X | X | | | | | X | X | X | | X | | X | | | | | X | X | X | | X | | | 22 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Mesentery | | | | | | | | | | | | | | | | | | | | | | | | | | 2 |
| Pancreas | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Fibrous histiocytoma, metastatic, uncertain primary site | | | | | | | | | | | | | | | | | | X | | | | | | | | 1 |
| Salivary glands | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Stomach, forestomach | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Stomach, glandular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Tooth | | | | | | | | | | | | | | | | | | | | + | | | | + | | 3 |
| **Cardiovascular System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Heart | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Fibrous histiocytoma, metastatic, uncertain primary site | | | | | | | | | | | | | | | | | | X | | | | | | | | 1 |
| **Endocrine System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Adrenal cortex | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Capsule, adenoma | X | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Adrenal medulla | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Islets, pancreatic | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Parathyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Pituitary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Pars distalis, adenoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Thyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Follicular cell, adenoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **General Body System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| None | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Genital System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Epididymis | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Preputial gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Prostate | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Seminal vesicle | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Testes | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |

**TABLE C2**
**Individual Animal Tumor Pathology of Male Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 250 ppm**

| Number of Days on Study | 3 3 5 | 4 7 1 | 6 4 5 | 6 6 5 | 7 0 0 | 7 1 0 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 0 7 4 | 0 6 9 | 0 9 5 | 0 5 7 | 0 8 3 | 0 8 9 | 0 5 4 | 0 5 5 | 0 5 6 | 0 5 8 | 0 5 9 | 0 6 0 | 0 6 2 | 0 6 3 | 0 6 5 | 0 6 6 | 0 7 0 | 0 7 1 | 0 7 2 | 0 7 3 | 0 7 6 | 0 7 7 | 0 7 8 | 0 8 0 | 0 8 2 |
| **Hematopoietic System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone marrow | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Lymph node | | | | | | | | | | | | | + | + | | | | | | + | | | | | |
| Fibrous histiocytoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Iliac, fibrous histiocytoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mediastinal, fibrous histiocytoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pancreatic, fibrous histiocytoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Renal, fibrous histiocytoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lymph node, mandibular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Fibrous histiocytoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lymph node, mesenteric | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Fibrous histiocytoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Spleen | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Fibrous histiocytoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hemangiosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Thymus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Thymoma benign | | | | | | | | | | | | | | | X | | | | | | | | | | |
| **Integumentary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary gland | M | M | M | M | M | M | M | M | M | M | M | M | M | + | M | M | M | M | M | M | M | M | M | M | M |
| Skin | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Subcutaneous tissue, hemangiosarcoma | | | | | | | | X | | | | | | | | | | | | | | | | | |
| **Musculoskeletal System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Skeletal muscle | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hemangiosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Nervous System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Respiratory System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Alveolar/bronchiolar adenoma | | | | | | | X | | | | | | X | | | | | X | | | | | | | |
| Alveolar/bronchiolar adenoma, multiple | | | | | | | | | | X | | | | | | | | | X | X | | | | | |
| Alveolar/bronchiolar carcinoma | | | | | | X | | | | | | | | | | | | | | | | | X | | |
| Alveolar/bronchiolar carcinoma, multiple | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fibrous histiocytoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hepatoblastoma, metastatic, liver | | | | | | | | | | | | | | | | | | | | | | | X | | |
| Hepatocellular carcinoma, metastatic, liver | X | | | | | | | | | | | | | | | | | | | | | | | | |
| Histiocytic sarcoma | | | | X | | | | | | | | | | | | | | | | | | | | | |
| Nose | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Trachea | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Special Senses System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Harderian gland | | | | | | | | | | | | | | | | | | | | | | | | + | |
| Adenoma | | | | | | | | | | | | | | | | | | | | | | | | X | |
| Carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | |

**TABLE C2**
**Individual Animal Tumor Pathology of Male Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 250 ppm**

| **Number of Days on Study** | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 730 | 730 | 730 | 730 | 730 | 730 | 730 | 730 | 730 | 730 | 730 | 730 | 730 | 730 | 730 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 00884 | 00885 | 00887 | 00890 | 00891 | 00892 | 00893 | 00897 | 00898 | 00899 | 00951 | 00952 | 00953 | 00961 | 00964 | 00967 | 00968 | 00975 | 00979 | 00981 | 00986 | 00988 | 00994 | 00996 | 00910 | Total Tissues/ Tumors |
| **Hematopoietic System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone marrow | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Lymph node | | | | | | | | | + | | | | | | | | | + | | | | | | | | 5 |
| Fibrous histiocytoma | | | | | | | | | | | | | | | | | | X | | | | | | | | 1 |
| Iliac, fibrous histiocytoma | | | | | | | | | | | | | | | | | | X | | | | | | | | 1 |
| Mediastinal, fibrous histiocytoma | | | | | | | | | | | | | | | | | | X | | | | | | | | 1 |
| Pancreatic, fibrous histiocytoma | | | | | | | | | | | | | | | | | | X | | | | | | | | 1 |
| Renal, fibrous histiocytoma | | | | | | | | | | | | | | | | | | X | | | | | | | | 1 |
| Lymph node, mandibular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Fibrous histiocytoma | | | | | | | | | | | | | | | | | | X | | | | | | | | 1 |
| Lymph node, mesenteric | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Fibrous histiocytoma | | | | | | | | | | | | | | | | | | X | | | | | | | | 1 |
| Spleen | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Fibrous histiocytoma | | | | | | | | | | | | | | | | | | X | | | | | | | | 1 |
| Hemangiosarcoma | | | | | | | | | X | | | | | | | | | | | | | | | | | 1 |
| Thymus | + | + | + | + | + | + | + | + | + | M | + | + | M | M | + | + | + | + | + | + | + | + | + | + | + | 47 |
| Thymoma benign | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Integumentary System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary gland | M | M | M | M | + | M | M | M | M | M | + | M | M | + | M | M | M | M | M | M | M | M | M | + | M | 5 |
| Skin | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Subcutaneous tissue, hemangiosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Musculoskeletal System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Skeletal muscle | | | | | | | | | | | + | | | | | | | | | | | | | | | 1 |
| Hemangiosarcoma | | | | | | | | | | | X | | | | | | | | | | | | | | | 1 |
| **Nervous System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Respiratory System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Alveolar/bronchiolar adenoma | | | | | X | | | | | | | | | | | | | | | | | X | | | | 5 |
| Alveolar/bronchiolar adenoma, multiple | | | | | | | | | | | | | | | | | | | | | | | | | | 3 |
| Alveolar/bronchiolar carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | | 2 |
| Alveolar/bronchiolar carcinoma, multiple | | | | | | | | | | | | | | | | | | | X | | | | | | | 1 |
| Fibrous histiocytoma | | | | | | | | | | | | | | | | | | X | | | | | | | | 1 |
| Hepatoblastoma, metastatic, liver | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Hepatocellular carcinoma, metastatic, liver | | | | | | | | | | | | | | | | | | | X | | | | | | | 2 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Nose | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Trachea | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Special Senses System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Harderian gland | | | | | | | | | + | | | + | | + | | | + | | | | | | | | | 5 |
| Adenoma | | | | | | | | | X | | | X | | | | | X | | | | | | | | | 4 |
| Carcinoma | | | | | | | | | | | | | | X | | | | | | | | | | | | 1 |

**TABLE C2**
**Individual Animal Tumor Pathology of Male Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 250 ppm**

| Number of Days on Study | 3 3 5 | 4 7 1 | 6 4 5 | 6 6 5 | 7 0 0 | 7 1 0 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 0 7 4 | 0 6 9 | 0 9 5 | 0 5 7 | 0 8 3 | 0 8 9 | 0 5 4 | 0 5 5 | 0 5 6 | 0 5 8 | 0 5 9 | 0 6 0 | 0 6 2 | 0 6 3 | 0 6 5 | 0 6 6 | 0 7 0 | 0 7 1 | 0 7 2 | 0 7 3 | 0 7 6 | 0 7 7 | 0 7 8 | 0 8 0 | 0 8 2 |
| **Urinary System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kidney | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Urinary bladder | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Fibrous histiocytoma, metastatic, uncertain primary site | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Systemic Lesions** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Multiple organs | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | X | | | | | | | | | | | | | | | | | | | | | | |
| Lymphoma malignant | | | | | | | | | | | | | | X | | | | | | | | | | | | |

**TABLE C2**
**Individual Animal Tumor Pathology of Male Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 250 ppm**

| Number of Days on Study | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 3 0 | 7 3 0 | 7 3 0 | 7 3 0 | 7 3 0 | 7 3 0 | 7 3 0 | 7 3 0 | 7 3 0 | 7 3 0 | 7 3 0 | 7 3 0 | 7 3 0 | 7 3 0 | 7 3 0 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 0 8 4 | 0 8 5 | 0 8 7 | 0 9 0 | 0 9 1 | 0 9 2 | 0 9 3 | 0 9 7 | 0 9 8 | 0 9 9 | 0 5 1 | 0 5 2 | 0 5 3 | 0 6 1 | 0 6 4 | 0 6 7 | 0 6 8 | 0 7 5 | 0 7 9 | 0 8 1 | 0 8 6 | 0 8 8 | 0 9 4 | 0 9 6 | 1 0 0 | Total Tissues/ Tumors |
| **Urinary System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kidney | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Urinary bladder | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Fibrous histiocytoma, metastatic, uncertain primary site | | | | | | | | | | | | | | | | | | X | | | | | | | | 1 |
| **Systemic Lesions** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Multiple organs | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Lymphoma malignant | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |

**TABLE C2**
**Individual Animal Tumor Pathology of Male Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 500 ppm**

| Number of Days on Study | 0 7 9 | 0 9 2 | 1 8 0 | 1 8 9 | 3 7 7 | 4 0 8 | 4 5 8 | 4 5 8 | 4 8 4 | 5 1 1 | 5 1 9 | 5 1 9 | 6 0 2 | 6 0 7 | 6 0 8 | 6 2 5 | 6 3 7 | 6 3 8 | 6 4 5 | 7 0 0 | 7 1 4 | 7 2 9 | 7 2 9 | 7 2 9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 1 0 2 | 1 4 3 | 1 4 5 | 1 4 0 | 1 3 7 | 1 1 6 | 1 0 3 | 1 2 2 | 1 2 6 | 1 3 8 | 1 3 1 | 1 3 9 | 1 4 7 | 1 0 5 | 1 1 0 | 1 0 4 | 1 4 1 | 1 0 7 | 1 3 2 | 1 5 0 | 1 2 1 | 1 0 1 | 1 0 6 | 1 0 8 | 1 0 9 |
| **Alimentary System** | | | | | | | | | | | | | | | | | | | | | | | | |
| Esophagus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Gallbladder | M | + | + | + | + | A | + | + | + | + | M | + | + | A | + | A | + | + | M | A | + | + | + | + |
| Intestine large, colon | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + |
| Intestine large, rectum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine large, cecum | + | + | + | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | A | + | + | + | + |
| Intestine small, duodenum | + | + | + | + | A | + | + | + | + | + | + | + | + | A | + | + | + | + | + | A | + | + | + | + |
| Intestine small, jejunum | A | + | + | + | A | A | + | + | + | + | + | + | + | A | + | A | + | + | + | A | + | + | + | + |
| Intestine small, ileum | + | A | + | + | + | + | + | A | + | + | + | + | + | A | + | A | + | + | + | A | + | + | + | + |
| Liver | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Hemangiosarcoma | | | | | | | | | | | | | X | | | | | | | | | | | |
| Hemangiosarcoma, multiple | | | | | | | | | | | | | | | | | | | | | | | | X |
| Hepatocellular carcinoma | | | | | | | X | | | | X | | | X | X | | | | | | | | | |
| Hepatocellular carcinoma, multiple | | | | | | | | | | | | | | | | | | | X | | | | | |
| Hepatocellular adenoma | | | | | X | | | | | X | X | X | | X | | X | | X | | X | | X | | |
| Hepatocellular adenoma, multiple | | | | | | | | X | | | | | X | | | | | | | | X | | X | | X |
| Mesentery | | | | | | | | | | | | | | | | | | | | | | | | + |
| Pancreas | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Salivary glands | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Stomach, forestomach | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Squamous cell papilloma | | | | | | | | | | | | | | | | | | | | | | | | |
| Stomach, glandular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Mast cell tumor benign | | | | | | | | | | | | | | | | | | | | | | | | |
| Tooth | | | | | | | | | | | | | | | | | | | | | | | | |
| **Cardiovascular System** | | | | | | | | | | | | | | | | | | | | | | | | |
| Heart | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Hemangiosarcoma | | | | | | | | | | | | | X | | | | | | | | | | | |
| **Endocrine System** | | | | | | | | | | | | | | | | | | | | | | | | |
| Adrenal cortex | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Capsule, adenoma | | | | | | | | | | | | | | | | | | | | | | | | |
| Adrenal medulla | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Islets, pancreatic | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Parathyroid gland | + | + | + | M | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + |
| Pituitary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + |
| Thyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Follicular cell, adenoma | | | | | | | | | | | | | | | | | | | | | | | | |
| **General Body System** | | | | | | | | | | | | | | | | | | | | | | | | |
| None | | | | | | | | | | | | | | | | | | | | | | | | |
| **Genital System** | | | | | | | | | | | | | | | | | | | | | | | | |
| Epididymis | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Penis | | | | | | | | | + | | | | | | | | | | | | | | | |
| Preputial gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Prostate | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Seminal vesicle | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Testes | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Interstitial cell, adenoma | | | | | | | | | | | | | | | | | | | | | | | | |

**TABLE C2**
**Individual Animal Tumor Pathology of Male Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 500 ppm**

| Number of Days on Study | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 730 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 11 1 | 11 2 | 11 3 | 11 4 | 11 5 | 11 7 | 11 8 | 11 9 | 12 0 | 12 3 | 12 4 | 12 5 | 12 7 | 12 8 | 12 9 | 13 0 | 13 3 | 13 4 | 13 5 | 13 6 | 14 2 | 14 4 | 14 6 | 14 8 | 14 9 | Total Tissues/ Tumors |
| **Alimentary System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Esophagus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Gallbladder | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + | + | 42 |
| Intestine large, colon | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Intestine large, rectum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Intestine large, cecum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 48 |
| Intestine small, duodenum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 47 |
| Intestine small, jejunum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 44 |
| Intestine small, ileum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 45 |
| Liver | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Hemangiosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Hemangiosarcoma, multiple | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Hepatocellular carcinoma | | X | | | | | | | | | | | | | | | | | | | | | | | | 5 |
| Hepatocellular carcinoma, multiple | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Hepatocellular adenoma | | X | | X | | X | | | X | X | X | | | X | | X | X | X | | | | X | X | | | 21 |
| Hepatocellular adenoma, multiple | | | X | | X | | | | | | | | X | | X | | | | X | X | | | | X | X | 13 |
| Mesentery | | | | | + | | + | | | | | | | | + | | + | | | | | | | | + | 6 |
| Pancreas | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Salivary glands | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Stomach, forestomach | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Squamous cell papilloma | | | | | | | | | | | | | | X | | | | | | | | | | | | 1 |
| Stomach, glandular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Mast cell tumor benign | | | | X | | | | | | | | | | | | | | | | | | | | | | 1 |
| Tooth | | + | | | | | + | | | | + | | + | | | | | | | | | | | | | 4 |
| **Cardiovascular System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Heart | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Hemangiosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Endocrine System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Adrenal cortex | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Capsule, adenoma | | | | | | | | | | | | X | | | | | | X | | | | | | | | 2 |
| Adrenal medulla | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Islets, pancreatic | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Parathyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | 47 |
| Pituitary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Thyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Follicular cell, adenoma | | | | | | | | | | | | | | | | | X | | | | | | | | | 1 |
| **General Body System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| None | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Genital System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Epididymis | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Penis | | | | + | | | | | | | | | | | | | | | | | | | | | | 2 |
| Preputial gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Prostate | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Seminal vesicle | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Testes | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Interstitial cell, adenoma | | | | | | | | | X | | | | | | | | | | X | | | | | | | 2 |

**TABLE C2**
**Individual Animal Tumor Pathology of Male Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 500 ppm**

| Number of Days on Study | 0 7 9 | 0 9 2 | 1 8 0 | 1 8 9 | 3 7 7 | 4 0 8 | 4 5 8 | 4 5 8 | 4 8 4 | 5 1 1 | 5 1 9 | 5 1 9 | 6 0 2 | 6 0 7 | 6 0 8 | 6 0 8 | 6 2 5 | 6 3 7 | 6 3 8 | 6 4 5 | 7 0 0 | 7 1 4 | 7 2 9 | 7 2 9 | 7 2 9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 1 0 0 2 | 1 0 4 3 | 1 0 4 5 | 1 0 4 0 | 1 0 3 7 | 1 1 0 6 | 1 0 3 3 | 1 0 2 2 | 1 2 2 6 | 1 3 3 8 | 1 3 1 1 | 1 3 3 9 | 1 4 0 7 | 1 4 0 5 | 1 4 1 0 | 1 4 1 0 | 1 4 0 4 | 1 4 4 1 | 1 4 0 7 | 1 4 3 2 | 1 5 5 0 | 1 5 2 1 | 1 6 0 1 | 1 6 0 6 | 1 6 0 8 | 1 6 0 9 |
| **Hematopoietic System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone marrow | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Hemangiosarcoma | | | | | | | | | | | | | X | | | | | | | | | | | | |
| Lymph node | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lymph node, mandibular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Carcinoma, metastatic, harderian gland | | | | | | | | | | | | | | | X | | | | | | | | | | |
| Lymph node, mesenteric | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Hemangiosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Spleen | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Hemangiosarcoma | | | | | | | | | | | | | | | | | | | | | | | X | | |
| Thymus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | M | + | M | + | + | + |
| **Integumentary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary gland | M | M | M | M | M | M | M | M | + | M | M | + | M | M | M | M | M | M | M | M | M | M | M | M | M |
| Skin | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Musculoskeletal System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Nervous System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Respiratory System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Alveolar/bronchiolar adenoma | | | | | | | | | | X | | | | | | | | | | | | | | | X |
| Alveolar/bronchiolar carcinoma | | | | | | | | | | | | X | | | | | | | | | | X | | | |
| Alveolar/bronchiolar carcinoma, multiple | | | | | | | | | | | | | | | | | | X | | | | | | | |
| Carcinoma, metastatic, harderian gland | | | | | | | | | | | | | | | X | | | | | | | | | | |
| Hepatocellular carcinoma, metastatic, liver | | | | | | | | | | | | | | X | | | | | | | | | | | |
| Nose | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Carcinoma, metastatic, harderian gland | | | | | | | | | | | | | | | X | | | | | | | | | | |
| Trachea | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Special Senses System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Harderian gland | | | | | | | | | | | | | | | + | | | | | | | | | | |
| Adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carcinoma | | | | | | | | | | | | | | | X | | | | | | | | | | |
| **Urinary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kidney | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Urinary bladder | + | + | + | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + |
| **Systemic Lesions** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Multiple organs | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |

**TABLE C2**
**Individual Animal Tumor Pathology of Male Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 500 ppm**

| **Number of Days on Study** | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 730 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 11011 | 11012 | 11013 | 11014 | 11015 | 11017 | 11018 | 11019 | 11020 | 11023 | 11024 | 11025 | 11027 | 11028 | 11029 | 11030 | 11033 | 11034 | 11035 | 11036 | 11042 | 11044 | 11046 | 11048 | 11049 | Total Tissues/ Tumors |
| **Hematopoietic System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone marrow | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Hemangiosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Lymph node | | | | | | | | | | | | | | | | + | | | | + | | | | | | 2 |
| Lymph node, mandibular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Carcinoma, metastatic, harderian gland | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Lymph node, mesenteric | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Hemangiosarcoma | | | | | | | | | | | | | | X | | | | | | | | | | | | 1 |
| Spleen | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Hemangiosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Thymus | M | + | + | + | + | + | M | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 45 |
| **Integumentary System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary gland | M | M | M | M | M | M | M | M | + | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | 3 |
| Skin | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Musculoskeletal System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Nervous System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Respiratory System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Alveolar/bronchiolar adenoma | | | | | | | | | | | | | | | | | | X | X | | | | | | | 4 |
| Alveolar/bronchiolar carcinoma | | | | | | | | | | | | | | | | X | | | | | | | | | X | 4 |
| Alveolar/bronchiolar carcinoma, multiple | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Carcinoma, metastatic, harderian gland | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Hepatocellular carcinoma, metastatic, liver | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Nose | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Carcinoma, metastatic, harderian gland | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Trachea | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Special Senses System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Harderian gland | | | | | | | | + | | | | | | | | | + | | | | | | | | | 3 |
| Adenoma | | | | | | | | X | | | | | | | | | X | | | | | | | | | 2 |
| Carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Urinary System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kidney | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Urinary bladder | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| **Systemic Lesions** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Multiple organs | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |

**TABLE C2**
**Individual Animal Tumor Pathology of Male Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 1,000 ppm**

| Number of Days on Study | 2 3 3 | 2 4 6 | 4 4 3 | 5 4 3 | 5 5 6 | 5 6 8 | 6 1 7 | 6 4 5 | 6 5 2 | 6 5 7 | 7 0 0 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 1 5 2 | 1 8 0 | 1 9 0 | 1 6 3 | 1 7 7 | 1 7 2 | 1 8 3 | 1 5 3 | 1 8 6 | 1 9 1 | 1 5 6 | 1 5 1 | 1 5 4 | 1 5 5 | 1 5 7 | 1 5 8 | 1 5 9 | 1 6 0 | 1 6 1 | 1 6 2 | 1 6 4 | 1 6 5 | 1 6 6 | 1 6 8 | 1 7 1 |
| **Alimentary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Esophagus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Gallbladder | A | + | M | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine large, colon | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine large, rectum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine large, cecum | A | + | + | + | A | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine small, duodenum | + | A | + | + | A | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine small, jejunum | A | + | + | + | A | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine small, ileum | A | + | + | + | A | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Liver | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Hemangiosarcoma | | | | | | | | | | | | | | | | | | | X | | | | | | |
| Hepatoblastoma | | | | | | X | | | X | | | | | | | | | | X | | X | | X | | |
| Hepatocellular carcinoma | | | | | | | X | | X | X | X | | X | | | | | | | | | | | | |
| Hepatocellular carcinoma, multiple | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hepatocellular adenoma | | | | | | | X | | | X | X | | | X | X | | | | | | | | | | |
| Hepatocellular adenoma, multiple | | | | | X | X | | | | | | X | | | | X | X | | | | | X | | | X |
| Mesentery | | | | | | + | + | | | + | | | | | | | | | + | | + | + | | | + |
| Oral mucosa | | | | | | | | | | | | | | | | | | | | + | | | | | |
| Pancreas | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Fibrous histiocytoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Salivary glands | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Stomach, forestomach | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Squamous cell papilloma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stomach, glandular | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Tooth | | | | | | | | | | | | | | | + | | | | | | | + | | | |
| **Cardiovascular System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Heart | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Hemangiosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Endocrine System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Adrenal cortex | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Adenoma | | | | | | | | | | | | | | | X | | | | | | | | | | |
| Capsule, adenoma | | | | X | | | | | | | | | | | | | | | | | | | | | |
| Adrenal medulla | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Islets, pancreatic | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Adenoma | | | | | | | | X | | | | | | | | | | | | | | | | | |
| Parathyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Pituitary gland | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Thyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Follicular cell, adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| **General Body System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| None | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Genital System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Epididymis | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Preputial gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Prostate | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Seminal vesicle | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Testes | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |

**TABLE C2**
**Individual Animal Tumor Pathology of Male Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 1,000 ppm**

| Number of Days on Study | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 730 | 730 | 730 | 730 | 730 | 730 | 730 | 730 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 17303 | 17505 | 17606 | 17808 | 17909 | 18101 | 18202 | 18404 | 18707 | 18808 | 18909 | 19303 | 19404 | 19707 | 19808 | 19909 | 20007 | 16707 | 16909 | 17010 | 17404 | 18505 | 19202 | 19505 | 19606 | Total Tissues/ Tumors |
| **Alimentary System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Esophagus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Gallbladder | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 47 |
| Intestine large, colon | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Intestine large, rectum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Intestine large, cecum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 47 |
| Intestine small, duodenum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 47 |
| Intestine small, jejunum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 47 |
| Intestine small, ileum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 47 |
| Liver | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Hemangiosarcoma | | | | | | | | | | | | | X | | | | | | | | | | | | | 2 |
| Hepatoblastoma | | | | | X | | | | | | | | | | | | | | | | | | | | | 6 |
| Hepatocellular carcinoma | | | | | | | | | | | X | | | | | | | | | | | | | | X | 7 |
| Hepatocellular carcinoma, multiple | | | | | | X | | | | | | | | | | | | | | | | | | | | 1 |
| Hepatocellular adenoma | | | | | | | | | | X | X | X | | | X | X | | | X | | | | | | | 11 |
| Hepatocellular adenoma, multiple | | | X | | | X | X | X | X | | | | X | X | | | X | | | | X | | X | X | X | 19 |
| Mesentery | | | | | | | | | | + | | | | | | | | | | | | | | | | 8 |
| Oral mucosa | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Pancreas | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Fibrous histiocytoma | | | | | | | | | | | | | | | | | | | | | X | | | | | 1 |
| Salivary glands | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Stomach, forestomach | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Squamous cell papilloma | | | | | | | | | | | | | | X | | | | | | | | | | | | 1 |
| Stomach, glandular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Tooth | | | + | + | | | | | + | | | | | | | | | + | | | | | + | | | 7 |
| **Cardiovascular System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Heart | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Hemangiosarcoma | | X | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Endocrine System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Adrenal cortex | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Adenoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Capsule, adenoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Adrenal medulla | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Islets, pancreatic | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Adenoma | | | | | | | | | | | | | | | | | | X | | | | | | | | 2 |
| Parathyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Pituitary gland | + | + | + | + | + | + | M | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 47 |
| Thyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Follicular cell, adenoma | | | | | | | | | | | | | | | | | | | | | X | | | | | 1 |
| **General Body System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| None | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Genital System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Epididymis | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Preputial gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Prostate | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Seminal vesicle | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Testes | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |

**TABLE C2**
**Individual Animal Tumor Pathology of Male Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 1,000 ppm**

| Number of Days on Study | 2 3 3 | 2 4 6 | 4 4 3 | 5 4 3 | 5 5 6 | 5 6 8 | 6 1 7 | 6 4 5 | 6 5 2 | 6 5 7 | 7 0 0 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 | 7 2 9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 1 5 2 | 1 8 0 | 1 9 0 | 1 6 3 | 1 7 7 | 1 7 2 | 1 8 3 | 1 5 3 | 1 8 6 | 1 9 1 | 1 5 6 | 1 5 1 | 1 5 4 | 1 5 5 | 1 5 7 | 1 5 8 | 1 5 9 | 1 6 0 | 1 6 1 | 1 6 2 | 1 6 4 | 1 6 5 | 1 6 6 | 1 6 8 | 1 7 1 |
| **Hematopoietic System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone marrow | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Hemangiosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lymph node | | | | | | | | | | | | | | + | | | | | | | | | | | |
| Renal, fibrous histiocytoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lymph node, mandibular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Lymph node, mesenteric | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Spleen | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Fibrous histiocytoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hemangiosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Thymus | + | + | + | + | + | + | M | + | M | + | + | M | M | + | + | + | M | + | + | + | + | + | M | + | + |
| Thymoma malignant | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Integumentary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary gland | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M |
| Skin | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Musculoskeletal System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Skeletal muscle | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Nervous System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Respiratory System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Alveolar/bronchiolar adenoma | | | | | | X | | | | | | | | | | | | | | | X | X | | | |
| Alveolar/bronchiolar adenoma, multiple | | | | | | | | | | | | | | | | | X | | | | | | | | |
| Alveolar/bronchiolar carcinoma | | | | X | | | | | | | | | X | | | X | | | | | | | | | |
| Hepatoblastoma, metastatic, liver | | | | | | | | | | | | | | | | | | | | | X | | | | |
| Hepatocellular carcinoma, metastatic, liver | | | | | | | | | X | | | | | | | | | | | | | | | | |
| Nose | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Trachea | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Special Senses System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ear | | | | | | | | + | | | | | | | | | | | | | | | | | |
| Harderian gland | | | | | | | | | | | | | | | | + | | | | | | | | | |
| Adenoma | | | | | | | | | | | | | | | | X | | | | | | | | | |
| **Urinary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kidney | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Renal tubule, adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Urinary bladder | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Systemic Lesions** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Multiple organs | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Lymphoma malignant | | | | | | | X | | | | | | | X | | | | | | | | | | | |

**TABLE C2**
**Individual Animal Tumor Pathology of Male Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 1,000 ppm**

| Number of Days on Study | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 729 | 730 | 730 | 730 | 730 | 730 | 730 | 730 | 730 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 17303 | 17505 | 17606 | 17708 | 17909 | 18101 | 18202 | 18404 | 18707 | 18808 | 18909 | 19303 | 19404 | 19707 | 19808 | 19909 | 20000 | 16707 | 16909 | 17010 | 17404 | 18505 | 19202 | 19505 | 19606 | Total Tissues/ Tumors |
| **Hematopoietic System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone marrow | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Hemangiosarcoma | | | | | | | | | | | | | | | | | | X | | | | | | | | 1 |
| Lymph node | | | | | | | | | | | | | | | | | | | + | | + | | | | | 3 |
| Renal, fibrous histiocytoma | | | | | | | | | | | | | | | | | | | | | X | | | | | 1 |
| Lymph node, mandibular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Lymph node, mesenteric | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Spleen | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Fibrous histiocytoma | | | | | | | | | | | | | | | | | | | | | X | | | | | 1 |
| Hemangiosarcoma | | | | | | | | | | | | | | | | | | X | | | | | | | | 1 |
| Thymus | + | + | + | + | + | + | M | + | + | M | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | 41 |
| Thymoma malignant | X | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Integumentary System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary gland | M | + | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | 1 |
| Skin | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Musculoskeletal System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Skeletal muscle | | | | | | | | | | | | | | | | | | | | + | | | | | | 1 |
| Sarcoma | | | | | | | | | | | | | | | | | | | | X | | | | | | 1 |
| **Nervous System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Respiratory System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Alveolar/bronchiolar adenoma | | | | | | | | | | | | | | X | | | | | | | | | | | | 4 |
| Alveolar/bronchiolar adenoma, multiple | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Alveolar/bronchiolar carcinoma | | | | | | X | | | | | | | | | | | | | | | | | | | | 4 |
| Hepatoblastoma, metastatic, liver | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Hepatocellular carcinoma, metastatic, liver | | | | | | X | | | | | | | | | | | | | | | | | | | | 2 |
| Nose | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Trachea | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Special Senses System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ear | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Harderian gland | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Adenoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Urinary System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kidney | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Renal tubule, adenoma | | | | | | | | | | | | | | | X | | | | | | | | | | | 1 |
| Urinary bladder | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Systemic Lesions** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Multiple organs | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Lymphoma malignant | | | | | | | | | X | | | | | | | | | | X | | | | | | | 4 |

**TABLE C3**
**Statistical Analysis of Primary Neoplasms in Male Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 250 ppm | 500 ppm | 1,000 ppm |
|---|---|---|---|---|
| **Harderian Gland: Adenoma** | | | | |
| Overall rate[a] | 1/50 (2%) | 4/50 (8%) | 2/50 (4%) | 1/50 (2%) |
| Adjusted rate[b] | 2.2% | 8.4% | 5.3% | 2.3% |
| Terminal rate[c] | 1/40 (3%) | 4/44 (9%) | 2/29 (7%) | 1/39 (3%) |
| First incidence (days) | 729 (T) | 729 (T) | 729 (T) | 729 (T) |
| Poly-3 test[d] | P=0.428N | P=0.211 | P=0.494 | P=0.786 |
| **Harderian Gland: Adenoma or Carcinoma** | | | | |
| Overall rate | 1/50 (2%) | 5/50 (10%) | 3/50 (6%) | 1/50 (2%) |
| Adjusted rate | 2.2% | 10.5% | 7.9% | 2.3% |
| Terminal rate | 1/40 (3%) | 5/44 (11%) | 2/29 (7%) | 1/39 (3%) |
| First incidence (days) | 729 (T) | 729 (T) | 608 | 729 (T) |
| Poly-3 test | P=0.393N | P=0.125 | P=0.288 | P=0.786 |
| **Liver: Hemangiosarcoma** | | | | |
| Overall rate | 3/50 (6%) | 0/50 (0%) | 2/50 (4%) | 2/50 (4%) |
| Adjusted rate | 6.6% | 0.0% | 5.3% | 4.5% |
| Terminal rate | 2/40 (5%) | 0/44 (0%) | 1/29 (3%) | 2/39 (5%) |
| First incidence (days) | 501 | —[e] | 602 | 729 (T) |
| Poly-3 test | P=0.613 | P=0.119N | P=0.620N | P=0.532N |
| **Liver: Hepatocellular Adenoma** | | | | |
| Overall rate | 35/50 (70%) | 35/50 (70%) | 34/50 (68%) | 30/50 (60%) |
| Adjusted rate | 76.0% | 72.9% | 79.6% | 65.1% |
| Terminal rate | 32/40 (80%) | 33/44 (75%) | 23/29 (79%) | 25/39 (64%) |
| First incidence (days) | 464 | 645 | 377 | 556 |
| Poly-3 test | P=0.151N | P=0.460N | P=0.451 | P=0.176N |
| **Liver: Hepatocellular Carcinoma** | | | | |
| Overall rate | 13/50 (26%) | 6/50 (12%) | 6/50 (12%) | 8/50 (16%) |
| Adjusted rate | 29.0% | 12.2% | 15.0% | 17.7% |
| Terminal rate | 12/40 (30%) | 4/44 (9%) | 1/29 (3%) | 4/39 (10%) |
| First incidence (days) | 646 | 335 | 458 | 617 |
| Poly-3 test | P=0.228N | P=0.038N | P=0.109N | P=0.159N |
| **Liver: Hepatocellular Adenoma or Carcinoma** | | | | |
| Overall rate | 39/50 (78%) | 38/50 (76%) | 37/50 (74%) | 32/50 (64%) |
| Adjusted rate | 84.2% | 76.5% | 83.8% | 69.0% |
| Terminal rate | 35/40 (88%) | 34/44 (77%) | 23/29 (79%) | 26/39 (67%) |
| First incidence (days) | 464 | 335 | 377 | 556 |
| Poly-3 test | P=0.068N | P=0.247N | P=0.608N | P=0.064N |
| **Liver: Hepatoblastoma** | | | | |
| Overall rate | 6/50 (12%) | 3/50 (6%) | 0/50 (0%) | 6/50 (12%) |
| Adjusted rate | 13.1% | 6.3% | 0.0% | 13.3% |
| Terminal rate | 4/40 (10%) | 3/44 (7%) | 0/29 (0%) | 4/39 (10%) |
| First incidence (days) | 518 | 729 (T) | — | 568 |
| Poly-3 test | P=0.483 | P=0.231N | P=0.037N | P=0.621 |
| **Liver: Hepatocellular Carcinoma or Hepatoblastoma** | | | | |
| Overall rate | 18/50 (36%) | 9/50 (18%) | 6/50 (12%) | 13/50 (26%) |
| Adjusted rate | 39.0% | 18.3% | 15.0% | 28.4% |
| Terminal rate | 15/40 (38%) | 7/44 (16%) | 1/29 (3%) | 8/39 (21%) |
| First incidence (days) | 518 | 335 | 458 | 568 |
| Poly-3 test | P=0.280N | P=0.020N | P=0.012N | P=0.199N |

**TABLE C3**
**Statistical Analysis of Primary Neoplasms in Male Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 250 ppm | 500 ppm | 1,000 ppm |
|---|---|---|---|---|
| **Liver: Hepatocellular Adenoma, Hepatocellular Carcinoma, or Hepatoblastoma** | | | | |
| Overall rate | 40/50 (80%) | 39/50 (78%) | 37/50 (74%) | 36/50 (72%) |
| Adjusted rate | 85.3% | 78.6% | 83.8% | 77.6% |
| Terminal rate | 35/40 (88%) | 35/44 (80%) | 23/29 (79%) | 30/39 (77%) |
| First incidence (days) | 464 | 335 | 377 | 556 |
| Poly-3 test | P=0.271N | P=0.277N | P=0.549N | P=0.245N |
| **Lung: Alveolar/bronchiolar Adenoma** | | | | |
| Overall rate | 12/50 (24%) | 8/50 (16%) | 4/50 (8%) | 5/50 (10%) |
| Adjusted rate | 26.3% | 16.8% | 10.5% | 11.2% |
| Terminal rate | 10/40 (25%) | 8/44 (18%) | 3/29 (10%) | 4/39 (10%) |
| First incidence (days) | 220 | 729 (T) | 511 | 568 |
| Poly-3 test | P=0.040N | P=0.199N | P=0.067N | P=0.059N |
| **Lung: Alveolar/bronchiolar Carcinoma** | | | | |
| Overall rate | 4/50 (8%) | 3/50 (6%) | 5/50 (10%) | 4/50 (8%) |
| Adjusted rate | 9.0% | 6.3% | 13.0% | 8.9% |
| Terminal rate | 4/40 (10%) | 2/44 (5%) | 2/29 (7%) | 3/39 (8%) |
| First incidence (days) | 729 (T) | 710 | 519 | 543 |
| Poly-3 test | P=0.487 | P=0.477N | P=0.438 | P=0.656N |
| **Lung: Alveolar/bronchiolar Adenoma or Carcinoma** | | | | |
| Overall rate | 16/50 (32%) | 11/50 (22%) | 9/50 (18%) | 9/50 (18%) |
| Adjusted rate | 35.1% | 23.1% | 23.0% | 19.8% |
| Terminal rate | 14/40 (35%) | 10/44 (23%) | 5/29 (17%) | 7/39 (18%) |
| First incidence (days) | 220 | 710 | 511 | 543 |
| Poly-3 test | P=0.087N | P=0.150N | P=0.177N | P=0.084N |
| **All Organs: Hemangiosarcoma** | | | | |
| Overall rate | 5/50 (10%) | 3/50 (6%) | 4/50 (8%) | 4/50 (8%) |
| Adjusted rate | 11.0% | 6.3% | 10.6% | 9.0% |
| Terminal rate | 3/40 (8%) | 3/44 (7%) | 3/29 (10%) | 4/39 (10%) |
| First incidence (days) | 501 | 729 (T) | 602 | 729 (T) |
| Poly-3 test | P=0.548N | P=0.340N | P=0.641N | P=0.531N |
| **All Organs: Hemangioma or Hemangiosarcoma** | | | | |
| Overall rate | 7/50 (14%) | 3/50 (6%) | 4/50 (8%) | 4/50 (8%) |
| Adjusted rate | 15.4% | 6.3% | 10.6% | 9.0% |
| Terminal rate | 5/40 (13%) | 3/44 (7%) | 3/29 (10%) | 4/39 (10%) |
| First incidence (days) | 501 | 729 (T) | 602 | 729 (T) |
| Poly-3 test | P=0.324N | P=0.144N | P=0.400N | P=0.287N |
| **All Organs: Malignant Lymphoma** | | | | |
| Overall rate | 1/50 (2%) | 1/50 (2%) | 0/50 (0%) | 4/50 (8%) |
| Adjusted rate | 2.2% | 2.1% | 0.0% | 9.0% |
| Terminal rate | 1/40 (3%) | 1/44 (2%) | 0/29 (0%) | 3/39 (8%) |
| First incidence (days) | 729 (T) | 729 (T) | — | 617 |
| Poly-3 test | P=0.057 | P=0.765N | P=0.627N | P=0.194 |
| **All Organs: Benign Neoplasms** | | | | |
| Overall rate | 41/50 (82%) | 39/50 (78%) | 36/50 (72%) | 34/50 (68%) |
| Adjusted rate | 87.1% | 81.2% | 84.3% | 72.3% |
| Terminal rate | 36/40 (90%) | 37/44 (84%) | 25/29 (86%) | 27/39 (69%) |
| First incidence (days) | 220 | 645 | 377 | 543 |
| Poly-3 test | P=0.044N | P=0.307N | P=0.485N | P=0.058N |

**TABLE C3**
**Statistical Analysis of Primary Neoplasms in Male Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 250 ppm | 500 ppm | 1,000 ppm |
|---|---|---|---|---|
| **All Organs: Malignant Neoplasms** | | | | |
| Overall rate | 32/50 (64%) | 17/50 (34%) | 15/50 (30%) | 24/50 (48%) |
| Adjusted rate | 66.9% | 34.3% | 36.2% | 51.7% |
| Terminal rate | 26/40 (65%) | 13/44 (30%) | 6/29 (21%) | 18/39 (46%) |
| First incidence (days) | 220 | 335 | 458 | 543 |
| Poly-3 test | P=0.237N | P < 0.001N | P=0.003N | P=0.098N |
| **All Organs: Benign or Malignant Neoplasms** | | | | |
| Overall rate | 48/50 (96%) | 44/50 (88%) | 40/50 (80%) | 42/50 (84%) |
| Adjusted rate | 98.7% | 88.2% | 89.9% | 88.8% |
| Terminal rate | 40/40 (100%) | 39/44 (89%) | 25/29 (86%) | 34/39 (87%) |
| First incidence (days) | 220 | 335 | 377 | 543 |
| Poly-3 test | P=0.106N | P=0.039N | P=0.068N | P=0.048N |

(T)Terminal sacrifice
[a] Number of neoplasm-bearing animals/number of animals examined. Denominator is number of animals examined microscopically for liver and lung; for other tissues, denominator is number of animals necropsied.
[b] Poly-3 estimated neoplasm incidence after adjustment for intercurrent mortality
[c] Observed incidence at terminal kill
[d] Beneath the control incidence are the P values associated with the trend test. Beneath the exposed group incidence are the P values corresponding to pairwise comparisons between the controls and that exposed group. The Poly-3 test accounts for differential mortality in animals that do not reach terminal sacrifice. A negative trend or a lower incidence in an exposure group is indicated by **N**.
[e] Not applicable; no neoplasms in animal group

**TABLE C4**
**Summary of the Incidence of Nonneoplastic Lesions in Male Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**[a]

| | 0 ppm | 250 ppm | 500 ppm | 1,000 ppm |
|---|---|---|---|---|
| **Disposition Summary** | | | | |
| Animals initially in study | 50 | 50 | 50 | 50 |
| Early deaths | | | | |
| Accidental deaths | | | 5 | 3 |
| Moribund | 8 | | 7 | 4 |
| Natural deaths | 2 | 6 | 9 | 4 |
| Survivors | | | | |
| Terminal sacrifice | 40 | 44 | 29 | 39 |
| Animals examined microscopically | 50 | 50 | 50 | 50 |
| **Alimentary System** | | | | |
| Intestine large, colon | (50) | (50) | (49) | (49) |
| Serosa, inflammation, chronic | | 1 (2%) | | |
| Intestine large, cecum | (49) | (50) | (48) | (47) |
| Serosa, inflammation, chronic | | 1 (2%) | | |
| Intestine small, jejunum | (49) | (49) | (44) | (47) |
| Diverticulum | 1 (2%) | | | |
| Liver | (50) | (50) | (50) | (50) |
| Angiectasis | | 1 (2%) | | 1 (2%) |
| Clear cell focus | 2 (4%) | 11 (22%) | 6 (12%) | 3 (6%) |
| Eosinophilic focus | 27 (54%) | 34 (68%) | 33 (66%) | 29 (58%) |
| Erythrophagocytosis | | 1 (2%) | | |
| Inflammation, chronic | 2 (4%) | 1 (2%) | | 1 (2%) |
| Mixed cell focus | 2 (4%) | 5 (10%) | 1 (2%) | 3 (6%) |
| Necrosis | 6 (12%) | 3 (6%) | 1 (2%) | 3 (6%) |
| Vacuolization cytoplasmic | | | 1 (2%) | 2 (4%) |
| Hepatocyte, centrilobular, vacuolization cytoplasmic | | | | 1 (2%) |
| Mesentery | (4) | (2) | (6) | (8) |
| Fat, necrosis | 4 (100%) | 2 (100%) | 6 (100%) | 8 (100%) |
| Pancreas | (50) | (50) | (50) | (50) |
| Hemorrhage | | | | 1 (2%) |
| Inflammation, chronic | | 1 (2%) | | |
| Acinus, atrophy | 3 (6%) | 1 (2%) | 2 (4%) | 2 (4%) |
| Duct, cyst | 2 (4%) | | | |
| Duct, hemorrhage | 1 (2%) | | | |
| Duct, inflammation, chronic | 1 (2%) | | | |
| Salivary glands | (50) | (50) | (50) | (50) |
| Metaplasia, squamous | | | | 1 (2%) |
| Stomach, forestomach | (49) | (50) | (49) | (50) |
| Angiectasis | 1 (2%) | | | |
| Hyperplasia, squamous | 4 (8%) | 3 (6%) | | 2 (4%) |
| Inflammation, chronic | 1 (2%) | | | |
| Ulcer | | | | 1 (2%) |
| Serosa, inflammation, acute | | 1 (2%) | | |
| Stomach, glandular | (49) | (50) | (50) | (49) |
| Cyst | | 1 (2%) | | 1 (2%) |
| Erosion | 3 (6%) | 1 (2%) | 1 (2%) | 2 (4%) |
| Hyperplasia | 1 (2%) | 1 (2%) | | 1 (2%) |
| Inflammation, chronic | 1 (2%) | | | 1 (2%) |
| Metaplasia, squamous | 1 (2%) | | | |
| Ulcer | 1 (2%) | | | |
| Glands, hyperplasia | | 1 (2%) | | |

[a] Number of animals examined microscopically at the site and the number of animals with lesion

**TABLE C4**
**Summary of the Incidence of Nonneoplastic Lesions in Male Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 250 ppm | 500 ppm | 1,000 ppm |
|---|---|---|---|---|
| **Alimentary System** (continued) | | | | |
| Tooth | (4) | (3) | (4) | (7) |
| Degeneration | 4 (100%) | 3 (100%) | 4 (100%) | 7 (100%) |
| Inflammation, chronic active | 1 (25%) | | | |
| **Cardiovascular System** | | | | |
| Heart | (50) | (50) | (50) | (50) |
| Cardiomyopathy | 6 (12%) | 2 (4%) | 2 (4%) | 2 (4%) |
| Mineralization | 2 (4%) | | | |
| Atrium, thrombosis | | | | 1 (2%) |
| Valve, inflammation, acute | | | | 1 (2%) |
| **Endocrine System** | | | | |
| Adrenal cortex | (50) | (50) | (50) | (50) |
| Hemorrhage | | | | 1 (2%) |
| Hyperplasia | | | 2 (4%) | |
| Hypertrophy, focal | 18 (36%) | 25 (50%) | 21 (42%) | 17 (34%) |
| Capsule, hyperplasia | 39 (78%) | 42 (84%) | 38 (76%) | 38 (76%) |
| Adrenal medulla | (50) | (50) | (50) | (50) |
| Hemorrhage | | 1 (2%) | | |
| Islets, pancreatic | (50) | (50) | (50) | (50) |
| Hyperplasia | 48 (96%) | 47 (94%) | 45 (90%) | 47 (94%) |
| Pituitary gland | (50) | (49) | (49) | (47) |
| Pars distalis, cyst | 2 (4%) | 3 (6%) | 2 (4%) | |
| Pars distalis, hyperplasia | 1 (2%) | | | |
| Thyroid gland | (50) | (50) | (50) | (50) |
| Cyst | 1 (2%) | | | 3 (6%) |
| Follicular cell, hyperplasia | 6 (12%) | 9 (18%) | 3 (6%) | 5 (10%) |
| **General Body System** | | | | |
| None | | | | |
| **Genital System** | | | | |
| Epididymis | (50) | (50) | (50) | (50) |
| Granuloma sperm | 1 (2%) | | | |
| Hemorrhage | | 1 (2%) | | |
| Inflammation, chronic | 1 (2%) | 3 (6%) | | 3 (6%) |
| Spermatocele | | 2 (4%) | 1 (2%) | |
| Penis | | | (2) | |
| Congestion | | | 1 (50%) | |
| Preputial gland | (50) | (50) | (50) | (50) |
| Atrophy | | 1 (2%) | | 1 (2%) |
| Cyst | 30 (60%) | 33 (66%) | 26 (52%) | 30 (60%) |
| Inflammation, acute | | | 1 (2%) | |
| Inflammation, chronic | 1 (2%) | 7 (14%) | 5 (10%) | 5 (10%) |
| Inflammation, chronic active | 6 (12%) | 6 (12%) | 4 (8%) | 7 (14%) |
| Pigmentation | 1 (2%) | | | |
| Prostate | (50) | (50) | (49) | (50) |
| Inflammation, acute | | | 1 (2%) | |
| Inflammation, chronic | 3 (6%) | 1 (2%) | | 3 (6%) |

**TABLE C4**
**Summary of the Incidence of Nonneoplastic Lesions in Male Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 250 ppm | 500 ppm | 1,000 ppm |
|---|---|---|---|---|
| **Genital System** (continued) | | | | |
| Seminal vesicle | (50) | (50) | (50) | (50) |
| Atrophy | | | | 1 (2%) |
| Hypertrophy | | 1 (2%) | | 1 (2%) |
| Inflammation, chronic | 3 (6%) | 9 (18%) | 8 (16%) | 1 (2%) |
| Inflammation, chronic active | | | | 1 (2%) |
| Mineralization | | | | 1 (2%) |
| Testes | (50) | (50) | (50) | (50) |
| Germinal epithelium, degeneration | | 1 (2%) | 1 (2%) | 2 (4%) |
| Interstitial cell, hyperplasia | | | 1 (2%) | |
| **Hematopoietic System** | | | | |
| Bone marrow | (50) | (50) | (50) | (50) |
| Angiectasis | 1 (2%) | | | |
| Hyperplasia, mast cell | | 1 (2%) | | |
| Myeloid cell, hyperplasia | | 2 (4%) | | |
| Lymph node | (4) | (5) | (2) | (3) |
| Infiltration cellular, plasma cell | | 1 (20%) | | |
| Iliac, infiltration cellular, plasma cell | | 1 (20%) | | |
| Iliac, infiltration cellular, histiocyte | 1 (25%) | | | |
| Iliac, pigmentation | 3 (75%) | 1 (20%) | | |
| Inguinal, hyperplasia, lymphoid | | 1 (20%) | | |
| Mediastinal, hyperplasia, lymphoid | | | 1 (50%) | |
| Mediastinal, infiltration cellular, plasma cell | | 1 (20%) | | |
| Mediastinal, pigmentation | 1 (25%) | | | |
| Renal, angiectasis | | 1 (20%) | | |
| Renal, hyperplasia, lymphoid | | | 1 (50%) | |
| Lymph node, mandibular | (50) | (50) | (50) | (50) |
| Hyperplasia, lymphoid | 2 (4%) | 1 (2%) | 1 (2%) | |
| Infiltration cellular, plasma cell | | 1 (2%) | 1 (2%) | 1 (2%) |
| Lymph node, mesenteric | (49) | (50) | (50) | (50) |
| Angiectasis | 7 (14%) | 8 (16%) | 3 (6%) | 5 (10%) |
| Hemorrhage | 1 (2%) | | | |
| Hyperplasia, lymphoid | 1 (2%) | 1 (2%) | | |
| Spleen | (50) | (50) | (50) | (50) |
| Hematopoietic cell proliferation | 9 (18%) | 8 (16%) | 5 (10%) | 6 (12%) |
| Hyperplasia, lymphoid | 1 (2%) | 3 (6%) | | |
| Lymphoid follicle, atrophy | | | 2 (4%) | |
| **Integumentary System** | | | | |
| Skin | (50) | (50) | (50) | (50) |
| Epidermis, cyst | 1 (2%) | | | |
| Epidermis, necrosis | | | 1 (2%) | |
| Subcutaneous tissue, edema | | 1 (2%) | | |
| Subcutaneous tissue, hemorrhage | | 1 (2%) | 1 (2%) | |
| Subcutaneous tissue, inflammation, acute | | | 1 (2%) | |
| **Musculoskeletal System** | | | | |
| Bone | (50) | (50) | (50) | (50) |
| Callus | | 1 (2%) | | |
| Fibrous osteodystrophy | | | | 1 (2%) |
| Hyperostosis | | 1 (2%) | | |

**TABLE C4**
**Summary of the Incidence of Nonneoplastic Lesions in Male Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 250 ppm | 500 ppm | 1,000 ppm |
|---|---|---|---|---|
| **Nervous System** | | | | |
| Brain | (50) | (50) | (50) | (50) |
| Demyelination | | | | 1 (2%) |
| Hemorrhage | | | 1 (2%) | |
| Thalamus, mineralization | 30 (60%) | 25 (50%) | 23 (46%) | 26 (52%) |
| Spinal cord | (1) | | | |
| Demyelination | 1 (100%) | | | |
| **Respiratory System** | | | | |
| Lung | (50) | (50) | (50) | (50) |
| Hemorrhage | | 2 (4%) | 1 (2%) | 2 (4%) |
| Infiltration cellular, histiocyte | 2 (4%) | 2 (4%) | 4 (8%) | 5 (10%) |
| Inflammation, chronic | | | | 2 (4%) |
| Leukocytosis | | 1 (2%) | | |
| Necrosis | 1 (2%) | | | |
| Alveolar epithelium, hyperplasia | 5 (10%) | 5 (10%) | 2 (4%) | 3 (6%) |
| Nose | (50) | (50) | (50) | (50) |
| Foreign body | 1 (2%) | | | |
| Inflammation, acute | 4 (8%) | | | 1 (2%) |
| Glands, amyloid deposition | 1 (2%) | | | |
| Nasolacrimal duct, inflammation, acute | 1 (2%) | | | |
| **Special Senses System** | | | | |
| None | | | | |
| **Urinary System** | | | | |
| Kidney | (50) | (50) | (50) | (50) |
| Cyst | 11 (22%) | 13 (26%) | 10 (20%) | 15 (30%) |
| Hemorrhage | 1 (2%) | | | |
| Hydronephrosis | 2 (4%) | 1 (2%) | 3 (6%) | 1 (2%) |
| Inflammation, acute | | | | 1 (2%) |
| Mineralization | | | 5 (10%) | 2 (4%) |
| Nephropathy, acute | 1 (2%) | 1 (2%) | 6 (12%) | 1 (2%) |
| Nephropathy, chronic | 43 (86%) | 45 (90%) | 38 (76%) | 46 (92%) |
| Arteriole, thrombosis | | | | 1 (2%) |
| Papilla, necrosis | | | 1 (2%) | |
| Pelvis, calculus microscopic observation only | | | 1 (2%) | |
| Renal tubule, hyperplasia | 4 (8%) | | | 1 (2%) |
| Transitional epithelium, hyperplasia | | | | 1 (2%) |
| Urethra | (1) | | | |
| Inflammation, acute | 1 (100%) | | | |
| Urinary bladder | (50) | (50) | (49) | (50) |
| Calculus, gross observation | | | | 1 (2%) |
| Calculus, microscopic observation only | 1 (2%) | | | |
| Hemorrhage | 1 (2%) | | | |
| Inflammation, acute | 1 (2%) | | 3 (6%) | 1 (2%) |
| Inflammation, chronic | 1 (2%) | | | |

# APPENDIX D
# SUMMARY OF LESIONS IN FEMALE MICE IN THE 2-YEAR DRINKING WATER STUDY OF 1-CHLORO-2-PROPANOL

**TABLE D1**
**Summary of the Incidence of Neoplasms in Female Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol[a]**

| | 0 ppm | 250 ppm | 500 ppm | 1,000 ppm |
|---|---|---|---|---|
| **Disposition Summary** | | | | |
| Animals initially in study | 50 | 50 | 50 | 50 |
| Early deaths | | | | |
| Accidental deaths | 3 | | 1 | 2 |
| Moribund | 8 | 7 | 3 | 5 |
| Natural deaths | 7 | 11 | 10 | 11 |
| Survivors | | | | |
| Terminal sacrifice | 32 | 32 | 36 | 32 |
| Animals examined microscopically | 50 | 50 | 50 | 50 |
| **Alimentary System** | | | | |
| Esophagus | (50) | (50) | (50) | (50) |
| Gallbladder | (42) | (44) | (45) | (40) |
| Carcinoma, metastatic, uncertain primary site | | 1 (2%) | | |
| Carcinoma, metastatic, urinary bladder | | | 1 (2%) | |
| Histiocytic sarcoma | 1 (2%) | | | |
| Intestine large, cecum | (44) | (46) | (48) | (49) |
| Intestine small, duodenum | (43) | (46) | (46) | (47) |
| Intestine small, jejunum | (46) | (45) | (47) | (46) |
| Carcinoma | 1 (2%) | | | |
| Leiomyosarcoma, metastatic, uncertain primary site | | | 1 (2%) | |
| Intestine small, ileum | (46) | (44) | (45) | (45) |
| Liver | (50) | (50) | (50) | (50) |
| Alveolar/bronchiolar carcinoma, metastatic, lung | | | | 1 (2%) |
| Carcinoma, metastatic, uncertain primary site | | 1 (2%) | | |
| Carcinoma, metastatic, urinary bladder | | | 1 (2%) | |
| Carcinoma, metastatic, intestine small, jejunum | 1 (2%) | | | |
| Fibrous histiocytoma, metastatic, uncertain primary site | | | 1 (2%) | |
| Hemangiosarcoma | 1 (2%) | | 1 (2%) | 1 (2%) |
| Hepatoblastoma | | 1 (2%) | 1 (2%) | 1 (2%) |
| Hepatocellular carcinoma | 6 (12%) | 9 (18%) | 7 (14%) | 9 (18%) |
| Hepatocellular carcinoma, multiple | | | 2 (4%) | 1 (2%) |
| Hepatocellular adenoma | 12 (24%) | 12 (24%) | 10 (20%) | 10 (20%) |
| Hepatocellular adenoma, multiple | 28 (56%) | 27 (54%) | 32 (64%) | 30 (60%) |
| Histiocytic sarcoma | 2 (4%) | 1 (2%) | 2 (4%) | |
| Leiomyosarcoma, metastatic, uncertain primary site | | | 1 (2%) | |
| Lipoma | | 1 (2%) | | |
| Mesentery | (20) | (19) | (16) | (12) |
| Carcinoma, metastatic, uncertain primary site | | 2 (11%) | | |
| Carcinoma, metastatic, urinary bladder | | | 1 (6%) | |
| Carcinoma, metastatic, intestine small, jejunum | 1 (5%) | | | |
| Hemangioma | | 1 (5%) | | |
| Hemangiosarcoma, metastatic, uterus | 1 (5%) | | | |
| Histiocytic sarcoma | 1 (5%) | | 1 (6%) | |

**TABLE D1**
**Summary of the Incidence of Neoplasms in Female Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 250 ppm | 500 ppm | 1,000 ppm |
|---|---|---|---|---|
| **Alimentary System** (continued) | | | | |
| Pancreas | (50) | (50) | (50) | (50) |
| Carcinoma, metastatic, uncertain primary site | | 2 (4%) | | |
| Carcinoma, metastatic, urinary bladder | | | 1 (2%) | |
| Fibrous histiocytoma, metastatic, uncertain primary site | | | 1 (2%) | |
| Histiocytic sarcoma | 1 (2%) | | | |
| Leiomyosarcoma, metastatic, uncertain primary site | | | 1 (2%) | |
| Acinus, adenoma | | 1 (2%) | | |
| Salivary glands | (50) | (50) | (49) | (50) |
| Stomach, forestomach | (50) | (50) | (50) | (50) |
| Carcinoma, metastatic, urinary bladder | | | 1 (2%) | |
| Squamous cell papilloma | 1 (2%) | 1 (2%) | | |
| Stomach, glandular | (50) | (50) | (48) | (50) |
| Carcinoma, metastatic, uncertain primary site | | 1 (2%) | | |
| Carcinoma, metastatic, urinary bladder | | | 1 (2%) | |
| **Cardiovascular System** | | | | |
| Heart | (50) | (50) | (50) | (50) |
| Alveolar/bronchiolar carcinoma, metastatic, lung | 1 (2%) | | | 1 (2%) |
| Histiocytic sarcoma | | 1 (2%) | | |
| **Endocrine System** | | | | |
| Adrenal cortex | (50) | (50) | (50) | (50) |
| Adenoma | | 1 (2%) | | |
| Histiocytic sarcoma | 1 (2%) | | | |
| Adrenal medulla | (50) | (50) | (50) | (50) |
| Pheochromocytoma malignant | 1 (2%) | | | |
| Islets, pancreatic | (50) | (50) | (50) | (50) |
| Adenoma | 1 (2%) | | | |
| Pituitary gland | (49) | (49) | (47) | (46) |
| Pars distalis, adenoma | 6 (12%) | 5 (10%) | 3 (6%) | 4 (9%) |
| Pars intermedia, adenoma | | 1 (2%) | 1 (2%) | |
| Thyroid gland | (50) | (50) | (50) | (50) |
| Follicular cell, adenoma | 1 (2%) | 2 (4%) | 1 (2%) | |
| **General Body System** | | | | |
| Tissue NOS | (3) | (1) | (2) | |
| Histiocytic sarcoma | 1 (33%) | | | |
| Leiomyosarcoma, metastatic, uncertain primary site | | | 1 (50%) | |
| Pelvic, hemangiosarcoma | 1 (33%) | | | |

**TABLE D1**
**Summary of the Incidence of Neoplasms in Female Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 250 ppm | 500 ppm | 1,000 ppm |
|---|---|---|---|---|
| **Genital System** | | | | |
| Clitoral gland | (50) | (49) | (48) | (49) |
| Histiocytic sarcoma | | | 1 (2%) | |
| Ovary | (50) | (49) | (50) | (50) |
| Carcinoma, metastatic, uncertain primary site | | 1 (2%) | | |
| Carcinoma, metastatic, urinary bladder | | | 1 (2%) | |
| Cystadenoma | 1 (2%) | | 1 (2%) | 2 (4%) |
| Granulosa cell tumor benign | 1 (2%) | | | |
| Granulosa-theca tumor benign | | | | 1 (2%) |
| Hemangioma | 1 (2%) | 1 (2%) | | |
| Histiocytic sarcoma | 1 (2%) | 1 (2%) | 2 (4%) | |
| Uterus | (50) | (50) | (50) | (50) |
| Hemangioma | | | | 1 (2%) |
| Hemangiosarcoma | 1 (2%) | | 1 (2%) | |
| Histiocytic sarcoma | 1 (2%) | 1 (2%) | 2 (4%) | |
| Polyp stromal | 1 (2%) | 2 (4%) | 1 (2%) | |
| Sarcoma stromal | 1 (2%) | 1 (2%) | | 1 (2%) |
| **Hematopoietic System** | | | | |
| Bone marrow | (50) | (50) | (50) | (50) |
| Hemangiosarcoma | | 1 (2%) | | |
| Histiocytic sarcoma | 1 (2%) | | 1 (2%) | |
| Lymph node | (8) | (12) | (15) | (9) |
| Histiocytic sarcoma | 1 (13%) | | | |
| Deep cervical, histiocytic sarcoma | 1 (13%) | | | |
| Iliac, hemangiosarcoma | | 1 (8%) | | |
| Iliac, hemangiosarcoma, metastatic, uterus | 1 (13%) | | | |
| Iliac, histiocytic sarcoma | 2 (25%) | 1 (8%) | | |
| Inguinal, histiocytic sarcoma | 1 (13%) | | | |
| Mediastinal, histiocytic sarcoma | 1 (13%) | 1 (8%) | | |
| Pancreatic, fibrous histiocytoma, metastatic, uncertain primary site | | | 1 (7%) | |
| Pancreatic, histiocytic sarcoma | 1 (13%) | | | |
| Renal, histiocytic sarcoma | 1 (13%) | | 1 (7%) | |
| Lymph node, mandibular | (50) | (49) | (49) | (50) |
| Carcinoma, metastatic, harderian gland | 1 (2%) | | | |
| Carcinoma, metastatic, urinary bladder | | | 1 (2%) | |
| Histiocytic sarcoma | 1 (2%) | 1 (2%) | | |
| Lymph node, mesenteric | (49) | (48) | (47) | (49) |
| Fibrous histiocytoma, metastatic, uncertain primary site | | | 1 (2%) | |
| Hemangioma | | | 1 (2%) | |
| Histiocytic sarcoma | 2 (4%) | 1 (2%) | 2 (4%) | |
| Leiomyosarcoma, metastatic, uncertain primary site | | | 1 (2%) | |
| Spleen | (49) | (50) | (50) | (50) |
| Fibrous histiocytoma, metastatic, uncertain primary site | | | 1 (2%) | |
| Hemangiosarcoma | 1 (2%) | 2 (4%) | 1 (2%) | 2 (4%) |
| Histiocytic sarcoma | 1 (2%) | | | |
| Thymus | (48) | (48) | (45) | (49) |
| Carcinoma, metastatic, harderian gland | | 1 (2%) | | |

**TABLE D1**
**Summary of the Incidence of Neoplasms in Female Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 250 ppm | 500 ppm | 1,000 ppm |
|---|---|---|---|---|
| **Integumentary System** | | | | |
| Skin | (50) | (50) | (50) | (50) |
| Subcutaneous tissue, fibrosarcoma | | 1 (2%) | 1 (2%) | 1 (2%) |
| Subcutaneous tissue, fibrosarcoma, multiple | 1 (2%) | | | |
| Subcutaneous tissue, fibrous histiocytoma | | 1 (2%) | | |
| Subcutaneous tissue, hemangiosarcoma | 1 (2%) | 2 (4%) | 1 (2%) | |
| Subcutaneous tissue, sarcoma | | 1 (2%) | | 1 (2%) |
| **Musculoskeletal System** | | | | |
| Skeletal muscle | | (1) | | (2) |
| Alveolar/bronchiolar carcinoma, metastatic, lung | | | | 1 (50%) |
| Sarcoma, metastatic, skin | | | | 1 (50%) |
| **Nervous System** | | | | |
| Brain | (50) | (49) | (50) | (50) |
| Carcinoma, metastatic, harderian gland | 1 (2%) | | | |
| Histiocytic sarcoma | 1 (2%) | | | |
| **Respiratory System** | | | | |
| Lung | (50) | (50) | (50) | (50) |
| Alveolar/bronchiolar adenoma | 4 (8%) | 1 (2%) | 4 (8%) | 4 (8%) |
| Alveolar/bronchiolar carcinoma | 5 (10%) | 1 (2%) | 2 (4%) | 3 (6%) |
| Carcinoma, metastatic, harderian gland | 2 (4%) | 1 (2%) | | |
| Carcinoma, metastatic, uncertain primary site | 1 (2%) | 1 (2%) | | |
| Carcinoma, metastatic, urinary bladder | | | 1 (2%) | |
| Hemangiosarcoma, metastatic, uterus | 1 (2%) | | | |
| Hepatocellular carcinoma, metastatic, liver | 2 (4%) | 4 (8%) | 3 (6%) | 1 (2%) |
| Histiocytic sarcoma | 2 (4%) | 1 (2%) | 2 (4%) | |
| Nose | (50) | (50) | (50) | (50) |
| Carcinoma, metastatic, harderian gland | 1 (2%) | 1 (2%) | 1 (2%) | |
| Histiocytic sarcoma | | | 1 (2%) | |
| Trachea | (50) | (50) | (50) | (50) |
| **Special Senses System** | | | | |
| Harderian gland | (5) | (3) | (2) | (1) |
| Adenoma | 3 (60%) | 1 (33%) | 1 (50%) | |
| Carcinoma | 2 (40%) | 2 (67%) | 1 (50%) | 1 (100%) |
| **Urinary System** | | | | |
| Kidney | (50) | (50) | (50) | (50) |
| Alveolar/bronchiolar carcinoma, metastatic, lung | | | | 1 (2%) |
| Carcinoma, metastatic, uncertain primary site | | 1 (2%) | | |
| Histiocytic sarcoma | 1 (2%) | 1 (2%) | 1 (2%) | |
| Urinary bladder | (48) | (49) | (48) | (49) |
| Fibrous histiocytoma, metastatic, uncertain primary site | | | 1 (2%) | |
| Histiocytic sarcoma | | | 1 (2%) | |
| Transitional epithelium, carcinoma | | | 1 (2%) | |

**TABLE D1**
**Summary of the Incidence of Neoplasms in Female Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 250 ppm | 500 ppm | 1,000 ppm |
|---|---|---|---|---|
| **Systemic Lesions** | | | | |
| Multiple organs[b] | (50) | (50) | (50) | (50) |
| Histiocytic sarcoma | 2 (4%) | 1 (2%) | 2 (4%) | |
| Lymphoma malignant | 10 (20%) | 14 (28%) | 10 (20%) | 11 (22%) |
| **Neoplasm Summary** | | | | |
| Total animals with primary neoplasms[c] | 46 | 49 | 46 | 44 |
| Total primary neoplasms | 94 | 95 | 86 | 84 |
| Total animals with benign neoplasms | 42 | 43 | 43 | 41 |
| Total benign neoplasms | 60 | 57 | 55 | 52 |
| Total animals with malignant neoplasms | 28 | 30 | 25 | 22 |
| Total malignant neoplasms | 34 | 38 | 31 | 32 |
| Total animals with metastatic neoplasms | 8 | 6 | 6 | 3 |
| Total metastatic neoplasms | 14 | 17 | 24 | 6 |
| Total animals with malignant neoplasms of uncertain primary site | 1 | 2 | 2 | |

[a] Number of animals examined microscopically at the site and the number of animals with neoplasms
[b] Number of animals with any tissue examined microscopically
[c] Primary neoplasms: all neoplasms except metastatic neoplasms

**TABLE D2**
**Individual Animal Tumor Pathology of Female Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 0 ppm**

| Number of Days on Study | 0 7 6 | 2 6 4 | 4 6 5 | 5 8 7 | 5 9 3 | 6 5 7 | 6 7 0 | 6 7 3 | 6 7 7 | 6 8 3 | 6 8 3 | 6 9 8 | 7 1 4 | 7 2 1 | 7 2 6 | 7 3 1 | 7 3 2 | 7 3 3 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 2 6 2 | 2 4 2 | 2 2 8 | 2 5 1 | 2 2 7 | 2 3 0 | 2 4 6 | 2 5 8 | 2 5 4 | 2 2 1 | 2 2 6 | 2 3 1 | 2 5 5 | 2 3 6 | 2 3 8 | 2 3 7 | 2 3 5 | 2 3 9 | 2 1 6 | 2 1 7 | 2 1 8 | 2 1 9 | 2 2 0 | 2 2 2 | 2 2 3 |
| **Alimentary System** | | | | | | | | | | | | | | | | | | | | | | | | |
| Esophagus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Gallbladder | + | A | + | + | A | + | + | + | A | A | + | A | + | + | A | + | M | A | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | X | | | | | | | | |
| Intestine large, colon | + | + | + | + | + | + | + | + | A | + | + | + | + | + | A | A | + | + | + | + | + | + | + | + |
| Intestine large, rectum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | A | A | + | + | + | + | + | + | + | + |
| Intestine large, cecum | + | + | + | + | A | + | A | + | A | + | + | + | + | + | A | A | + | A | + | + | + | + | + | + |
| Intestine small, duodenum | + | A | + | + | A | + | A | + | A | + | + | A | + | + | A | A | + | + | + | + | + | + | + | + |
| Intestine small, jejunum | + | A | + | + | + | + | + | + | + | + | + | A | + | + | A | A | + | + | + | + | + | + | + | + |
| Carcinoma | | | | | X | | | | | | | | | | | | | | | | | | | |
| Intestine small, ileum | + | + | + | + | + | + | A | + | A | + | + | + | + | + | A | A | + | + | + | + | + | + | + | + |
| Liver | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Carcinoma, metastatic, intestine small, jejunum | | | | | X | | | | | | | | | | | | | | | | | | | |
| Hemangiosarcoma | | | | | | | | | | | | | | | | | | | | | | | | |
| Hepatocellular carcinoma | | | | | | | | | | | | | | | X | | X | | | | | | | |
| Hepatocellular adenoma | | | | X | | | | | | X | X | | | X | | | | X | | | | X | | |
| Hepatocellular adenoma, multiple | | | | | X | X | X | X | | | | X | | | X | | | | X | X | X | X | | X | X |
| Histiocytic sarcoma | | | | | | | | | | | | | | | X | X | | | | | | | | |
| Mesentery | | | | | + | | | + | + | + | | | | | + | | | | | | | + | | + | |
| Carcinoma, metastatic, intestine small, jejunum | | | | | X | | | | | | | | | | | | | | | | | | | |
| Hemangiosarcoma, metastatic, uterus | | | | | | | | X | | | | | | | | | | | | | | | | |
| Histiocytic sarcoma | | | | | | | | | | | | | | | X | | | | | | | | | |
| Pancreas | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | X | | | | | | | | |
| Salivary glands | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Stomach, forestomach | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Squamous cell papilloma | | | | | | | | | | | | | | | | | | | | | | | | |
| Stomach, glandular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Cardiovascular System** | | | | | | | | | | | | | | | | | | | | | | | | |
| Heart | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Alveolar/bronchiolar carcinoma, metastatic, lung | | | X | | | | | | | | | | | | | | | | | | | | | |
| **Endocrine System** | | | | | | | | | | | | | | | | | | | | | | | | |
| Adrenal cortex | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | X | | | | | | | | |
| Adrenal medulla | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Pheochromocytoma malignant | | | | | | | | | X | | | | | | | | | | | | | | | |
| Islets, pancreatic | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Adenoma | | | | | | | | | | | | | | | | | | | | | | | | |
| Parathyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + |
| Pituitary gland | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Pars distalis, adenoma | | | | | | | | | | | | | | | | | | X | | | | X | | |
| Thyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Follicular cell, adenoma | | | | | | | | | | | | | | | | | | | | | | | | |

+: Tissue examined microscopically
A: Autolysis precludes examination
M: Missing tissue
I: Insufficient tissue
X: Lesion present
Blank: Not examined

**TABLE D2**
**Individual Animal Tumor Pathology of Female Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 0 ppm**

| Number of Days on Study | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 224 | 225 | 229 | 232 | 233 | 234 | 240 | 241 | 243 | 244 | 245 | 247 | 248 | 249 | 250 | 252 | 253 | 256 | 257 | 259 | 260 | 261 | 263 | 264 | 265 | Total Tissues/ Tumors |
| **Alimentary System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Esophagus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Gallbladder | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 42 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Intestine large, colon | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 47 |
| Intestine large, rectum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 48 |
| Intestine large, cecum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 44 |
| Intestine small, duodenum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 43 |
| Intestine small, jejunum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 46 |
| Carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Intestine small, ileum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 46 |
| Liver | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Carcinoma, metastatic, intestine small, jejunum | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Hemangiosarcoma | | | | | | | | | | | | | | | | | X | | | | | | | | | 1 |
| Hepatocellular carcinoma | | | | | | X | | | | | | X | | | | X | | | | | X | | | | | 6 |
| Hepatocellular adenoma | X | | | | | | | | | | | | | | | | X | | | | X | X | X | X | | 12 |
| Hepatocellular adenoma, multiple | | X | X | | X | X | X | | X | X | X | X | X | | X | X | | X | X | X | | | | | X | 28 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 2 |
| Mesentery | + | | + | | | + | + | | + | + | + | | + | | + | | | | | + | + | | + | | + | 20 |
| Carcinoma, metastatic, intestine small, jejunum | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Hemangiosarcoma, metastatic, uterus | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Pancreas | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Salivary glands | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Stomach, forestomach | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Squamous cell papilloma | | | | | | | | | | X | | | | | | | | | | | | | | | | 1 |
| Stomach, glandular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Cardiovascular System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Heart | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Alveolar/bronchiolar carcinoma, metastatic, lung | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Endocrine System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Adrenal cortex | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Adrenal medulla | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Pheochromocytoma malignant | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Islets, pancreatic | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Adenoma | | | | | | | | | | | | | | | | | | | | | | | | | X | 1 |
| Parathyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Pituitary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Pars distalis, adenoma | | | X | | | | | | X | | | | | | X | | | | | | | | | | X | 6 |
| Thyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Follicular cell, adenoma | | | X | | | | | | | | | | | | | | | | | | | | | | | 1 |

**TABLE D2**
**Individual Animal Tumor Pathology of Female Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 0 ppm**

| Number of Days on Study | 0 7 6 | 2 6 4 | 4 6 5 | 5 8 7 | 5 9 3 | 6 5 7 | 6 7 0 | 6 7 3 | 6 7 7 | 6 8 3 | 6 8 3 | 6 9 8 | 7 1 4 | 7 2 1 | 7 2 6 | 7 3 1 | 7 3 2 | 7 3 3 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 2 6 2 | 2 4 2 | 2 2 8 | 2 5 1 | 2 2 7 | 2 3 0 | 2 4 6 | 2 5 8 | 2 5 4 | 2 2 1 | 2 2 6 | 2 3 1 | 2 5 5 | 2 3 6 | 2 3 8 | 2 3 7 | 2 3 5 | 2 3 9 | 2 1 6 | 2 1 7 | 2 1 8 | 2 1 9 | 2 2 0 | 2 2 2 | 2 2 3 |
| **General Body System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tissue NOS | | | | | | | | | | + | | | | | | + | | | | | | | | | |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | X | | | | | | | | | |
| Pelvic, hemangiosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Genital System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Clitoral gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Ovary | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Cystadenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Granulosa cell tumor benign | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hemangioma | | | | | | | | | X | | | | | | | | | | | | | | | | |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | X | | | | | | | | | |
| Oviduct | | | | + | | | | | | | | | | | | | | | | | | | | | |
| Uterus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Hemangiosarcoma | | | | | | | | X | | | | | | | | | | | | | | | | | |
| Histiocytic sarcoma | | | | | | | | | | | | | | | X | | | | | | | | | | |
| Polyp stromal | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sarcoma stromal | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Hematopoietic System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone marrow | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | X | | | | | | | | | |
| Lymph node | | | | | | | + | + | | + | | | | + | + | + | | + | | | | | | | |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | X | | | | | | | | | |
| Deep cervical, histiocytic sarcoma | | | | | | | | | | | | | | | | X | | | | | | | | | |
| Iliac, hemangiosarcoma, metastatic, uterus | | | | | | | | X | | | | | | | | | | | | | | | | | |
| Iliac, histiocytic sarcoma | | | | | | | | | | | | | | | X | X | | | | | | | | | |
| Inguinal, histiocytic sarcoma | | | | | | | | | | | | | | | | X | | | | | | | | | |
| Mediastinal, histiocytic sarcoma | | | | | | | | | | | | | | | | X | | | | | | | | | |
| Pancreatic, histiocytic sarcoma | | | | | | | | | | | | | | | | X | | | | | | | | | |
| Renal, histiocytic sarcoma | | | | | | | | | | | | | | | | X | | | | | | | | | |
| Lymph node, mandibular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Carcinoma, metastatic, harderian gland | | | | | | X | | | | | | | | | | | | | | | | | | | |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | X | | | | | | | | | |
| Lymph node, mesenteric | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | | | | | | | | X | X | | | | | | | | | |
| Spleen | + | + | + | + | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + |
| Hemangiosarcoma | | | | | | | | | | | | | | | | | | | | | | X | | | |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | X | | | | | | | | | |
| Thymus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + |
| **Integumentary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Skin | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Subcutaneous tissue, fibrosarcoma, multiple | | | | | | | | | | | | | | | | | | | | | | | | | |
| Subcutaneous tissue, hemangiosarcoma | | | | | | | | | | | | | | | | | | | | | | X | | | |
| **Musculoskeletal System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |

**TABLE D2**
**Individual Animal Tumor Pathology of Female Mice the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 0 ppm**

| **Number of Days on Study** | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 22 24 | 22 25 | 22 29 | 23 32 | 23 33 | 23 34 | 24 40 | 24 41 | 24 43 | 24 44 | 24 45 | 24 47 | 24 48 | 24 49 | 25 50 | 25 52 | 25 53 | 25 56 | 25 57 | 25 59 | 26 60 | 26 61 | 26 63 | 26 64 | 26 65 | Total Tissues/ Tumors |
| **General Body System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tissue NOS | + | | | | | | | | | | | | | | | | | | | | | | | | | 3 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Pelvic, hemangiosarcoma | X | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Genital System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Clitoral gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Ovary | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Cystadenoma | | | | | | | | | | | | | | | | | | | | | | | | | X | 1 |
| Granulosa cell tumor benign | | | | X | | | | | | | | | | | | | | | | | | | | | | 1 |
| Hemangioma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Oviduct | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Uterus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Hemangiosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Polyp stromal | | | | | | | | | X | | | | | | | | | | | | | | | | | 1 |
| Sarcoma stromal | | | | | | X | | | | | | | | | | | | | | | | | | | | 1 |
| **Hematopoietic System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone marrow | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Lymph node | | | | | | | | | | | | | | | | | | | + | | | | | | | 8 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Deep cervical, histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Iliac, hemangiosarcoma, metastatic, uterus | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Iliac, histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 2 |
| Inguinal, histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Mediastinal, histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Pancreatic, histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Renal, histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Lymph node, mandibular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Carcinoma, metastatic, harderian gland | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Lymph node, mesenteric | + | + | + | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 2 |
| Spleen | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Hemangiosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Thymus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | 48 |
| **Integumentary System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Skin | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Subcutaneous tissue, fibrosarcoma, multiple | | | | | | | | | | | | | | X | | | | | | | | | | | | 1 |
| Subcutaneous tissue, hemangiosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Musculoskeletal System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |

**TABLE D2**
**Individual Animal Tumor Pathology of Female Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 0 ppm**

| Number of Days on Study | 0 7 6 | 2 6 4 | 4 6 5 | 5 8 7 | 5 9 3 | 6 5 7 | 6 7 0 | 6 7 3 | 6 7 7 | 6 8 3 | 6 8 3 | 6 9 8 | 7 1 4 | 7 2 1 | 7 2 6 | 7 3 1 | 7 3 2 | 7 3 3 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 2 6 2 | 2 4 2 | 2 2 8 | 2 5 1 | 2 2 7 | 2 3 0 | 2 4 6 | 2 5 8 | 2 5 4 | 2 2 1 | 2 2 6 | 2 3 1 | 2 5 5 | 2 3 6 | 2 3 8 | 2 3 7 | 2 3 5 | 2 3 9 | 2 1 6 | 2 1 7 | 2 1 8 | 2 1 9 | 2 2 0 | 2 2 2 | 2 2 3 |
| **Nervous System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Carcinoma, metastatic, harderian gland | | | | | | X | | | | | | | | | | | | | | | | | | | |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | X | | | | | | | | | |
| Peripheral nerve | | | | | | | | | | | | | | + | | | | | | | | | | | |
| Spinal cord | | | | | | | | | | | | | | + | | | | | | | | | | | |
| **Respiratory System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Alveolar/bronchiolar adenoma | | | | | | | | | | | | | | | | | | X | | X | | | X | | |
| Alveolar/bronchiolar carcinoma | | | X | X | X | | | | | | | | | | X | | | | | | | | | | |
| Carcinoma, metastatic, harderian gland | | | | | | X | | | | | | | | | | | | | | | | | | X | |
| Carcinoma, metastatic, uncertain primary site | | | | | | | | | | | | | | | | | | | | | | | | | X |
| Hemangiosarcoma, metastatic, uterus | | | | | | | | X | | | | | | | | | | | | | | | | | |
| Hepatocellular carcinoma, metastatic, liver | | | | | | | | | | | | | | | X | | X | | | | | | | | |
| Histiocytic sarcoma | | | | | | | | | | | | | | | X | X | | | | | | | | | |
| Nose | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Carcinoma, metastatic, harderian gland | | | | | | X | | | | | | | | | | | | | | | | | | | |
| Trachea | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Special Senses System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Harderian gland | | | | + | | + | | | | | | | | | | | | | | + | | | + | | |
| Adenoma | | | | X | | | | | | | | | | | | | | | | X | | | | | |
| Carcinoma | | | | | | X | | | | | | | | | | | | | | | | | X | | |
| **Urinary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kidney | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | X | | | | | | | | | |
| Urinary bladder | + | + | + | + | + | + | M | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + |
| **Systemic Lesions** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Multiple organs | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | | | | | | | | X | X | | | | | | | | | |
| Lymphoma malignant | | | | | | | | | | X | | | | | | | | X | | X | | | X | | X |

**TABLE D2**
**Individual Animal Tumor Pathology of Female Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 0 ppm**

| Number of Days on Study | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 22 4 | 22 5 | 22 9 | 23 2 | 23 3 | 23 4 | 24 0 | 24 1 | 24 3 | 24 4 | 24 5 | 24 7 | 24 8 | 24 9 | 25 0 | 25 2 | 25 3 | 25 6 | 25 7 | 25 9 | 26 0 | 26 1 | 26 3 | 26 4 | 26 5 | Total Tissues/ Tumors | |
| **Nervous System** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | |
| Carcinoma, metastatic, harderian gland | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | |
| Peripheral nerve | | | | | | | | | | | | | | | | | | | | | | + | | | | 2 | |
| Spinal cord | | | | | | | | | | | | | | | | | | | | | | + | | | | 2 | |
| **Respiratory System** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | |
| Alveolar/bronchiolar adenoma | | | | | | X | | | | | | | | | | | | | | | | | | | | 4 | |
| Alveolar/bronchiolar carcinoma | | | | | | | | | | | | | | | | | | | | | | | X | | | 5 | |
| Carcinoma, metastatic, harderian gland | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | |
| Carcinoma, metastatic, uncertain primary site | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | |
| Hemangiosarcoma, metastatic, uterus | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | |
| Hepatocellular carcinoma, metastatic, liver | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | |
| Nose | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | |
| Carcinoma, metastatic, harderian gland | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | |
| Trachea | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | |
| **Special Senses System** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Harderian gland | | | | | | | | | | | | | | | | | | | | | | + | | | | 5 | |
| Adenoma | | | | | | | | | | | | | | | | | | | | | | X | | | | 3 | |
| Carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | |
| **Urinary System** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kidney | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | |
| Urinary bladder | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 48 | |
| **Systemic Lesions** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Multiple organs | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | |
| Lymphoma malignant | | | X | | | | | | | | | | | | | | | X | | | | X | X | X | | 10 | |

**TABLE D2**
**Individual Animal Tumor Pathology of Female Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 250 ppm**

| Number of Days on Study | 4 4 9 | 4 4 9 | 5 3 8 | 5 7 5 | 5 8 2 | 5 9 4 | 6 4 7 | 6 6 2 | 6 6 3 | 6 6 8 | 6 9 1 | 6 9 5 | 7 0 3 | 7 0 4 | 7 0 7 | 7 1 0 | 7 1 2 | 7 3 2 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 2 8 4 | 2 9 2 | 2 7 5 | 3 0 7 | 2 6 8 | 3 1 2 | 3 0 2 | 3 1 4 | 3 1 5 | 2 8 6 | 2 7 1 | 3 0 3 | 3 0 6 | 3 0 8 | 2 9 0 | 2 9 7 | 2 9 5 | 7 7 7 | 2 6 6 | 6 6 7 | 6 6 9 | 7 0 0 | 7 7 2 | 7 7 3 | 7 7 4 |
| **Alimentary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Esophagus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Gallbladder | + | + | + | + | + | + | + | + | A | A | + | A | + | + | + | A | + | A | + | + | + | + | + | + | + |
| Carcinoma, metastatic, uncertain primary site | | | | X | | | | | | | | | | | | | | | | | | | | | |
| Intestine large, colon | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine large, rectum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine large, cecum | + | + | + | + | + | + | + | + | A | A | + | A | + | A | + | + | + | + | + | + | + | + | + | + | + |
| Intestine small, duodenum | + | + | + | + | + | + | + | + | A | A | + | A | + | A | + | + | + | + | + | + | + | + | + | + | + |
| Intestine small, jejunum | + | + | + | + | + | + | + | + | A | A | + | A | + | A | + | + | + | A | + | + | + | + | + | + | + |
| Intestine small, ileum | + | + | + | + | + | + | + | + | A | A | A | A | + | A | + | + | + | A | + | + | + | + | + | + | + |
| Liver | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Carcinoma, metastatic, uncertain primary site | | | | | | | | | | X | | | | | | | | | | | | | | | |
| Hepatoblastoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hepatocellular carcinoma | | | | X | X | X | | X | | X | | | | X | | | | | | X | | X | | | |
| Hepatocellular adenoma | | X | | | | X | | X | | | X | | | | | X | X | X | | | | | X | | X |
| Hepatocellular adenoma, multiple | | | | | X | | | | X | | | X | | X | X | | | | | X | X | X | | X | |
| Histiocytic sarcoma | | | | | | | | X | | | | | | | | | | | | | | | | | |
| Lipoma | | | | X | | | | | | | | | | | | | | | | | | | | | |
| Mesentery | | | | + | | | | + | + | + | | | | + | | | | | | | + | + | | | |
| Carcinoma, metastatic, uncertain primary site | | | | X | | | | | | X | | | | | | | | | | | | | | | |
| Hemangioma | | | | | | | | | | | | | | | | | | | | | | X | | | |
| Pancreas | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Carcinoma, metastatic, uncertain primary site | | | | X | | | | | | X | | | | | | | | | | | | | | | |
| Acinus, adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Salivary glands | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Stomach, forestomach | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Squamous cell papilloma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stomach, glandular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Carcinoma, metastatic, uncertain primary site | | | | | | | | | | X | | | | | | | | | | | | | | | |
| **Cardiovascular System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Heart | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | X | | | | | | | | | | | | | | | | | |
| **Endocrine System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Adrenal cortex | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Adrenal medulla | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Islets, pancreatic | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Parathyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Pituitary gland | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Pars distalis, adenoma | | | | | | | | | | | | X | | | | | | | | | X | | | | |
| Pars intermedia, adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Thyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Follicular cell, adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| **General Body System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tissue NOS | | | | | | | | | | | | | | | | | | | | | | | | | |

**TABLE D2**
**Individual Animal Tumor Pathology of Female Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 250 ppm**

| Number of Days on Study | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 27606 | 27808 | 27909 | 28000 | 28101 | 28202 | 28303 | 28505 | 28707 | 28808 | 28909 | 29101 | 29303 | 29404 | 29606 | 29808 | 29909 | 30000 | 30101 | 30404 | 30505 | 30909 | 31000 | 31101 | 31103 | Total Tissues/ Tumors |
| **Alimentary System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Esophagus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Gallbladder | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 44 |
| Carcinoma, metastatic, uncertain primary site | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Intestine large, colon | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Intestine large, rectum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Intestine large, cecum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 46 |
| Intestine small, duodenum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 46 |
| Intestine small, jejunum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 45 |
| Intestine small, ileum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 44 |
| Liver | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Carcinoma, metastatic, uncertain primary site | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Hepatoblastoma | | | | | | | | | | | | | | | X | | | | | | | | | | | 1 |
| Hepatocellular carcinoma | | | | | | | | | | | X | | | | | | | | | | | | | | | 9 |
| Hepatocellular adenoma | | | | | | | | | | | | | X | X | | X | | | | | | | | | | 12 |
| Hepatocellular adenoma, multiple | X | | | X | X | X | | X | X | X | X | | | | X | | X | X | X | X | X | X | X | X | X | 27 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Lipoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Mesentery | | | | + | | | | + | | | + | | | | + | | + | + | + | + | + | + | | + | + | 19 |
| Carcinoma, metastatic, uncertain primary site | | | | | | | | | | | | | | | | | | | | | | | | | | 2 |
| Hemangioma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Pancreas | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Carcinoma, metastatic, uncertain primary site | | | | | | | | | | | | | | | | | | | | | | | | | | 2 |
| Acinus, adenoma | | | | X | | | | | | | | | | | | | | | | | | | | | | 1 |
| Salivary glands | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Stomach, forestomach | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Squamous cell papilloma | | | | | | | | | | | | | | | | | | | | | X | | | | | 1 |
| Stomach, glandular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Carcinoma, metastatic, uncertain primary site | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Cardiovascular System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Heart | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Endocrine System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Adrenal cortex | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Adenoma | | | | | | | | | | | | | | | | | | | | | | | | X | | 1 |
| Adrenal medulla | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Islets, pancreatic | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Parathyroid gland | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Pituitary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Pars distalis, adenoma | | | X | | | | X | | | | | | | X | | | | | | | | | | | | 5 |
| Pars intermedia, adenoma | | | | | | | | | | X | | | | | | | | | | | | | | | | 1 |
| Thyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Follicular cell, adenoma | | | | | | | | | | | | | | | | | | | | | | X | | X | | 2 |
| **General Body System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tissue NOS | | | | | | | | | | | | + | | | | | | | | | | | | | | 1 |

**TABLE D2**
**Individual Animal Tumor Pathology of Female Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 250 ppm**

| Number of Days on Study | 4 4 9 | 4 4 9 | 5 3 8 | 5 7 5 | 5 8 2 | 5 9 4 | 6 4 7 | 6 6 2 | 6 6 3 | 6 6 8 | 6 9 1 | 6 9 5 | 7 0 3 | 7 0 4 | 7 0 7 | 7 1 0 | 7 1 2 | 7 3 2 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 2 8 4 | 2 9 2 | 2 7 5 | 3 0 7 | 2 6 8 | 3 1 2 | 3 0 2 | 3 1 4 | 3 1 5 | 2 8 6 | 2 7 1 | 3 0 3 | 3 0 6 | 3 0 8 | 2 9 0 | 2 9 7 | 2 9 5 | 2 7 7 | 2 6 6 | 2 6 7 | 2 6 9 | 2 7 0 | 2 7 2 | 2 7 3 | 2 7 4 |
| **Genital System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Clitoral gland | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Ovary | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Carcinoma, metastatic, uncertain primary site | | | | | | | | | | X | | | | | | | | | | | | | | | |
| Hemangioma | | | | | | | | | | | | | X | | | | | | | | | | | | |
| Histiocytic sarcoma | | | | | | | | X | | | | | | | | | | | | | | | | | |
| Uterus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | X | | | | | | | | | | | | | | | | | |
| Polyp stromal | | | | | | | | | | | | X | | | | | | | | | | | | | |
| Sarcoma stromal | | | | | | | | | | | | | | | | | | | | | | | X | | |
| **Hematopoietic System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone marrow | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Hemangiosarcoma | | | | | | | | | | | X | | | | | | | | | | | | | | |
| Lymph node | + | + | + | | | | | + | | | + | | | + | + | + | | | + | | | | | | + |
| Iliac, hemangiosarcoma | | | | | | | | | | | X | | | | | | | | | | | | | | |
| Iliac, histiocytic sarcoma | | | | | | | | X | | | | | | | | | | | | | | | | | |
| Mediastinal, histiocytic sarcoma | | | | | | | | X | | | | | | | | | | | | | | | | | |
| Lymph node, mandibular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | X | | | | | | | | | | | | | | | | | |
| Lymph node, mesenteric | + | + | + | M | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | X | | | | | | | | | | | | | | | | | |
| Spleen | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Hemangiosarcoma | | | | | | | | | | | X | | X | | | | | | | | | | | | |
| Thymus | + | + | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + | M | + | + | + | + | + | + | + |
| Carcinoma, metastatic, harderian gland | | | | | | | X | | | | | | | | | | | | | | | | | | |
| **Integumentary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Skin | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Subcutaneous tissue, fibrosarcoma | | | | | | | | | | | | | | | | | | | X | | | | | | |
| Subcutaneous tissue, fibrous histiocytoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Subcutaneous tissue, hemangiosarcoma | | | | | | | | | | | X | | X | | | | | | | | | | | | |
| Subcutaneous tissue, sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Musculoskeletal System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Skeletal muscle | | | | | | | | | | | | | | | | | | | | | | + | | | |
| **Nervous System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + |

**TABLE D2**
**Individual Animal Tumor Pathology of Female Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 250 ppm**

| Number of Days on Study | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 2 7 6 | 2 7 8 | 2 7 9 | 2 8 0 | 2 8 1 | 2 8 2 | 2 8 3 | 2 8 5 | 2 8 7 | 2 8 8 | 2 8 9 | 2 9 1 | 2 9 3 | 2 9 4 | 2 9 6 | 2 9 8 | 2 9 9 | 3 0 0 | 3 0 1 | 3 0 4 | 3 0 5 | 3 0 9 | 3 1 0 | 3 1 1 | 3 1 3 | Total Tissues/ Tumors |
| **Genital System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Clitoral gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Ovary | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Carcinoma, metastatic, uncertain primary site | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Hemangioma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Uterus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Polyp stromal | | | | | | | | | | | | | | | | | | | | | | X | | | | 2 |
| Sarcoma stromal | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Hematopoietic System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone marrow | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Hemangiosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Lymph node | | | | + | | | | | | | | | | | | | | | | | | + | | | | 12 |
| Iliac, hemangiosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Iliac, histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Mediastinal, histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Lymph node, mandibular | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Lymph node, mesenteric | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 48 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Spleen | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Hemangiosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 2 |
| Thymus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 48 |
| Carcinoma, metastatic, harderian gland | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Integumentary System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Skin | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Subcutaneous tissue, fibrosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Subcutaneous tissue, fibrous histiocytoma | | | | | | | | | | | | | | | | | | | | | | X | | | | 1 |
| Subcutaneous tissue, hemangiosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 2 |
| Subcutaneous tissue, sarcoma | | | | | | | | | | | | | | | X | | | | | | | | | | | 1 |
| **Musculoskeletal System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Skeletal muscle | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Nervous System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |

**TABLE D2**
**Individual Animal Tumor Pathology of Female Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 250 ppm**

| Number of Days on Study | 4 4 9 | 4 4 9 | 5 3 8 | 5 7 5 | 5 8 2 | 5 9 4 | 6 4 7 | 6 6 2 | 6 6 3 | 6 6 8 | 6 9 1 | 6 9 5 | 7 0 3 | 7 0 4 | 7 0 7 | 7 1 0 | 7 1 2 | 7 3 2 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 2 8 4 | 2 9 2 | 2 7 5 | 3 0 7 | 2 6 8 | 3 1 2 | 3 0 2 | 3 1 4 | 3 1 5 | 2 8 6 | 2 7 1 | 3 0 3 | 3 0 6 | 3 0 8 | 2 9 0 | 2 9 7 | 2 9 5 | 2 7 7 | 2 6 6 | 2 6 7 | 2 6 9 | 2 7 0 | 2 7 2 | 2 7 3 | 2 7 4 |
| **Respiratory System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Alveolar/bronchiolar adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alveolar/bronchiolar carcinoma | | | | | | | | | | | | | | | | X | | | | | | | | | |
| Carcinoma, metastatic, harderian gland | | | | | | | X | | | | | | | | | | | | | | | | | | |
| Carcinoma, metastatic, uncertain primary site | | | | X | | | | | | | | | | | | | | | | | | | | | |
| Hepatocellular carcinoma, metastatic, liver | | | | | X | | | | | X | | | | | | | | | | X | | X | | | |
| Histiocytic sarcoma | | | | | | | | X | | | | | | | | | | | | | | | | | |
| Nose | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Carcinoma, metastatic, harderian gland | | | | | | | X | | | | | | | | | | | | | | | | | | |
| Trachea | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Special Senses System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Harderian gland | | | | | | | + | | | | | | | | | | | | | + | | | | | |
| Adenoma | | | | | | | | | | | | | | | | | | | | X | | | | | |
| Carcinoma | | | | | | | X | | | | | | | | | | | | | | | | | | |
| Lacrimal gland | | | | | | | | | | | | | | | | | | | + | | | | | | |
| **Urinary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kidney | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Carcinoma, metastatic, uncertain primary site | | | | X | | | | | | | | | | | | | | | | | | | | | |
| Histiocytic sarcoma | | | | | | | | X | | | | | | | | | | | | | | | | | |
| Urinary bladder | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Systemic Lesions** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Multiple organs | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | X | | | | | | | | | | | | | | | | | |
| Lymphoma malignant | X | X | X | | | | | | X | | | | | | | X | | | | | | | | | X |

**TABLE D2**
**Individual Animal Tumor Pathology of Female Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 250 ppm**

| Number of Days on Study | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 2 7 6 | 2 7 8 | 2 7 9 | 2 8 0 | 2 8 1 | 2 8 2 | 2 8 3 | 2 8 5 | 2 8 7 | 2 8 8 | 2 8 9 | 2 9 1 | 2 9 3 | 2 9 4 | 2 9 6 | 2 9 8 | 2 9 9 | 3 0 0 | 3 0 1 | 3 0 4 | 3 0 5 | 3 0 9 | 3 1 0 | 3 1 1 | 3 1 3 | Total Tissues/ Tumors |
| **Respiratory System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Alveolar/bronchiolar adenoma | | | | | | | | | | | | | | | | | | | X | | | | | | | 1 |
| Alveolar/bronchiolar carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Carcinoma, metastatic, harderian gland | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Carcinoma, metastatic, uncertain primary site | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Hepatocellular carcinoma, metastatic, liver | | | | | | | | | | | | | | | | | | | | | | | | | | 4 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Nose | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Carcinoma, metastatic, harderian gland | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Trachea | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Special Senses System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Harderian gland | | | | | | | | | | | | | | | | | | | + | | | | | | | 3 |
| Adenoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Carcinoma | | | | | | | | | | | | | | | | | | | X | | | | | | | 2 |
| Lacrimal gland | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Urinary System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kidney | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Carcinoma, metastatic, uncertain primary site | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Urinary bladder | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | M | + | + | 49 |
| **Systemic Lesions** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Multiple organs | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Lymphoma malignant | | | | X | | | | | X | X | | X | | | | X | | | X | | | | X | | X | 14 |

**TABLE D2**
**Individual Animal Tumor Pathology of Female Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 500 ppm**

| Number of Days on Study | 0 5 0 | 1 1 3 | 3 9 3 | 5 4 0 | 5 4 3 | 6 2 2 | 6 3 3 | 6 4 5 | 6 4 5 | 6 4 6 | 6 4 9 | 6 5 5 | 6 8 9 | 6 9 7 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 3 4 5 | 3 1 9 | 3 5 5 | 3 2 8 | 3 6 2 | 3 2 3 | 3 1 6 | 3 5 9 | 3 6 4 | 3 6 0 | 3 3 9 | 3 3 3 | 3 5 4 | 3 3 8 | 3 1 7 | 3 1 8 | 3 2 0 | 3 2 1 | 3 2 2 | 3 2 4 | 3 2 5 | 3 2 6 | 3 2 7 | 3 2 9 | 3 3 0 |
| **Alimentary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Esophagus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Gallbladder | M | A | + | + | A | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + |
| Carcinoma, metastatic, urinary bladder | | | | | | | | | | | X | | | | | | | | | | | | | | |
| Intestine large, colon | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine large, rectum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine large, cecum | + | A | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine small, duodenum | + | A | + | + | + | + | + | + | + | + | A | + | A | A | + | + | + | + | + | + | + | + | + | + | + |
| Intestine small, jejunum | + | A | + | + | + | + | + | + | + | + | A | + | A | + | + | + | + | + | + | + | + | + | + | + | + |
| Leiomyosarcoma, metastatic, uncertain primary site | | | | | | | | X | | | | | | | | | | | | | | | | | |
| Intestine small, ileum | + | A | + | + | + | + | A | + | + | + | A | + | A | A | + | + | + | + | + | + | + | + | + | + | + |
| Liver | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Carcinoma, metastatic, urinary bladder | | | | | | | | | | | X | | | | | | | | | | | | | | |
| Fibrous histiocytoma, metastatic, uncertain primary site | | | | X | | | | | | | | | | | | | | | | | | | | | |
| Hemangiosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hepatoblastoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hepatocellular carcinoma | | | | | | | | X | | X | | | X | | | | | | | | | | | | |
| Hepatocellular carcinoma, multiple | | | | | | | | | | | | X | | | | | | | | | | | | | |
| Hepatocellular adenoma | | | | | X | X | | | | | | X | | | X | | | X | | X | | X | | | |
| Hepatocellular adenoma, multiple | | | | | | | X | X | | | | | X | | | X | X | | X | | X | | X | X | X |
| Histiocytic sarcoma | | | | | | | | | | | | | | X | | | | | | X | | | | | |
| Leiomyosarcoma, metastatic, uncertain primary site | | | | | | | | X | | | | | | | | | | | | | | | | | |
| Mesentery | | | | | | + | + | | | | + | | | | | | + | | | + | | | + | + | + |
| Carcinoma, metastatic, urinary bladder | | | | | | | | | | | X | | | | | | | | | | | | | | |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | X | | | | | |
| Pancreas | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Carcinoma, metastatic, urinary bladder | | | | | | | | | | | X | | | | | | | | | | | | | | |
| Fibrous histiocytoma, metastatic, uncertain primary site | | | | X | | | | | | | | | | | | | | | | | | | | | |
| Leiomyosarcoma, metastatic, uncertain primary site | | | | | | | | X | | | | | | | | | | | | | | | | | |
| Salivary glands | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + | + |
| Stomach, forestomach | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Carcinoma, metastatic, urinary bladder | | | | | | | | | | | X | | | | | | | | | | | | | | |
| Stomach, glandular | + | A | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + |
| Carcinoma, metastatic, urinary bladder | | | | | | | | | | | X | | | | | | | | | | | | | | |
| **Cardiovascular System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Heart | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Endocrine System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Adrenal cortex | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Adrenal medulla | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Islets, pancreatic | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Parathyroid gland | + | M | + | + | + | + | + | + | + | + | + | + | M | + | M | M | + | + | + | + | + | + | + | + | + |
| Pituitary gland | + | + | + | + | + | + | + | + | + | M | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Pars distalis, adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pars intermedia, adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Thyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Follicular cell, adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |

**TABLE D2**
**Individual Animal Tumor Pathology of Female Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 500 ppm**

| **Number of Days on Study** | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 331 | 332 | 334 | 335 | 336 | 337 | 340 | 341 | 342 | 343 | 344 | 346 | 347 | 348 | 349 | 350 | 351 | 352 | 353 | 356 | 357 | 358 | 361 | 363 | 365 | Total Tissues/ Tumors |
| **Alimentary System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Esophagus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Gallbladder | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 45 |
| Carcinoma, metastatic, urinary bladder | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Intestine large, colon | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Intestine large, rectum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Intestine large, cecum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 48 |
| Intestine small, duodenum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 46 |
| Intestine small, jejunum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 47 |
| Leiomyosarcoma, metastatic, uncertain primary site | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Intestine small, ileum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 45 |
| Liver | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Carcinoma, metastatic, urinary bladder | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Fibrous histiocytoma, metastatic, uncertain primary site | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Hemangiosarcoma | | | | | | | | | | | | | | | | | | | | | | | X | | | 1 |
| Hepatoblastoma | | | | | | | | | | | | | | | | | | | | | | X | | | | 1 |
| Hepatocellular carcinoma | X | | | X | | | | | | | | | X | | | | | X | | | | | | | | 7 |
| Hepatocellular carcinoma, multiple | | X | | | | | | | | | | | | | | | | | | | | | | | | 2 |
| Hepatocellular adenoma | | | X | | | | | | | | | | | | | | X | | | X | | | | | | 10 |
| Hepatocellular adenoma, multiple | X | X | | X | X | X | X | X | X | X | X | X | X | X | X | X | | X | X | | X | X | X | X | X | 32 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 2 |
| Leiomyosarcoma, metastatic, uncertain primary site | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Mesentery | | | | | | | | + | | + | + | | | | | + | + | + | | + | | | | | + | 16 |
| Carcinoma, metastatic, urinary bladder | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Pancreas | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Carcinoma, metastatic, urinary bladder | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Fibrous histiocytoma, metastatic, uncertain primary site | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Leiomyosarcoma, metastatic, uncertain primary site | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Salivary glands | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Stomach, forestomach | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Carcinoma, metastatic, urinary bladder | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Stomach, glandular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 48 |
| Carcinoma, metastatic, urinary bladder | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Cardiovascular System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Heart | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Endocrine System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Adrenal cortex | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Adrenal medulla | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Islets, pancreatic | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Parathyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 46 |
| Pituitary gland | + | + | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | 47 |
| Pars distalis, adenoma | | X | | | | | | | | | | | | | | | | | | X | | | X | | | 3 |
| Pars intermedia, adenoma | | | | | | | | | | | | | | | X | | | | | | | | | | | 1 |
| Thyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Follicular cell, adenoma | | | | X | | | | | | | | | | | | | | | | | | | | | | 1 |

**TABLE D2**
**Individual Animal Tumor Pathology of Female Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 500 ppm**

| Number of Days on Study | 0 5 0 | 1 1 3 | 3 9 3 | 5 4 0 | 5 4 3 | 6 2 2 | 6 3 3 | 6 4 5 | 6 4 5 | 6 4 6 | 6 4 9 | 6 5 5 | 6 8 9 | 6 9 7 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 3 4 5 | 3 1 9 | 3 5 5 | 3 2 8 | 3 6 2 | 3 2 3 | 3 1 6 | 3 5 9 | 3 6 4 | 3 6 0 | 3 3 9 | 3 3 3 | 3 5 4 | 3 3 8 | 3 1 7 | 3 1 8 | 3 2 0 | 3 2 1 | 3 2 2 | 3 2 4 | 3 2 5 | 3 2 6 | 3 2 7 | 3 2 9 | 3 3 0 |
| **General Body System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tissue NOS | | | | | | | | + | + | | | | | | | | | | | | | | | | |
| Leiomyosarcoma, metastatic, uncertain primary site | | | | | | | | X | | | | | | | | | | | | | | | | | |
| **Genital System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Clitoral gland | M | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | | | | | | | X | | | | | | | | | | | |
| Ovary | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Carcinoma, metastatic, urinary bladder | | | | | | | | | | | X | | | | | | | | | | | | | | |
| Cystadenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Histiocytic sarcoma | | | | | | | | | | | | | | X | | | | | | X | | | | | |
| Uterus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Hemangiosarcoma | | | | | | | | | | | | X | | | | | | | | | | | | | |
| Histiocytic sarcoma | | | | | | | | | | | | | | X | | | | | | X | | | | | |
| Polyp stromal | | | | | | | | | | | | | | | | | | | | | | | | | |
| Vagina | | | | + | | | | | | | | | | | | | | | | | | | | | |
| **Hematopoietic System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone marrow | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | | | | | | | X | | | | | | | | | | | |
| Lymph node | | | | + | | + | | + | + | | | | | | | + | | | | + | | | + | | |
| Pancreatic, fibrous histiocytoma, metastatic, uncertain primary site | | | | X | | | | | | | | | | | | | | | | | | | | | |
| Renal, histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | X | | | | | |
| Lymph node, mandibular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + | + |
| Carcinoma, metastatic, urinary bladder | | | | | | | | | | | X | | | | | | | | | | | | | | |
| Lymph node, mesenteric | + | A | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + |
| Fibrous histiocytoma, metastatic, uncertain primary site | | | | X | | | | | | | | | | | | | | | | | | | | | |
| Hemangioma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Histiocytic sarcoma | | | | | | | | | | | | | | X | | | | | | X | | | | | |
| Leiomyosarcoma, metastatic, uncertain primary site | | | | | | | | X | | | | | | | | | | | | | | | | | |
| Spleen | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Fibrous histiocytoma, metastatic, uncertain primary site | | | | X | | | | | | | | | | | | | | | | | | | | | |
| Hemangiosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Thymus | + | + | + | + | + | + | + | + | + | + | M | M | + | + | + | + | + | + | + | I | + | + | + | + | + |
| **Integumentary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Skin | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Subcutaneous tissue, fibrosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Subcutaneous tissue, hemangiosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Musculoskeletal System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |

**TABLE D2**
**Individual Animal Tumor Pathology of Female Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 500 ppm**

| Number of Days on Study | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 33101 | 33102 | 33104 | 33105 | 33106 | 33107 | 34001 | 34101 | 34201 | 34301 | 34401 | 34601 | 34701 | 34801 | 34901 | 35001 | 35101 | 35201 | 35301 | 35601 | 35701 | 35801 | 36101 | 36301 | 36501 | Total Tissues/ Tumors | |
| **General Body System** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tissue NOS | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | | |
| Leiomyosarcoma, metastatic, uncertain primary site | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | |
| **Genital System** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Clitoral gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 48 | | |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | |
| Ovary | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | |
| Carcinoma, metastatic, urinary bladder | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | |
| Cystadenoma | | | | | | | | | | | | | | | | | | | | | | X | | | | 1 | | |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | | |
| Uterus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | |
| Hemangiosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | | |
| Polyp stromal | | | | | | | | | | | | | | | | | | | | | | | | X | | 1 | | |
| Vagina | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | |
| **Hematopoietic System** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone marrow | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | |
| Lymph node | | + | | | + | | | | | | | | | | + | | | + | + | + | + | | + | | | 15 | | |
| Pancreatic, fibrous histiocytoma, metastatic, uncertain primary site | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | |
| Renal, histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | |
| Lymph node, mandibular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 | | |
| Carcinoma, metastatic, urinary bladder | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | |
| Lymph node, mesenteric | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | 47 | | |
| Fibrous histiocytoma, metastatic, uncertain primary site | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | |
| Hemangioma | | | | | | | | | | | | | | | | | | | | | | | | X | | 1 | | |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | | |
| Leiomyosarcoma, metastatic, uncertain primary site | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | |
| Spleen | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | |
| Fibrous histiocytoma, metastatic, uncertain primary site | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | |
| Hemangiosarcoma | | | | | | | | | | | | | | | | | | | | | | | X | | | 1 | | |
| Thymus | + | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | 45 | | |
| **Integumentary System** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | |
| Skin | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | |
| Subcutaneous tissue, fibrosarcoma | | | | | | | | | | | | | | | | | | | | | | | | X | | 1 | | |
| Subcutaneous tissue, hemangiosarcoma | | | | | | | | | | | | X | | | | | | | | | | | | | | 1 | | |
| **Musculoskeletal System** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | |

**TABLE D2**
**Individual Animal Tumor Pathology of Female Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 500 ppm**

| Number of Days on Study | 0 5 0 | 1 1 3 | 3 9 3 | 5 4 0 | 5 4 3 | 6 2 2 | 6 3 3 | 6 4 5 | 6 4 5 | 6 4 6 | 6 4 9 | 6 5 5 | 6 8 9 | 6 9 7 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 3 4 5 | 3 1 9 | 3 5 5 | 3 2 8 | 3 6 2 | 3 2 3 | 3 1 6 | 3 5 9 | 3 6 4 | 3 6 0 | 3 3 9 | 3 3 3 | 3 5 4 | 3 3 8 | 3 1 7 | 3 1 8 | 3 2 0 | 3 2 1 | 3 2 2 | 3 2 4 | 3 2 5 | 3 2 6 | 3 2 7 | 3 2 9 | 3 3 0 |
| **Nervous System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Spinal cord | | | + | | | | | | | | | | | | | | | | | | | | | | |
| **Respiratory System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Alveolar/bronchiolar adenoma | | | | | | | | | X | | | X | | | | | | | | X | | | | | |
| Alveolar/bronchiolar carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carcinoma, metastatic, urinary bladder | | | | | | | | | | | X | | | | | | | | | | | | | | |
| Hepatocellular carcinoma, metastatic, liver | | | | | | | | X | | | | X | | | | | | | | | | | | | |
| Histiocytic sarcoma | | | | | | | | | | | | | | X | | | | | | X | | | | | |
| Nose | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Carcinoma, metastatic, harderian gland | | | | | | | | | | | | | | | | | | | | | | | X | | |
| Histiocytic sarcoma | | | | | | | | | | | | | | X | | | | | | | | | | | |
| Trachea | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Special Senses System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Harderian gland | | | | | | | | | | | | + | | | | | | | | | | | + | | |
| Adenoma | | | | | | | | | | | | X | | | | | | | | | | | | | |
| Carcinoma | | | | | | | | | | | | | | | | | | | | | | | X | | |
| **Urinary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kidney | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | X | | | | | |
| Urinary bladder | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Fibrous histiocytoma, metastatic, uncertain primary site | | | | X | | | | | | | | | | | | | | | | | | | | | |
| Histiocytic sarcoma | | | | | | | | | | | | | | X | | | | | | | | | | | |
| Transitional epithelium, carcinoma | | | | | | | | | | | X | | | | | | | | | | | | | | |
| **Systemic Lesions** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Multiple organs | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Histiocytic sarcoma | | | | | | | | | | | | | | X | | | | | | X | | | | | |
| Lymphoma malignant | | | | | | | | | X | | | | | | | | | | | | | | | X | |

**TABLE D2**
**Individual Animal Tumor Pathology of Female Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 500 ppm**

| **Number of Days on Study** | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 331 | 332 | 334 | 335 | 336 | 337 | 340 | 341 | 342 | 343 | 344 | 346 | 347 | 348 | 349 | 350 | 351 | 352 | 353 | 356 | 357 | 358 | 361 | 363 | 365 | Total Tissues/ Tumors | |
| **Nervous System** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | |
| Spinal cord | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | |
| **Respiratory System** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | |
| Alveolar/bronchiolar adenoma | | | | | | | | | | | | | X | | | | | | | | | | | | | 4 | |
| Alveolar/bronchiolar carcinoma | | | | | | | | X | | | | | X | | | | | | | | | | | | | 2 | |
| Carcinoma, metastatic, urinary bladder | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | |
| Hepatocellular carcinoma, metastatic, liver | | X | | | | | | | | | | | | | | | | | | | | | | | | 3 | |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | |
| Nose | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | |
| Carcinoma, metastatic, harderian gland | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | |
| Trachea | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | |
| **Special Senses System** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Harderian gland | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | |
| Adenoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | |
| Carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | |
| **Urinary System** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kidney | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | |
| Urinary bladder | + | + | + | + | | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 48 | |
| Fibrous histiocytoma, metastatic, uncertain primary site | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | |
| Transitional epithelium, carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | |
| **Systemic Lesions** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Multiple organs | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | |
| Histiocytic sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | |
| Lymphoma malignant | X | | | | X | | | | | | | | | X | X | | | | X | | X | X | X | | | 10 | |

**TABLE D2**
**Individual Animal Tumor Pathology of Female Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 1,000 ppm**

| Number of Days on Study | 0 7 7 | 1 5 0 | 2 3 8 | 2 6 1 | 4 6 6 | 5 2 3 | 5 6 9 | 6 0 6 | 6 1 6 | 6 2 9 | 6 4 2 | 6 4 6 | 6 6 4 | 6 8 1 | 6 8 1 | 7 0 1 | 7 1 7 | 7 3 4 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 4 0 5 | 3 9 1 | 3 8 5 | 4 0 9 | 3 9 9 | 3 7 1 | 4 0 6 | 3 9 4 | 3 4 7 | 4 1 0 | 3 7 9 | 3 9 7 | 4 0 4 | 3 7 4 | 3 8 6 | 3 8 8 | 4 1 4 | 4 0 8 | 3 6 6 | 3 6 7 | 3 6 8 | 3 6 9 | 3 7 0 | 7 7 2 | 3 7 3 |
| **Alimentary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Esophagus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Gallbladder | A | + | + | + | A | A | + | + | + | + | A | M | + | + | A | + | A | A | + | + | + | + | + | + | + |
| Intestine large, colon | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine large, rectum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine large, cecum | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine small, duodenum | + | + | + | + | A | + | + | + | + | + | A | + | + | A | + | + | + | + | + | + | + | + | + | + | + |
| Intestine small, jejunum | + | + | + | + | + | + | + | + | + | + | A | + | + | A | + | + | A | A | + | + | + | + | + | + | + |
| Intestine small, ileum | + | + | + | + | A | + | + | + | + | + | A | A | + | + | A | + | + | A | + | + | + | + | + | + | + |
| Liver | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Alveolar/bronchiolar carcinoma, metastatic, lung | | | | | X | | | | | | | | | | | | | | | | | | | | |
| Hemangiosarcoma | | | | | | | | | | | | | | | | | | X | | | | | | | |
| Hepatoblastoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hepatocellular carcinoma | | | | | X | | | | | | | X | | X | | | | | X | | | X | | | |
| Hepatocellular carcinoma, multiple | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hepatocellular adenoma | | | | | X | X | | | | | | | | | X | | | | | | | | X | | |
| Hepatocellular adenoma, multiple | | | | | | | | X | X | X | X | X | | | | X | X | X | X | X | X | X | | X | X |
| Mesentery | | | | | | | + | + | | | | | | | | | | + | + | | | | | | |
| Pancreas | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Salivary glands | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Stomach, forestomach | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Stomach, glandular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Cardiovascular System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Heart | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Alveolar/bronchiolar carcinoma, metastatic, lung | | | | | X | | | | | | | | | | | | | | | | | | | | |
| **Endocrine System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Adrenal cortex | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Adrenal medulla | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Islets, pancreatic | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Parathyroid gland | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | M |
| Pituitary gland | + | + | + | + | + | + | + | + | M | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + |
| Pars distalis, adenoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Thyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **General Body System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| None | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Genital System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Clitoral gland | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Ovary | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Cystadenoma | | | | | | | | | | | X | | | X | | | | | | | | | | | |
| Granulosa-theca tumor benign | | | | | | | | | | | | | | | | | | | X | | | | | | |
| Uterus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Hemangioma | | | | | | | | | X | | | | | | | | | | | | | | | | |
| Sarcoma stromal | | | | | | | | | | | | | | | | | | | | | | | | | |

**TABLE D2**
**Individual Animal Tumor Pathology of Female Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 1,000 ppm**

| Number of Days on Study | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 37515 | 37616 | 37718 | 38010 | 38111 | 38212 | 38313 | 38414 | 38717 | 38919 | 39010 | 39212 | 39313 | 39515 | 39616 | 39818 | 40001 | 40102 | 40203 | 40707 | 41101 | 41212 | 41313 | 41515 | Total Tissues/ Tumors |
| **Alimentary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Esophagus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Gallbladder | + | + | + | + | + | + | + | + | + | + | + | + | M | + | + | M | + | + | + | + | + | + | + | + | 40 |
| Intestine large, colon | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Intestine large, rectum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Intestine large, cecum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Intestine small, duodenum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 47 |
| Intestine small, jejunum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 46 |
| Intestine small, ileum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 45 |
| Liver | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Alveolar/bronchiolar carcinoma, metastatic, lung | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Hemangiosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Hepatoblastoma | | | | | | | | | | | | | | | X | | | | | | | | | | 1 |
| Hepatocellular carcinoma | | | | | | | | X | | X | | | | | X | | | | | | | | X | | 9 |
| Hepatocellular carcinoma, multiple | | | | | | | | | | | | | | | | | | | | | X | | | | 1 |
| Hepatocellular adenoma | | X | | | | X | | | | X | | X | X | | | | | | | X | | | | | 10 |
| Hepatocellular adenoma, multiple | X | | X | X | X | | X | | X | | | | | X | X | X | | X | X | X | | X | X | X | X | 30 |
| Mesentery | | | + | | + | | | + | + | | | + | | | | + | | | | | + | | + | | 12 |
| Pancreas | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Salivary glands | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Stomach, forestomach | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Stomach, glandular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Cardiovascular System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Heart | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Alveolar/bronchiolar carcinoma, metastatic, lung | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Endocrine System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Adrenal cortex | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Adrenal medulla | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Islets, pancreatic | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Parathyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 48 |
| Pituitary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + | M | + | + | + | + | + | 46 |
| Pars distalis, adenoma | | | | X | | X | | | | | | | X | | | | | X | | | | | | | 4 |
| Thyroid gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **General Body System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| None | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Genital System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Clitoral gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Ovary | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Cystadenoma | | | | | | | | | | | | | | | | | | | | | | | | | 2 |
| Granulosa-theca tumor benign | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Uterus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Hemangioma | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Sarcoma stromal | | | | | | | | | X | | | | | | | | | | | | | | | | 1 |

**TABLE D2**
**Individual Animal Tumor Pathology of Female Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 1,000 ppm**

| Number of Days on Study | 0 7 7 | 1 5 0 | 2 3 8 | 2 6 1 | 4 6 6 | 5 2 3 | 5 6 9 | 6 0 6 | 6 1 6 | 6 2 9 | 6 4 2 | 6 4 6 | 6 6 4 | 6 8 1 | 6 8 1 | 7 0 1 | 7 1 7 | 7 3 4 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 4 0 5 | 3 9 1 | 3 8 5 | 4 0 9 | 3 9 9 | 3 7 1 | 4 0 6 | 3 9 4 | 3 4 7 | 4 1 0 | 3 7 9 | 3 9 7 | 4 0 4 | 3 7 4 | 3 8 6 | 3 8 8 | 4 1 4 | 4 0 8 | 3 6 6 | 3 6 7 | 3 6 8 | 3 6 9 | 3 7 0 | 3 7 2 | 3 7 3 |
| **Hematopoietic System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone marrow | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Lymph node | | | + | | | | | | + | + | | + | | | | + | | | | | | + | | | |
| Lymph node, mandibular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Lymph node, mesenteric | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Spleen | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Hemangiosarcoma | | | | | | | | | | | | | X | | | | | X | | | | | | | |
| Thymus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Integumentary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Skin | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Subcutaneous tissue, fibrosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| Subcutaneous tissue, sarcoma | | | | | | | | | | | | | | | | | | | | | | | X | | |
| **Musculoskeletal System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Skeletal muscle | | | | | + | | | | | | | | | | | | | | | | | | + | | |
| Alveolar/bronchiolar carcinoma, metastatic, lung | | | | | X | | | | | | | | | | | | | | | | | | | | |
| Sarcoma, metastatic, skin | | | | | | | | | | | | | | | | | | | | | | | X | | |
| **Nervous System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Respiratory System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Alveolar/bronchiolar adenoma | | | | | X | | | | | | | | | | | | | X | | | | | | | |
| Alveolar/bronchiolar carcinoma | | | | | X | | | | | | | | | | | | | | | | | | X | | |
| Hepatocellular carcinoma, metastatic, liver | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nose | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Trachea | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Special Senses System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ear | | + | | | | | | | | | | | | | | | | | | | | | | | |
| Eye | | + | | | | | | | | + | | | | | | | | | | | | | | | |
| Harderian gland | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carcinoma | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Urinary System** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kidney | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Alveolar/bronchiolar carcinoma, metastatic, lung | | | | | X | | | | | | | | | | | | | | | | | | | | |
| Urinary bladder | + | + | + | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + |
| **Systemic Lesions** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Multiple organs | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Lymphoma malignant | | | X | | | | | | X | X | | | | | | | | | | | | X | | | X |

**TABLE D2**
**Individual Animal Tumor Pathology of Female Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol: 1,000 ppm**

| Number of Days on Study | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | 7 3 5 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcass ID Number** | 3 7 5 | 3 7 6 | 3 7 8 | 3 8 0 | 3 8 1 | 3 8 2 | 3 8 3 | 3 8 4 | 3 8 7 | 3 8 9 | 3 9 0 | 3 9 2 | 3 9 3 | 3 9 5 | 3 9 6 | 3 9 8 | 4 0 0 | 4 0 1 | 4 0 2 | 4 0 3 | 4 0 7 | 4 1 1 | 4 1 2 | 4 1 3 | 4 1 5 | Total Tissues/ Tumors |
| **Hematopoietic System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone marrow | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | M | 49 |
| Lymph node | | | + | | | | | | | | | | | | + | | + | | | | | | | | | 3 |
| Lymph node, mandibular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Lymph node, mesenteric | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| Spleen | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Hemangiosarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Thymus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | M | 48 |
| **Integumentary System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Skin | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Subcutaneous tissue, fibrosarcoma | | | | | | | | X | | | | | | | | | | | | | | | | | | 1 |
| Subcutaneous tissue, sarcoma | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Musculoskeletal System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Skeletal muscle | | | | | | | | | | | | | | | | | | | | | | | | | | 2 |
| Alveolar/bronchiolar carcinoma, metastatic, lung | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Sarcoma, metastatic, skin | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| **Nervous System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Respiratory System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Alveolar/bronchiolar adenoma | | X | | | | | | | | | | | | | | | | | | | X | | | | | 3 |
| Alveolar/bronchiolar carcinoma | | | | | | | | | | | | | | | | | | | | | | | | X | | 1 |
| Hepatocellular carcinoma, metastatic, liver | | | | | | | | | | | | | | | | | | | | | X | | | | | 1 |
| Nose | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Trachea | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| **Special Senses System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ear | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Eye | | | | | | | | | | | | | | | | | | | | + | | | | | | 3 |
| Harderian gland | | | | | | | | | | | | | | | | | | | | + | | | | | | 1 |
| Carcinoma | | | | | | | | | | | | | | | | | | | | X | | | | | | 1 |
| **Urinary System** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kidney | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Alveolar/bronchiolar carcinoma, metastatic, lung | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Urinary bladder | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 |
| **Systemic Lesions** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Multiple organs | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Lymphoma malignant | | | X | | | | | | X | X | | X | | | X | | | | | | X | | | | | 11 |

**TABLE D3**
**Statistical Analysis of Primary Neoplasms in Female Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 250 ppm | 500 ppm | 1,000 ppm |
|---|---|---|---|---|
| **Harderian Gland: Adenoma** | | | | |
| Overall rate[a] | 3/50 (6%) | 1/50 (2%) | 1/50 (2%) | 0/50 (0%) |
| Adjusted rate[b] | 6.7% | 2.3% | 2.3% | 0.0% |
| Terminal rate[c] | 2/32 (6%) | 1/32 (3%) | 0/36 (0%) | 0/32 (0%) |
| First incidence (days) | 587 | 735 (T) | 655 | —[e] |
| Poly-3 test[d] | P=0.089N | P=0.333N | P=0.341N | P=0.156N |
| **Harderian Gland: Adenoma or Carcinoma** | | | | |
| Overall rate | 5/50 (10%) | 3/50 (6%) | 2/50 (4%) | 1/50 (2%) |
| Adjusted rate | 11.0% | 6.7% | 4.6% | 2.4% |
| Terminal rate | 3/32 (9%) | 2/32 (6%) | 1/36 (3%) | 1/32 (3%) |
| First incidence (days) | 587 | 647 | 655 | 735 (T) |
| Poly-3 test | P=0.082N | P=0.380N | P=0.248N | P=0.138N |
| **Liver: Hepatocellular Adenoma** | | | | |
| Overall rate | 40/50 (80%) | 39/50 (78%) | 42/50 (84%) | 40/50 (80%) |
| Adjusted rate | 85.2% | 82.3% | 92.4% | 88.7% |
| Terminal rate | 29/32 (91%) | 27/32 (84%) | 36/36 (100%) | 29/32 (91%) |
| First incidence (days) | 587 | 449 | 543 | 466 |
| Poly-3 test | P=0.237 | P=0.465N | P=0.211 | P=0.430 |
| **Liver: Hepatocellular Carcinoma** | | | | |
| Overall rate | 6/50 (12%) | 9/50 (18%) | 9/50 (18%) | 10/50 (20%) |
| Adjusted rate | 13.4% | 19.4% | 20.3% | 23.4% |
| Terminal rate | 4/32 (13%) | 3/32 (9%) | 5/36 (14%) | 7/32 (22%) |
| First incidence (days) | 726 | 575 | 645 | 466 |
| Poly-3 test | P=0.168 | P=0.326 | P=0.294 | P=0.186 |
| **Liver: Hepatocellular Adenoma or Carcinoma** | | | | |
| Overall rate | 41/50 (82%) | 41/50 (82%) | 43/50 (86%) | 42/50 (84%) |
| Adjusted rate | 87.3% | 85.1% | 93.9% | 92.7% |
| Terminal rate | 29/32 (91%) | 27/32 (84%) | 36/36 (100%) | 30/32 (94%) |
| First incidence (days) | 587 | 449 | 543 | 466 |
| Poly-3 test | P=0.140 | P=0.503N | P=0.219 | P=0.301 |
| **Liver: Hepatocellular Carcinoma or Hepatoblastoma** | | | | |
| Overall rate | 6/50 (12%) | 10/50 (20%) | 10/50 (20%) | 10/50 (20%) |
| Adjusted rate | 13.4% | 21.5% | 22.5% | 23.4% |
| Terminal rate | 4/32 (13%) | 4/32 (13%) | 6/36 (17%) | 7/32 (22%) |
| First incidence (days) | 726 | 575 | 645 | 466 |
| Poly-3 test | P=0.186 | P=0.239 | P=0.210 | P=0.186 |
| **Liver: Hepatocellular Adenoma, Hepatocellular Carcinoma, or Hepatoblastoma** | | | | |
| Overall rate | 41/50 (82%) | 41/50 (82%) | 43/50 (86%) | 42/50 (84%) |
| Adjusted rate | 87.3% | 85.1% | 93.9% | 92.7% |
| Terminal rate | 29/32 (91%) | 27/32 (84%) | 36/36 (100%) | 30/32 (94%) |
| First incidence (days) | 587 | 449 | 543 | 466 |
| Poly-3 test | P=0.140 | P=0.503N | P=0.219 | P=0.301 |
| **Lung: Alveolar/bronchiolar Adenoma** | | | | |
| Overall rate | 4/50 (8%) | 1/50 (2%) | 4/50 (8%) | 4/50 (8%) |
| Adjusted rate | 9.0% | 2.3% | 9.1% | 9.5% |
| Terminal rate | 3/32 (9%) | 1/32 (3%) | 2/36 (6%) | 2/32 (6%) |
| First incidence (days) | 733 | 735 (T) | 645 | 466 |
| Poly-3 test | P=0.388 | P=0.195N | P=0.653 | P=0.634 |

**TABLE D3**
**Statistical Analysis of Primary Neoplasms in Female Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 250 ppm | 500 ppm | 1,000 ppm |
|---|---|---|---|---|
| **Lung: Alveolar/bronchiolar Carcinoma** | | | | |
| Overall rate | 5/50 (10%) | 1/50 (2%) | 2/50 (4%) | 3/50 (6%) |
| Adjusted rate | 10.8% | 2.2% | 4.6% | 7.1% |
| Terminal rate | 1/32 (3%) | 0/32 (0%) | 2/36 (6%) | 2/32 (6%) |
| First incidence (days) | 465 | 710 | 735 (T) | 466 |
| Poly-3 test | P=0.435N | P=0.120N | P=0.259N | P=0.429N |
| **Lung: Alveolar/bronchiolar Adenoma or Carcinoma** | | | | |
| Overall rate | 9/50 (18%) | 2/50 (4%) | 5/50 (10%) | 6/50 (12%) |
| Adjusted rate | 19.4% | 4.5% | 11.4% | 14.2% |
| Terminal rate | 4/32 (13%) | 1/32 (3%) | 3/36 (8%) | 4/32 (13%) |
| First incidence (days) | 465 | 710 | 645 | 466 |
| Poly-3 test | P=0.461N | P=0.032N | P=0.233N | P=0.373N |
| **Pituitary Gland (Pars Distalis): Adenoma** | | | | |
| Overall rate | 6/49 (12%) | 5/49 (10%) | 3/47 (6%) | 4/46 (9%) |
| Adjusted rate | 13.6% | 11.4% | 7.3% | 10.5% |
| Terminal rate | 5/32 (16%) | 4/32 (13%) | 3/35 (9%) | 4/30 (13%) |
| First incidence (days) | 733 | 695 | 735 (T) | 735 (T) |
| Poly-3 test | P=0.374N | P=0.519N | P=0.295N | P=0.487N |
| **Skin (Subcutaneous Tissue): Fibrous Histiocytoma, Fibrosarcoma, or Sarcoma** | | | | |
| Overall rate | 1/50 (2%) | 3/50 (6%) | 1/50 (2%) | 2/50 (4%) |
| Adjusted rate | 2.2% | 6.8% | 2.3% | 4.8% |
| Terminal rate | 1/32 (3%) | 3/32 (9%) | 1/36 (3%) | 2/32 (6%) |
| First incidence (days) | 735 (T) | 735 (T) | 735 (T) | 735 (T) |
| Poly-3 test | P=0.513 | P=0.326 | P=0.784 | P=0.513 |
| **Uterus: Stromal Polyp or Stromal Sarcoma** | | | | |
| Overall rate | 2/50 (4%) | 3/50 (6%) | 1/50 (2%) | 1/50 (2%) |
| Adjusted rate | 4.5% | 6.7% | 2.3% | 2.4% |
| Terminal rate | 2/32 (6%) | 2/32 (6%) | 1/36 (3%) | 1/32 (3%) |
| First incidence (days) | 735 (T) | 695 | 735 (T) | 735 (T) |
| Poly-3 test | P=0.322N | P=0.521 | P=0.542N | P=0.564N |
| **All Organs: Hemangiosarcoma** | | | | |
| Overall rate | 4/50 (8%) | 2/50 (4%) | 3/50 (6%) | 2/50 (4%) |
| Adjusted rate | 8.9% | 4.5% | 6.9% | 4.8% |
| Terminal rate | 3/32 (9%) | 0/32 (0%) | 2/36 (6%) | 0/32 (0%) |
| First incidence (days) | 673 | 691 | 655 | 664 |
| Poly-3 test | P=0.365N | P=0.357N | P=0.536N | P=0.397N |
| **All Organs: Hemangioma or Hemangiosarcoma** | | | | |
| Overall rate | 5/50 (10%) | 3/50 (6%) | 4/50 (8%) | 3/50 (6%) |
| Adjusted rate | 11.1% | 6.7% | 9.2% | 7.1% |
| Terminal rate | 3/32 (9%) | 1/32 (3%) | 3/36 (8%) | 0/32 (0%) |
| First incidence (days) | 673 | 691 | 655 | 616 |
| Poly-3 test | P=0.390N | P=0.377N | P=0.538N | P=0.416N |
| **All Organs: Malignant Lymphoma** | | | | |
| Overall rate | 10/50 (20%) | 14/50 (28%) | 10/50 (20%) | 11/50 (22%) |
| Adjusted rate | 22.3% | 29.9% | 22.9% | 25.5% |
| Terminal rate | 8/32 (25%) | 9/32 (28%) | 9/36 (25%) | 8/32 (25%) |
| First incidence (days) | 683 | 449 | 645 | 238 |
| Poly-3 test | P=0.525 | P=0.287 | P=0.587 | P=0.474 |

**TABLE D3**
**Statistical Analysis of Primary Neoplasms in Female Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 250 ppm | 500 ppm | 1,000 ppm |
|---|---|---|---|---|
| **All Organs: Benign Neoplasms** | | | | |
| Overall rate | 42/50 (84%) | 43/50 (86%) | 43/50 (86%) | 41/50 (82%) |
| Adjusted rate | 89.0% | 89.5% | 93.9% | 90.5% |
| Terminal rate | 30/32 (94%) | 29/32 (91%) | 36/36 (100%) | 29/32 (91%) |
| First incidence (days) | 587 | 449 | 543 | 466 |
| Poly-3 test | P=0.428 | P=0.612 | P=0.314 | P=0.553 |
| **All Organs: Malignant Neoplasms** | | | | |
| Overall rate | 28/50 (56%) | 30/50 (60%) | 26/50 (52%) | 22/50 (44%) |
| Adjusted rate | 59.2% | 60.4% | 56.8% | 49.2% |
| Terminal rate | 17/32 (53%) | 16/32 (50%) | 18/36 (50%) | 14/32 (44%) |
| First incidence (days) | 465 | 449 | 540 | 238 |
| Poly-3 test | P=0.162N | P=0.534 | P=0.496N | P=0.231N |
| **All Organs: Benign or Malignant Neoplasms** | | | | |
| Overall rate | 46/50 (92%) | 49/50 (98%) | 47/50 (94%) | 44/50 (88%) |
| Adjusted rate | 95.9% | 98.0% | 99.7% | 94.6% |
| Terminal rate | 31/32 (97%) | 31/32 (97%) | 36/36 (100%) | 30/32 (94%) |
| First incidence (days) | 465 | 449 | 540 | 238 |
| Poly-3 test | P=0.431N | P=0.499 | P=0.293 | P=0.587N |

(T)Terminal sacrifice
[a] Number of neoplasm-bearing animals/number of animals examined. Denominator is number of animals examined microscopically for liver, lung, pituitary gland, and uterus; for other tissues, denominator is number of animals necropsied.
[b] Poly-3 estimated neoplasm incidence after adjustment for intercurrent mortality
[c] Observed incidence at terminal kill
[d] Beneath the control incidence are the P values associated with the trend test. Beneath the exposed group incidence are the P values corresponding to pairwise comparisons between the controls and that exposed group. The Poly-3 test accounts for differential mortality in animals that do not reach terminal sacrifice. A negative trend or a lower incidence in an exposure group is indicated by **N**.
[e] Not applicable; no neoplasms in animal group

**TABLE D4**
**Historical Incidence of Liver Neoplasms in Untreated Female B6C3F$_1$ Mice**[a]

| Study | Incidence in Controls | | | |
|---|---|---|---|---|
| | Hepatocellular Adenoma | Hepatocellular Carcinoma | Hepatoblastoma | Hepatocellular Adenoma, Hepatocellular Carcinoma, or Hepatoblastoma |
| **Historical Incidence at TSI Mason Research Institute: Drinking Water Study** | | | | |
| Pyridine | 37/49 | 13/49 | 1/49 | 41/49 |
| **Overall Historical Incidence: Drinking Water Studies** | | | | |
| Total | 147/288 (51.0%) | 62/288 (21.5%) | 1/288 (0.3%) | 173/288 (60.1%) |
| Standard deviation | 19.5% | 13.6% | 0.9% | 21.9% |
| Range | 26%-74% | 8%-42% | 0%-2% | 32%-82% |

[a] Data as of 15 October 1997

**TABLE D5**
**Summary of the Incidence of Nonneoplastic Lesions in Female Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**[a]

| | 0 ppm | 250 ppm | 500 ppm | 1,000 ppm |
|---|---|---|---|---|
| **Disposition Summary** | | | | |
| Animals initially in study | 50 | 50 | 50 | 50 |
| Early deaths | | | | |
| Accidental deaths | 3 | | 1 | 2 |
| Moribund | 8 | 7 | 3 | 5 |
| Natural deaths | 7 | 11 | 10 | 11 |
| Survivors | | | | |
| Terminal sacrifice | 32 | 32 | 36 | 32 |
| Animals examined microscopically | 50 | 50 | 50 | 50 |
| **Alimentary System** | | | | |
| Gallbladder | (42) | (44) | (45) | (40) |
| Inflammation, acute | 1 (2%) | | | |
| Necrosis | | | | 1 (3%) |
| Intestine large, cecum | (44) | (46) | (48) | (49) |
| Lymphoid tissue, hyperplasia | | | 1 (2%) | |
| Serosa, inflammation, chronic active | | | 1 (2%) | |
| Intestine small, jejunum | (46) | (45) | (47) | (46) |
| Hyperplasia, lymphoid | | | | 1 (2%) |
| Peyer's patch, hyperplasia, lymphoid | 2 (4%) | 1 (2%) | 1 (2%) | 1 (2%) |
| Peyer's patch, inflammation, acute | | | | 1 (2%) |
| Serosa, inflammation, chronic active | 1 (2%) | | | |
| Intestine small, ileum | (46) | (44) | (45) | (45) |
| Serosa, inflammation, chronic active | | | 1 (2%) | |
| Liver | (50) | (50) | (50) | (50) |
| Amyloid deposition | 1 (2%) | | | |
| Angiectasis | 1 (2%) | 1 (2%) | | |
| Clear cell focus | 2 (4%) | 3 (6%) | 2 (4%) | 2 (4%) |
| Cyst | | 1 (2%) | 1 (2%) | |
| Eosinophilic focus | 29 (58%) | 24 (48%) | 29 (58%) | 31 (62%) |
| Fibrosis | | 1 (2%) | | |
| Hematopoietic cell proliferation | | 1 (2%) | 2 (4%) | |
| Infiltration cellular, polymorphonuclear | 1 (2%) | | | |
| Inflammation, chronic | 1 (2%) | 1 (2%) | | |
| Inflammation, suppurative | | | 1 (2%) | |
| Leukocytosis | 1 (2%) | | 1 (2%) | |
| Mixed cell focus | | 2 (4%) | | 1 (2%) |
| Necrosis | 1 (2%) | 3 (6%) | 1 (2%) | |
| Bile duct, hyperplasia | | | | 1 (2%) |
| Hepatocyte, vacuolization cytoplasmic | 1 (2%) | 1 (2%) | | |
| Hepatocyte, portal, vacuolization cytoplasmic | | | | 1 (2%) |
| Hepatocyte, centrilobular, vacuolization cytoplasmic | | | 1 (2%) | |
| Serosa, inflammation, chronic active | 1 (2%) | | 1 (2%) | |
| Mesentery | (20) | (19) | (16) | (12) |
| Inflammation, chronic active | | | 1 (6%) | |
| Fat, necrosis | 19 (95%) | 17 (89%) | 14 (88%) | 11 (92%) |
| Pancreas | (50) | (50) | (50) | (50) |
| Acinus, atrophy | 1 (2%) | 1 (2%) | | 3 (6%) |
| Acinus, hyperplasia | | | 1 (2%) | 1 (2%) |
| Duct, cyst | | 1 (2%) | | 2 (4%) |
| Serosa, inflammation, chronic active | | | | 1 (2%) |

[a] Number of animals examined microscopically at the site and the number of animals with lesion

**TABLE D5**
**Summary of the Incidence of Nonneoplastic Lesions in Female Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 250 ppm | 500 ppm | 1,000 ppm |
|---|---|---|---|---|
| **Alimentary System** (continued) | | | | |
| Stomach, forestomach | (50) | (50) | (50) | (50) |
| Hyperplasia, squamous | 3 (6%) | 2 (4%) | | |
| Inflammation, chronic | | | 1 (2%) | |
| Ulcer | 1 (2%) | 2 (4%) | 3 (6%) | |
| Stomach, glandular | (50) | (50) | (48) | (50) |
| Erosion | 5 (10%) | 2 (4%) | 2 (4%) | 2 (4%) |
| Mineralization | | 1 (2%) | | |
| Glands, hyperplasia | | 1 (2%) | | |
| Serosa, inflammation, chronic active | 1 (2%) | | | |
| **Cardiovascular System** | | | | |
| Heart | (50) | (50) | (50) | (50) |
| Angiectasis | 1 (2%) | | | |
| Cardiomyopathy | 5 (10%) | 2 (4%) | | 2 (4%) |
| Inflammation, acute | 1 (2%) | | | |
| Inflammation, chronic | | 1 (2%) | 1 (2%) | |
| Inflammation, chronic active | | | 1 (2%) | 1 (2%) |
| Mineralization | 1 (2%) | 1 (2%) | 2 (4%) | |
| Atrium, thrombosis | 1 (2%) | | 1 (2%) | |
| **Endocrine System** | | | | |
| Adrenal cortex | (50) | (50) | (50) | (50) |
| Angiectasis | 1 (2%) | 1 (2%) | | |
| Cyst | | | 1 (2%) | |
| Hyperplasia | | | | 1 (2%) |
| Capsule, hyperplasia | 48 (96%) | 50 (100%) | 49 (98%) | 48 (96%) |
| Adrenal medulla | (50) | (50) | (50) | (50) |
| Hyperplasia | | | | 2 (4%) |
| Islets, pancreatic | (50) | (50) | (50) | (50) |
| Hyperplasia | 28 (56%) | 30 (60%) | 30 (60%) | 31 (62%) |
| Hypertrophy | | | | 1 (2%) |
| Pituitary gland | (49) | (49) | (47) | (46) |
| Hemorrhage | 1 (2%) | | | |
| Pars distalis, angiectasis | 2 (4%) | 1 (2%) | 1 (2%) | 2 (4%) |
| Pars distalis, cyst | | 1 (2%) | | |
| Pars distalis, hemorrhage | | 1 (2%) | | |
| Pars distalis, hyperplasia | 5 (10%) | 3 (6%) | 8 (17%) | 10 (22%) |
| Pars intermedia, hemorrhage | 1 (2%) | | | |
| Thyroid gland | (50) | (50) | (50) | (50) |
| C-cell, hyperplasia | | 1 (2%) | | |
| Follicular cell, hyperplasia | 13 (26%) | 6 (12%) | 15 (30%) | 13 (26%) |
| **General Body System** | | | | |
| None | | | | |

**TABLE D5**
**Summary of the Incidence of Nonneoplastic Lesions in Female Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 250 ppm | 500 ppm | 1,000 ppm |
|---|---|---|---|---|
| **Genital System** | | | | |
| Clitoral gland | (50) | (49) | (48) | (49) |
| Cyst | 1 (2%) | | 1 (2%) | |
| Pigmentation | 2 (4%) | 1 (2%) | 3 (6%) | 1 (2%) |
| Ovary | (50) | (49) | (50) | (50) |
| Angiectasis | | 2 (4%) | | 2 (4%) |
| Cyst | 11 (22%) | 9 (18%) | 9 (18%) | 11 (22%) |
| Hemorrhage | 1 (2%) | 1 (2%) | 2 (4%) | |
| Inflammation, chronic active | 1 (2%) | | 1 (2%) | |
| Oviduct | (1) | | | |
| Cyst | 1 (100%) | | | |
| Uterus | (50) | (50) | (50) | (50) |
| Angiectasis | 1 (2%) | 1 (2%) | | 3 (6%) |
| Hemorrhage | 1 (2%) | | 1 (2%) | |
| Hyperplasia, cystic | 41 (82%) | 46 (92%) | 43 (86%) | 44 (88%) |
| Inflammation, acute | 1 (2%) | 1 (2%) | 1 (2%) | |
| Inflammation, chronic | 1 (2%) | | | |
| Vagina | | | (1) | |
| Fibrosis | | | 1 (100%) | |
| **Hematopoietic System** | | | | |
| Bone marrow | (50) | (50) | (50) | (50) |
| Angiectasis | | 1 (2%) | | |
| Depletion cellular | | 2 (4%) | | |
| Myelofibrosis | | | 1 (2%) | |
| Lymph node | (8) | (12) | (15) | (9) |
| Iliac, angiectasis | | | 2 (13%) | |
| Iliac, hemorrhage | | | | 1 (11%) |
| Iliac, hyperplasia, lymphoid | 2 (25%) | 2 (17%) | 2 (13%) | |
| Iliac, infiltration cellular, plasma cell | 1 (13%) | 1 (8%) | 1 (7%) | |
| Mediastinal, angiectasis | | | 1 (7%) | |
| Mediastinal, hemorrhage | 1 (13%) | | | |
| Mediastinal, inflammation, acute | 1 (13%) | | | |
| Mediastinal, pigmentation | | | | 1 (11%) |
| Renal, angiectasis | | 1 (8%) | | |
| Renal, ectasia | | 1 (8%) | | |
| Renal, hemorrhage | | | 1 (7%) | |
| Renal, hyperplasia, lymphoid | | | 4 (27%) | |
| Renal, infiltration cellular, plasma cell | | | 1 (7%) | |
| Lymph node, mandibular | (50) | (49) | (49) | (50) |
| Angiectasis | | 1 (2%) | | |
| Hyperplasia, lymphoid | 1 (2%) | 1 (2%) | 2 (4%) | 2 (4%) |
| Infiltration cellular, plasma cell | 1 (2%) | | 1 (2%) | 1 (2%) |
| Infiltration cellular, histiocyte | | | 1 (2%) | |
| Lymph node, mesenteric | (49) | (48) | (47) | (49) |
| Angiectasis | 1 (2%) | 2 (4%) | 3 (6%) | 1 (2%) |
| Ectasia | | 1 (2%) | 1 (2%) | |
| Fibrosis | 1 (2%) | | | |
| Hemorrhage | | | 1 (2%) | 1 (2%) |
| Hyperplasia, lymphoid | | 1 (2%) | | 1 (2%) |
| Infiltration cellular, plasma cell | | | 1 (2%) | |
| Inflammation, acute | 1 (2%) | | | |
| Inflammation, granulomatous | | | | 1 (2%) |

**TABLE D5**
**Summary of the Incidence of Nonneoplastic Lesions in Female Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 250 ppm | 500 ppm | 1,000 ppm |
|---|---|---|---|---|
| **Hematopoietic System** (continued) | | | | |
| Spleen | (49) | (50) | (50) | (50) |
| Congestion | | 1 (2%) | | |
| Hematopoietic cell proliferation | 13 (27%) | 9 (18%) | 16 (32%) | 11 (22%) |
| Hyperplasia, lymphoid | | 3 (6%) | 1 (2%) | |
| Infiltration cellular, histiocyte | | | | 1 (2%) |
| Metaplasia, osseous | 1 (2%) | | | 1 (2%) |
| Pigmentation | 1 (2%) | | | |
| **Integumentary System** | | | | |
| Skin | (50) | (50) | (50) | (50) |
| Ulcer | 1 (2%) | 1 (2%) | | 1 (2%) |
| Subcutaneous tissue, inflammation, acute | 1 (2%) | | | 1 (2%) |
| Subcutaneous tissue, inflammation, chronic | | 1 (2%) | | 1 (2%) |
| **Musculoskeletal System** | | | | |
| Bone | (50) | (50) | (50) | (50) |
| Fibrous osteodystrophy | 8 (16%) | 6 (12%) | 5 (10%) | 4 (8%) |
| Hyperplasia | | | 2 (4%) | |
| Skeletal muscle | | (1) | | (2) |
| Inflammation, chronic | | 1 (100%) | | |
| **Nervous System** | | | | |
| Brain | (50) | (49) | (50) | (50) |
| Demyelination | 1 (2%) | | | 1 (2%) |
| Hemorrhage | 1 (2%) | | | 1 (2%) |
| Thalamus, mineralization | 22 (44%) | 27 (55%) | 22 (44%) | 22 (44%) |
| Peripheral nerve | (2) | | | |
| Demyelination | 1 (50%) | | | |
| Spinal cord | (2) | | (1) | |
| Cyst epithelial inclusion | | | 1 (100%) | |
| **Respiratory System** | | | | |
| Lung | (50) | (50) | (50) | (50) |
| Hemorrhage | 4 (8%) | 3 (6%) | 6 (12%) | 3 (6%) |
| Infiltration cellular, lymphocyte | | | 1 (2%) | |
| Infiltration cellular, histiocyte | 4 (8%) | 2 (4%) | 2 (4%) | 4 (8%) |
| Inflammation, acute | 1 (2%) | | | |
| Inflammation, chronic | 1 (2%) | | | 1 (2%) |
| Thrombosis | 1 (2%) | | 1 (2%) | 1 (2%) |
| Alveolar epithelium, hyperplasia | | 1 (2%) | | 1 (2%) |
| Nose | (50) | (50) | (50) | (50) |
| Hemorrhage | | | | 1 (2%) |
| Inflammation, acute | | | | 1 (2%) |

**TABLE D5**
**Summary of the Incidence of Nonneoplastic Lesions in Female Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 250 ppm | 500 ppm | 1,000 ppm |
|---|---|---|---|---|
| **Special Senses System** | | | | |
| Ear | | | | (1) |
| External ear, inflammation, chronic | | | | 1 (100%) |
| Eye | | | | (3) |
| Atrophy | | | | 1 (33%) |
| Inflammation, acute | | | | 1 (33%) |
| Cornea, inflammation, acute | | | | 1 (33%) |
| Cornea, necrosis | | | | 1 (33%) |
| **Urinary System** | | | | |
| Kidney | (50) | (50) | (50) | (50) |
| Cyst | 1 (2%) | | 1 (2%) | |
| Hydronephrosis | 1 (2%) | | 3 (6%) | 1 (2%) |
| Inflammation, acute | 1 (2%) | | | |
| Inflammation, chronic | 1 (2%) | | 1 (2%) | |
| Metaplasia, osseous | 2 (4%) | | 1 (2%) | 1 (2%) |
| Mineralization | 1 (2%) | 1 (2%) | | 1 (2%) |
| Nephropathy, acute | | 1 (2%) | | |
| Nephropathy, chronic | 16 (32%) | 6 (12%) | 9 (18%) | 11 (22%) |
| Pigmentation | 1 (2%) | | | |
| Renal tubule, accumulation, hyaline droplet | 3 (6%) | 3 (6%) | 1 (2%) | |
| Renal tubule, dilatation | | | | 1 (2%) |
| Urinary bladder | (48) | (49) | (48) | (49) |
| Inflammation, acute | | | 1 (2%) | |

# APPENDIX E
# GENETIC TOXICOLOGY

# GENETIC TOXICOLOGY

## *SALMONELLA TYPHIMURIUM* MUTAGENICITY TEST PROTOCOL

Testing was performed as reported by Zeiger *et al*. (1987). 1-Chloro-2-propanol was sent to the laboratory as a coded aliquot from Radian Corporation (Austin, TX). It was incubated with the *Salmonella typhimurium* tester strains TA97, TA98, TA100, TA1535, and TA1537 either in buffer or S9 mix (metabolic activation enzymes and cofactors from Aroclor 1254-induced male Sprague-Dawley rat or Syrian hamster liver) for 20 minutes at 37° C. Top agar supplemented with L-histidine and d-biotin was added, and the contents of the tubes were mixed and poured onto the surfaces of minimal glucose agar plates. Histidine-independent mutant colonies arising on these plates were counted following incubation for 2 days at 37° C.

Each trial consisted of triplicate plates of concurrent positive and negative controls and five doses of 1-chloro-2-propanol. In the absence of toxicity, 10,000 µg/plate was selected as the high dose. All positive trials were repeated under the conditions that elicited the positive response.

In this assay, a positive response is defined as a reproducible, dose-related increase in histidine-independent (revertant) colonies in any one strain/activation combination. An equivocal response is defined as an increase in revertants that is not dose related, is not reproducible, or is not of sufficient magnitude to support a determination of mutagenicity. A negative response is obtained when no increase in revertant colonies is observed following chemical treatment. There is no minimum percentage or fold increase required for a chemical to be judged positive or weakly positive.

## CHINESE HAMSTER OVARY CELL CYTOGENETICS PROTOCOLS

Testing was performed as reported by Galloway *et al*. (1987). 1-Chloro-2-propanol was sent to the laboratory as a coded aliquot by Radian Corporation. It was tested in cultured Chinese hamster ovary (CHO) cells for induction of sister chromatid exchanges (SCEs) and chromosomal aberrations (Abs), both in the presence and absence of Aroclor 1254-induced male Sprague-Dawley rat liver S9 and cofactor mix. Cultures were handled under gold lights to prevent photolysis of bromodeoxyuridine-substituted DNA. Each test consisted of concurrent solvent and positive controls and of three doses of 1-chloro-2-propanol; the high dose was limited to 5,000 µg/mL. A single flask per dose was used.

***Sister Chromatid Exchange Test:*** In the SCE test without S9, CHO cells were incubated for 25.5 hours with 1-chloro-2-propanol in supplemental McCoy's 5A medium. Bromodeoxyuridine (BrdU) was added 2 hours after culture initiation. After 25.5 hours, the medium containing 1-chloro-2-propanol was removed and replaced with fresh medium plus BrdU and Colcemid, and incubation was continued for 2 hours. Cells were then harvested by mitotic shake-off, fixed, and stained with Hoechst 33258 and Giemsa. In the SCE test with S9, cells were incubated with 1-chloro-2-propanol, serum-free medium, and S9 for 2 hours. The medium was then removed and replaced with medium containing serum and BrdU and no 1-chloro-2-propanol. Incubation proceeded for an additional 25.5 hours, with Colcemid present for the final 2 hours. Harvesting and staining were the same as for cells treated without S9. All slides were scored blind and those from a single test were read by the same person. Up to 50 second-division metaphase cells were scored for frequency of SCEs/cell from each dose level. Because significant chemical-induced cell cycle delay was seen with and without S9 at 1,700 µg/mL and greater, incubation time was lengthened to ensure a sufficient number of scorable (second-division metaphase) cells.

Statistical analyses were conducted on the slopes of the dose-response curves and the individual dose points (Galloway *et al.*, 1987). An SCE frequency 20% above the concurrent solvent control value was chosen as a statistically conservative positive response. The probability of this level of difference occurring by chance at one dose point is less than 0.01; the probability for such a chance occurrence at two dose points is less than

0.001. An increase of 20% or greater at any single dose was considered weak evidence of activity; increases at two or more doses resulted in a determination that the trial was positive. A statistically significant trend ($P < 0.005$) in the absence of any responses reaching 20% above background led to a call of equivocal.

***Chromosomal Aberrations Test:*** In the Abs test without S9, cells were incubated in McCoy's 5A medium with 1-chloro-2-propanol for 18.5 hours; Colcemid was added and incubation continued for 2 hours. The cells were then harvested by mitotic shake-off, fixed, and stained with Giemsa. For the Abs test with S9, cells were treated with 1-chloro-2-propanol and S9 for 2 hours, after which the treatment medium was removed and the cells were incubated for 18.5 hours in fresh medium, with Colcemid present for the final 2 hours. Cells were harvested in the same manner as for the treatment without S9. The harvest time for the Abs test was based on the cell cycle information obtained in the SCE test: because cell cycle delay was anticipated, the incubation period was extended from the normal duration of approximately 12 hours.

Cells were selected for scoring on the basis of good morphology and completeness of karyotype ($21 \pm 2$ chromosomes). All slides were scored blind and those from a single test were read by the same person. Twenty or fifty first-division metaphase cells were scored at each concentration. Normally 200 cells are scored, but due to the high percentage of aberrant cells observed after treatment with 1-chloro-2-propanol, few metaphase cells were scored. Classes of aberrations included simple (breaks and terminal deletions), complex (rearrangements and translocations), and other (pulverized cells, despiralized chromosomes, and cells containing 10 or more aberrations).

Chromosomal aberration data are presented as percentage of cells with aberrations. To arrive at a statistical call for a trial, analyses were conducted on both the dose response curve and individual dose points. For a single trial, a statistically significant ($P \leq 0.05$) difference for one dose point and a significant trend ($P \leq 0.015$) were considered weak evidence for a positive response; significant differences for two or more doses indicated the trial was positive. A positive trend test in the absence of a statistically significant increase at any one dose resulted in an equivocal call (Galloway *et al.*, 1987). Ultimately, the trial calls were based on a consideration of the statistical analyses as well as the biological information available to the reviewers.

## *DROSOPHILA MELANOGASTER* TEST PROTOCOLS

The assays for induction of sex-linked recessive lethal (SLRL) mutations and chromosomal reciprocal translocations (RTs) were performed with adult flies as described by Foureman *et al.* (1994). 1-Chloro-2-propanol was supplied as a coded aliquot by Radian Corporation.

***Sex-Linked Recessive Lethal Mutation Test:*** 1-Chloro-2-propanol was assayed in the SLRL test by feeding for 3 days to adult Canton-S wild-type males no more than 24 hours old at the beginning of treatment. Because no response was obtained, 1-chloro-2-propanol was retested by injection into adult males.

To administer 1-chloro-2-propanol by injection, a glass Pasteur pipette was drawn out in a flame to a microfine filament, and the tip was broken off to allow delivery of the test solution. Injection was performed either manually, by attaching a rubber bulb to the other end of the pipette and forcing through sufficient solution (0.2 to 0.3 µL) to slightly distend the abdomen of the fly, or by attaching the pipette to a microinjector that automatically delivered a calibrated volume. Flies were anesthetized with ether and immobilized on a strip of tape. Injection into the thorax, under the wing, was performed with the aid of a dissecting microscope.

Toxicity tests were performed to set concentrations of 1-chloro-2-propanol at a level that would induce 30% mortality after 72 hours of feeding or 24 hours after injection, while keeping induced sterility at an acceptable level. Canton-S males were allowed to feed for 72 hours on a solution of 1-chloro-2-propanol in 5% sucrose. In the injection experiments, 24- to 72-hour old Canton-S males were treated with a solution of

1-chloro-2-propanol dissolved in saline and allowed to recover for 24 hours. A concurrent saline control group was also included. Treated males were mated to three *Basc* females for 3 days and were given fresh females at 2-day intervals to produce three matings of 3, 2, and 2 days (in each case, sample sperm from successive matings was treated at successively earlier postmeiotic stages). $F_1$ heterozygous females were mated with their siblings and then placed in individual vials. $F_1$ daughters from the same parental male were kept together to identify clusters. (A cluster occurs when a number of mutants from a given male result from a single spontaneous premeiotic mutation event and is identified when the number of mutants from that male exceeds the number predicted by a Poisson distribution.) If a cluster was identified, all data from the male in question were discarded. Presumptive lethal mutations were identified as vials containing fewer than 5% of the expected number of wild-type males after 17 days; these were retested to confirm the response.

SLRL data were analyzed by simultaneous comparison with the concurrent and historical controls (Mason *et al.*, 1992) using a normal approximation to the binomial test (Margolin *et al.*, 1983). A test result was considered positive if the P value was less than or equal to 0.01 and the mutation frequency in the tested group was greater than 0.10% or if the P value was less than or equal to 0.05 and the frequency in the treatment group was greater than 0.15%. A test was considered to be inconclusive if the P value was between 0.05 and 0.01 but the frequency in the treatment group was between 0.10% and 0.15% or if the P value was between 0.10 and 0.05 but the frequency in the treatment group was greater than 0.10%. A test was considered negative if the P value was greater than or equal to 0.10 or if the frequency in the treatment group was less than 0.10%.

***Reciprocal Translocation Test:*** Because the injection route produced a positive result in the SLRL test, 1-chloro-2-propanol was assayed for induction of RTs using the same method of exposure. The treatment regimen was essentially the same as that for the SLRL test, except that Canton-S males were mated *en masse* to marker (*bw;st*) females. The females were transferred to fresh medium every 3 to 4 days for a period of about 3 weeks to produce a total of six broods. The results of the SLRL test were used to determine the germ cell stages most likely to be affected by 1-chloro-2-propanol. $F_1$ heterozygous males were backcrossed individually to *bw;st* females, and the $F_2$ progeny were screened for pseudolinkage, which results from the induction of a translocation in a germ cell of the parental male. Flies suspected of carrying RTs were retested to confirm the findings. The translocation data were compared to the concurrent and historical controls, and significance was analyzed according to the conditional binomial response of Kastenbaum and Bowman (1970).

## MOUSE PERIPHERAL BLOOD MICRONUCLEUS TEST PROTOCOL

A detailed discussion of this assay is presented in MacGregor *et al.* (1990). At the end of the 14-week toxicity study, peripheral blood samples were obtained from male and female mice. Smears were immediately prepared and fixed in absolute methanol. The methanol-fixed slides were stained with a chromatin-specific fluorescent dye mixture of Hoechst 33258/pyronin Y (MacGregor *et al.*, 1983) and coded. Slides were scanned to determine the frequency of micronuclei in 2,000 polychromatic erythrocytes (PCEs) and 10,000 normochromatic erythrocytes (NCEs) in each of 10 animals per exposure group.

Log transformation of the NCE data, testing for normality by the Shapiro-Wilk test, and testing for heterogeneity of variance by Cochran's test were performed before statistical analyses. The frequency of micronucleated cells among NCEs was determined by analysis of variance with the SAS GLM procedure. The NCE data for each exposure group were compared with the concurrent solvent control by Student's *t*-test. The frequency of micronucleated cells among PCEs was analyzed by the Cochran-Armitage trend test, and individual exposure groups were compared to the concurrent solvent control by Kastenbaum-Bowman's binomial test. The percentage of PCEs among total erythrocytes was determined by an analysis of variance on ranks (classed by sex), and individual exposure groups were compared with the concurrent solvent control with a *t*-test on ranks.

## RESULTS

1-Chloro-2-propanol is genotoxic *in vitro*. It was tested for mutation induction in *Salmonella typhimurium* in three studies at two laboratories, and all test responses were similar (Table E1; Zeiger *et al.*, 1987). In strain TA100, equivocal responses were obtained in the absence of S9; with S9, equivocal or weakly positive mutagenic activity was seen. Clearly positive, reproducible responses were seen across studies with strain TA1535, with and without S9. No mutagenic activity was detected with strain TA97, TA98, or TA1537, with or without S9.

1-Chloro-2-propanol induced marked increases in SCEs (Table E2) and Abs (Table E3) in cultured CHO cells, with and without S9. Cell cycle delay was induced in cultures treated with concentrations of 1,700 µg/mL 1-chloro-2-propanol and greater; to obtain sufficient cells for scoring, incubation time was extended to up to 34 hours in the SCE test. Experimental design normally calls for no more than 33 hours of exposure to BrdU, but, because increases in SCE frequencies were also seen at standard harvest times, in the absence of S9, the delayed harvest results were accepted as confirmatory of the results seen in Trial 1. In the SCE test with S9, the only concentration that produced a significant increase in SCEs was the 1,700 µg/mL dose, which employed a culture time of 33.5 hours. However, because the response was so strong, it was accepted that even if BrdU exposure contributed to some extent to the induction of SCEs, much of the increase was due to exposure to 1-chloro-2-propanol. This trial was not repeated because it was apparent from the combined results of the three trials that 1-chloro-2-propanol induced SCEs in cultured CHO cells. In the cultured CHO cell Abs test with 1-chloro-2-propanol, fewer than the usual 200 cells per concentration were scored because a marked increase in aberrations as well as in the percentage of cells with aberrations were observed.

The chromosomal effects seen *in vitro* were not apparent in the *in vivo* studies, but induction of gene mutations was observed. Positive results were obtained in the *Drosophila melanogaster* test for induction of SLRL mutations in germ cells of male flies administered 1-chloro-2-propanol via injection (Table E4; Foureman *et al.*, 1994). However, a subsequent test for induction of reciprocal chromosomal translocations in germ cells of male *D. melanogaster* yielded negative results (Table E5; Foureman *et al.*, 1994). Additional negative results were obtained for chromosomal effects in mice. No increase in the frequency of micronucleated erythrocytes was observed in peripheral blood of male or female mice administered 1-chloro-2-propanol in drinking water for 14 weeks (Table E6).

**TABLE E1**
**Mutagenicity of 1-Chloro-2-propanol in *Salmonella typhimurium*[a]**

| Strain | Dose (µg/plate) | Revertants/plate[b] S9 Trial 1 | S9 Trial 2 | +10% hamster S9 Trial 1 | +10% hamster S9 Trial 2 | +10% rat S9 Trial 1 | +10% rat S9 Trial 2 |
|---|---|---|---|---|---|---|---|
| **Study 1 Performed at SRI International** | | | | | | | |
| **TA100** | 0 | 119 ± 3.8 | 120 ± 4.4 | 129 ± 3.8 | 128 ± 5.9 | 133 ± 4.8 | 136 ± 4.9 |
| | 100 | 120 ± 7.8 | | 144 ± 10.1 | | 131 ± 3.2 | |
| | 333 | 117 ± 4.7 | 147 ± 7.1 | 143 ± 11.4 | 124 ± 3.8 | 126 ± 5.9 | 146 ± 7.8 |
| | 1,000 | 116 ± 3.5 | | 142 ± 2.4 | 129 ± 6.2 | 136 ± 3.1 | 138 ± 13.7 |
| | 1,666 | | 153 ± 4.3 | | | | |
| | 3,333 | 144 ± 21.7 | 147 ± 2.8 | 133 ± 4.4 | 158 ± 4.7 | 162 ± 13.0 | 161 ± 8.7 |
| | 6,666 | | 160 ± 6.0 | | 195 ± 11.8 | | 200 ± 5.2 |
| | 10,000 | 188 ± 4.9 | 172 ± 10.4 | 151 ± 2.3 | 201 ± 11.7 | 197 ± 7.4 | 227 ± 9.3 |
| Trial summary | | Equivocal | Equivocal | Negative | Weakly positive | Equivocal | Weakly positive |
| Positive control[c] | | 229 ± 34.4 | 274 ± 6.4 | 790 ± 67.8 | 718 ± 68.9 | 326 ± 7.6 | 352 ± 26.3 |
| **TA1535** | 0 | 14 ± 2.3 | 19 ± 3.8 | 9 ± 2.3 | 10 ± 2.7 | 8 ± 2.0 | 9 ± 2.6 |
| | 100 | 21 ± 5.2 | | 12 ± 1.7 | | 11 ± 1.5 | |
| | 333 | 17 ± 2.3 | 30 ± 3.4 | 7 ± 2.8 | 12 ± 1.8 | 7 ± 0.9 | 14 ± 2.9 |
| | 1,000 | 18 ± 5.8 | | 16 ± 0.6 | 21 ± 1.5 | 16 ± 1.3 | 22 ± 2.2 |
| | 1,666 | | 54 ± 6.0 | | | | |
| | 3,333 | 29 ± 0.9 | 69 ± 6.3 | 26 ± 5.5 | 37 ± 4.4 | 21 ± 3.2 | 60 ± 6.2 |
| | 6,666 | | 93 ± 5.2 | | 78 ± 2.2 | | 73 ± 8.5 |
| | 10,000 | 58 ± 9.7 | 122 ± 4.6 | 41 ± 1.8 | 108 ± 4.2 | 47 ± 5.2 | 112 ± 9.0 |
| Trial summary | | Positive | Positive | Positive | Positive | Positive | Positive |
| Positive control | | 134 ± 10.7 | 236 ± 12.4 | 161 ± 9.0 | 216 ± 9.7 | 152 ± 4.3 | 172 ± 8.7 |
| **TA1537** | 0 | 5 ± 1.2 | | 7 ± 1.2 | | 4 ± 1.0 | |
| | 100 | 5 ± 0.6 | | 4 ± 0.9 | | 6 ± 0.7 | |
| | 333 | 5 ± 1.5 | | 4 ± 0.9 | | 5 ± 0.9 | |
| | 1,000 | 6 ± 1.3 | | 3 ± 0.9 | | 6 ± 1.7 | |
| | 3,333 | 7 ± 2.6 | | 5 ± 0.6 | | 5 ± 0.3 | |
| | 10,000 | 5 ± 0.7 | | 3 ± 1.2 | | 3 ± 0.3 | |
| Trial summary | | Negative | | Negative | | Negative | |
| Positive control | | 143 ± 13.3 | | 253 ± 40.8 | | 160 ± 10.6 | |
| **TA98** | 0 | 17 ± 2.4 | | 25 ± 3.0 | | 17 ± 1.7 | |
| | 100 | 15 ± 3.5 | | 33 ± 4.8 | | 30 ± 7.1 | |
| | 333 | 16 ± 1.2 | | 24 ± 3.8 | | 30 ± 5.2 | |
| | 1,000 | 13 ± 2.3 | | 26 ± 3.5 | | 31 ± 3.2 | |
| | 3,333 | 20 ± 2.7 | | 19 ± 1.2 | | 22 ± 2.3 | |
| | 10,000 | 14 ± 3.5 | | 20 ± 5.2 | | 25 ± 2.2 | |
| Trial summary | | Negative | | Negative | | Negative | |
| Positive control | | 913 ± 42.2 | | 620 ± 90.5 | | 255 ± 12.2 | |

**TABLE E1**
**Mutagenicity of 1-Chloro-2-propanol in *Salmonella typhimurium***

| Strain | Dose (µg/plate) | Revertants/plate | | | | | |
|---|---|---|---|---|---|---|---|
| | | S9 | | +10% hamster S9 | | +10% rat S9 | |
| | | Trial 1 | Trial 2 | Trial 1 | Trial 2 | Trial 1 | Trial 2 |
| **Study 2 Performed at SRI International** | | | | | | | |
| **TA100** | 0 | 127 ± 7.5 | | 153 ± 3.5 | | 124 ± 14.5 | |
| | 100 | 135 ± 16.5 | | 135 ± 12.4 | | 134 ± 6.7 | |
| | 333 | 131 ± 8.3 | | 136 ± 8.1 | | 123 ± 3.3 | |
| | 1,000 | 127 ± 5.9 | | 144 ± 14.1 | | 132 ± 4.6 | |
| | 3,333 | 130 ± 1.3 | | 161 ± 10.4 | | 148 ± 5.0 | |
| | 10,000 | 149 ± 10.7 | | 159 ± 15.8 | | 177 ± 5.5 | |
| Trial summary | | Negative | | Negative | | Equivocal | |
| Positive control | | 444 ± 11.0 | | 875 ± 68.8 | | 719 ± 59.3 | |
| **TA1535** | 0 | 20 ± 1.5 | 34 ± 0.7 | 13 ± 2.4 | 11 ± 2.2 | 15 ± 2.2 | 13 ± 3.2 |
| | 100 | 30 ± 3.3 | | 10 ± 2.1 | | 9 ± 1.2 | |
| | 333 | 37 ± 2.4 | 29 ± 2.8 | 11 ± 0.9 | 11 ± 3.0 | 10 ± 4.3 | 11 ± 1.8 |
| | 1,000 | 39 ± 2.7 | 29 ± 0.3 | 14 ± 0.9 | 16 ± 2.6 | 13 ± 1.0 | 13 ± 1.0 |
| | 3,333 | 37 ± 0.6 | 34 ± 2.4 | 27 ± 2.3 | 40 ± 6.4 | 17 ± 1.7 | 21 ± 2.0 |
| | 6,666 | | 49 ± 5.0 | | 53 ± 0.9 | | 42 ± 5.5 |
| | 10,000 | 64 ± 2.5 | 67 ± 15.0 | 39 ± 4.7 | 55 ± 1.2 | 48 ± 1.7 | 52 ± 1.5 |
| Trial summary | | Weakly positive | Equivocal | Positive | Positive | Equivocal | Positive |
| Positive control | | 344 ± 18.5 | 347 ± 43.9 | 331 ± 11.7 | 134 ± 10.1 | 217 ± 1.3 | 89 ± 4.0 |
| **TA97** | 0 | 152 ± 22.8 | | 179 ± 16.9 | | 206 ± 4.4 | |
| | 100 | 151 ± 15.5 | | 186 ± 18.0 | | 199 ± 7.8 | |
| | 333 | 142 ± 14.7 | | 196 ± 4.5 | | 191 ± 12.2 | |
| | 1,000 | 139 ± 5.5 | | 178 ± 17.9 | | 209 ± 5.5 | |
| | 3,333 | 148 ± 10.1 | | 69 ± 24.0 | | 214 ± 15.5 | |
| | 10,000 | 156 ± 4.5 | | 0 ± 0.0[d] | | 175 ± 20.0 | |
| Trial summary | | Negative | | Negative | | Negative | |
| Positive control | | 479 ± 28.3 | | 628 ± 35.9 | | 589 ± 27.5 | |
| **TA98** | 0 | 24 ± 3.8 | | 32 ± 3.6 | | 41 ± 4.9 | |
| | 100 | 14 ± 1.5 | | 29 ± 1.7 | | 28 ± 4.9 | |
| | 333 | 25 ± 3.8 | | 25 ± 0.9 | | 34 ± 3.4 | |
| | 1,000 | 22 ± 2.3 | | 29 ± 4.9 | | 28 ± 2.5 | |
| | 3,333 | 22 ± 1.0 | | 26 ± 1.5 | | 24 ± 1.2 | |
| | 10,000 | 17 ± 1.2 | | 18 ± 2.0 | | 27 ± 0.6 | |
| Trial summary | | Negative | | Negative | | Negative | |
| Positive control | | 746 ± 39.0 | | 577 ± 51.1 | | 424 ± 11.4 | |

**TABLE E1**
**Mutagenicity of 1-Chloro-2-propanol in *Salmonella typhimurium***

| Strain | Dose (µg/plate) | Revertants/plate | | | | | |
|---|---|---|---|---|---|---|---|
| | | S9 | | +10% hamster S9 | | +10% rat S9 | |
| | | Trial 1 | Trial 2 | Trial 1 | Trial 2 | Trial 1 | Trial 2 |
| **Study 3 Performed at Microbiological Associates, Inc.** | | | | | | | |
| **TA100** | 0 | 89 ± 7.3 | 115 ± 8.0 | 85 ± 7.3 | 112 ± 14.9 | 93 ± 2.4 | 93 ± 5.5 |
| | 100 | 100 ± 5.3 | 97 ± 4.1 | 90 ± 0.7 | 94 ± 8.8 | 94 ± 7.9 | 101 ± 5.1 |
| | 333 | 102 ± 4.1 | 113 ± 5.3 | 104 ± 6.4 | 127 ± 6.4 | 101 ± 4.0 | 104 ± 2.5 |
| | 1,000 | 98 ± 3.2 | 106 ± 3.3 | 93 ± 4.3 | 122 ± 2.6 | 85 ± 1.9 | 122 ± 7.7 |
| | 3,333 | 111 ± 3.5 | 141 ± 8.4 | 112 ± 4.3 | 156 ± 6.1 | 120 ± 6.2 | 149 ± 13.4 |
| | 6,667 | | | 128 ± 5.0 | | 151 ± 4.7 | 176 ± 5.9 |
| | 10,000 | 194 ± 0.7 | 195 ± 6.4 | | 163 ± 7.6 | | |
| Trial summary | | Equivocal | Equivocal | Equivocal | Equivocal | Equivocal | Weakly positive |
| Positive control | | 343 ± 19.5 | 329 ± 7.3 | 721 ± 11.4 | 363 ± 20.8 | 452 ± 20.0 | 466 ± 47.8 |
| **TA1535** | 0 | 18 ± 0.3 | 17 ± 2.2 | 13 ± 2.2 | 9 ± 1.0 | 7 ± 1.5 | 6 ± 0.3 |
| | 100 | 19 ± 1.9 | 21 ± 3.5 | 10 ± 1.2 | 15 ± 4.0 | 10 ± 1.9 | 10 ± 2.1 |
| | 333 | 21 ± 2.0 | 25 ± 3.8 | 14 ± 3.2 | 19 ± 0.9 | 10 ± 0.6 | 13 ± 1.5 |
| | 1,000 | 29 ± 3.7 | 25 ± 1.3 | 22 ± 3.0 | 23 ± 1.8 | 22 ± 1.5 | 21 ± 1.7 |
| | 3,333 | 51 ± 2.9 | 62 ± 3.5 | 51 ± 1.2 | 67 ± 3.5 | 50 ± 2.2 | 44 ± 3.5 |
| | 6,667 | | | 67 ± 3.2 | 110 ± 2.8 | 83 ± 3.5 | 65 ± 2.1 |
| | 10,000 | 92 ± 2.3 | 125 ± 10.8 | | | | |
| Trial summary | | Positive | Positive | Positive | Positive | Positive | Positive |
| Positive control | | 199 ± 11.4 | 171 ± 16.5 | 79 ± 7.0 | 69 ± 11.8 | 116 ± 8.1 | 124 ± 2.0 |
| **TA97** | 0 | 102 ± 9.2 | | 135 ± 4.2 | | 102 ± 7.8 | |
| | 100 | 85 ± 12.1 | | 108 ± 8.1 | | 130 ± 7.2 | |
| | 333 | 71 ± 9.8 | | 97 ± 8.5 | | 104 ± 3.5 | |
| | 1,000 | 76 ± 1.0 | | 68 ± 4.2 | | 79 ± 9.2 | |
| | 3,333 | 81 ± 11.3 | | 97 ± 4.1 | | 111 ± 10.0 | |
| | 6,667 | | | 17 ± 4.3 | | 104 ± 9.3 | |
| | 10,000 | 102 ± 0.6 | | | | | |
| Trial summary | | Negative | | Negative | | Negative | |
| Positive control | | 276 ± 16.2 | | 783 ± 65.7 | | 848 ± 48.6 | |
| **TA98** | 0 | 18 ± 2.0 | | 22 ± 4.4 | | 27 ± 3.2 | |
| | 100 | 14 ± 4.3 | | 26 ± 0.6 | | 21 ± 2.2 | |
| | 333 | 19 ± 2.0 | | 28 ± 0.0 | | 21 ± 3.9 | |
| | 1,000 | 18 ± 4.5 | | 17 ± 0.3 | | 21 ± 0.9 | |
| | 3,333 | 20 ± 1.8 | | 17 ± 2.6 | | 20 ± 4.1 | |
| | 6,667 | | | 14 ± 1.5 | | 27 ± 1.2 | |
| | 10,000 | 16 ± 0.9 | | | | | |
| Trial summary | | Negative | | Negative | | Negative | |
| Positive control | | 117 ± 0.9 | | 115 ± 5.9 | | 157 ± 10.1 | |

[a] The detailed protocol and these data are presented in Zeiger *et al*. (1987). 0 µg/plate was the solvent control.
[b] Revertants are presented as mean ± standard error from three plates.
[c] The positive controls in the absence of metabolic activation were sodium azide (TA100 and TA1535), 9-aminoacridine (TA97 and TA1537), and 4-nitro-*o*-phenylenediamine (TA98). The positive control for metabolic activation with all strains was 2-aminoanthracene.
[d] Slight toxicity

**TABLE E2**
**Induction of Sister Chromatid Exchanges in Chinese Hamster Ovary Cells by 1-Chloro-2-propanol**[a]

| Compound | Concentration (µg/mL) | Total Cells Scored | No. of Chromo-somes | No. of SCEs | SCEs/ Chromo-some | SCEs/ Cell | Hrs in BrdU | Relative Change of SCEs/ Chromosome[b] (%) |
|---|---|---|---|---|---|---|---|---|
| **S9** | | | | | | | | |
| **Trial 1** | | | | | | | | |
| Summary: Positive | | | | | | | | |
| Medium[c] | | 50 | 1,025 | 366 | 0.35 | 7.3 | 25.5 | |
| Mitomycin-C[d] | 0.001 | 50 | 1,035 | 637 | 0.61 | 12.7 | 25.5 | 72.36 |
| | 0.01 | 5 | 104 | 236 | 2.26 | 47.2 | 25.5 | 535.51 |
| 1-Chloro-2-propanol | 167 | 50 | 1,051 | 506 | 0.48 | 10.1 | 25.5 | 34.83* |
| | 500 | 25 | 517 | 543 | 1.05 | 21.7 | 25.5 | 194.14* |
| | 1,700 | 25 | 527 | 675 | 1.28 | 27.0 | 33.5 | 258.71* |
| | | | | | P≤0.000[e] | | | |
| **Trial 2** | | | | | | | | |
| Summary: Positive | | | | | | | | |
| Medium | | 50 | 1,052 | 357 | 0.33 | 7.1 | 26.0 | |
| Mitomycin-C | 0.001 | 50 | 1,050 | 599 | 0.57 | 12.0 | 26.0 | 68.11 |
| | 0.01 | 5 | 105 | 223 | 2.12 | 44.6 | 26.0 | 525.84 |
| 1-Chloro-2-propanol | 1,700 | 10 | 211 | 309 | 1.46 | 30.9 | 34.0 | 331.55* |
| | 3,000 | 5 | 105 | 175 | 1.66 | 35.0 | 34.0 | 391.13* |
| | 4,000 | 5 | 106 | 185 | 1.74 | 37.0 | 34.0 | 414.30* |
| | | | | | P≤0.000 | | | |
| **+S9** | | | | | | | | |
| Summary: Positive | | | | | | | | |
| Medium | | 50 | 1,039 | 398 | 0.38 | 8.0 | 25.5 | |
| Cyclophosphamide[d] | 0.4 | 50 | 1,046 | 626 | 0.59 | 12.5 | 25.5 | 56.23 |
| | 2 | 5 | 105 | 218 | 2.07 | 43.6 | 25.5 | 442.00 |
| 1-Chloro-2-propanol | 167 | 50 | 1,046 | 373 | 0.35 | 7.5 | 25.5 | –6.91 |
| | 500 | 50 | 1,041 | 431 | 0.41 | 8.6 | 25.5 | 8.08 |
| | 1,700 | 50 | 1,041 | 664 | 0.63 | 13.3 | 33.5 | 66.51* |
| | | | | | P≤0.000 | | | |

* Positive response ( 20% increase over solvent control)
[a] Study was performed at Litton Bionetics, Inc. A detailed description of the protocol is presented in Galloway *et al*. (1987). SCE=sister chromatid exchange; BrdU=bromodeoxyuridine
[b] SCEs/chromosome in treated cells versus SCEs/chromosome in solvent control cells
[c] Solvent control
[d] Positive control
[e] Significance of SCEs/chromosome tested by the linear regression trend test versus log of the dose

**TABLE E3**
**Induction of Chromosomal Aberrations in Chinese Hamster Ovary Cells by 1-Chloro-2-propanol[a]**

| Compound | Concentration (µg/mL) | Total Cells Scored | Number of Aberrations | Aberrations/ Cell | Cells with Aberrations (%) |
|---|---|---|---|---|---|
| **S9** | | | | | |
| Harvest time: 20.5 hours[b] | | | | | |
| Summary: Positive | | | | | |
| Medium[c] | | 100 | 3 | 0.03 | 3.0 |
| Mitomycin-C[d] | 0.05 | 50 | 27 | 0.54 | 32.0 |
| | 0.08 | 25 | 22 | 0.88 | 52.0 |
| 1-Chloro-2-propanol | 3,000 | 50 | 5 | 0.10 | 10.0 |
| | 4,000 | 50 | 11 | 0.22 | 18.0* |
| | 5,000 | 50 | 12 | 0.24 | 22.0* |
| | | | | | $P \leq 0.000$[e] |
| **+ S9** | | | | | |
| Harvest time: 20.5 hours[b] | | | | | |
| Summary: Positive | | | | | |
| Medium | | 200 | 10 | 0.05 | 4.0 |
| Cyclophosphamide[d] | 6.25 | 200 | 57 | 0.29 | 22.0 |
| | 12.5 | 25 | 18 | 0.72 | 40.0 |
| 1-Chloro-2-propanol | 3,000 | 20 | 47 | 2.35 | 75.0* |
| | 4,000 | 20 | 74 | 3.70 | 95.0* |
| | 5,000 | 20 | 79 | 3.95 | 90.0* |
| | | | | | $P \leq 0.000$ |

* Positive response ($P \leq 0.05$) versus the solvent control
[a] Study was performed at Litton Bionetics, Inc. The detailed protocol is presented in Galloway *et al*. (1987).
[b] Due to cell cycle delay, harvest time was extended to maximize the number of first-division metaphase cells available for analysis.
[c] Solvent control
[d] Positive control
[e] Significance of percent cells with aberrations tested by the linear regression trend test versus log of the dose

**TABLE E4**
**Induction of Sex-Linked Recessive Lethal Mutations in *Drosophila melanogaster* by 1-Chloro-2-propanol[a]**

| Route of Exposure | Dose (ppm) | Incidence of Death (%) | Incidence of Sterility (%) | No. of Lethals/No. of X Chromosomes Tested | | | Total[b] |
|---|---|---|---|---|---|---|---|
| | | | | Mating 1 | Mating 2 | Mating 3 | |
| Feed | 200 | 16 | 5 | 0/1,948 | 1/1,645 | 1/1,556 | 2/5,149 (0.04%) |
| | 0 | | | 3/3,060 | 9/2,972 | 6/2,679 | 18/8,711 (0.21%) |
| | | | | | | | P=0.994[c] |
| Injection | 1,000 | 24 | 12 | 3/2,044 | 3/1,607 | 3/1,735 | 9/5,386 (0.17%) |
| | 0 | | | 1/2,001 | 1/1,967 | 1/1,988 | 3/5,956 (0.05%) |
| | | | | | | | P=0.028[c] |

[a] Study was performed at the University of Wisconsin, Madison. The detailed protocol and these data are presented in Foureman *et al*. (1994). The mean mutant frequency from 518 negative control experiments is 0.074% (Mason *et al.*, 1992).
[b] Total number of lethal mutations/total number of X chromosomes tested for three mating trials
[c] Significance of total number of lethal mutations/total number of X chromosomes tested by a normal approximation to the binomial test (Margolin *et al.*, 1983).

**TABLE E5**
**Induction of Reciprocal Translocations in *Drosophila melanogaster* by 1-Chloro-2-propanol[a]**

| Route of Exposure | Dose (ppm) | Translocations/Total $F_1$ Tested | | | | | | No. of Tests | Total No. of Translocations | Total Translocations (%) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | | | |
| Injection | 1,000 | 0/2,268 | 1/1,941 | 0/768 | 0/308 | 0/26 | 0/9 | 5,312 | 1 | 0.00 |
| Concurrent control | | | | | | | | 77,700 | 1 | 0.00 |
| Historical control | | | | | | | | 116,163 | 2 | 0.00 |
| | | | | | | | | | | P=0.126 |

[a] Study was performed at the University of Wisconsin, Madison. The detailed protocol and these data are presented in Foureman *et al*. (1994). Results were not significant at the 5% level (Kastenbaum and Bowman, 1970).

**TABLE E6**
**Frequency of Micronuclei in Mouse Peripheral Blood Erythrocytes Following Treatment with 1-Chloro-2-propanol in Drinking Water for 14 Weeks**[a]

| Compound | Dose (ppm) | Number of Mice | Micronucleated Cells/1,000 Cells[b] | | PCEs[b] (%) |
|---|---|---|---|---|---|
| | | | PCEs | NCEs | |
| **Male** | | | | | |
| Water[c] | | 10 | 1.21 ± 0.19 | 1.34 ± 0.13 | 2.19 ± 0.11 |
| 1-Chloro-2- | 33 | 9 | 2.08 ± 0.53 | 1.42 ± 0.12 | 2.35 ± 0.14 |
| | 100 | 10 | 1.79 ± 0.26 | 1.43 ± 0.13 | 2.07 ± 0.08 |
| | 330 | 9 | 1.26 ± 0.17 | 1.11 ± 0.06 | 2.39 ± 0.16 |
| | 1,000 | 10 | 1.41 ± 0.16 | 1.40 ± 0.09 | 2.17 ± 0.09 |
| | 3,000 | 10 | 1.81 ± 0.36 | 1.31 ± 0.08 | 2.59 ± 0.12 |
| | | | P=0.290[d] | P=0.635 | |
| **Female** | | | | | |
| Water | | 10 | 2.15 ± 0.38 | 0.98 ± 0.08 | 1.99 ± 0.12 |
| 1-Chloro-2- | 33 | 10 | 1.12 ± 0.26 | 1.20 ± 0.08 | 2.05 ± 0.11 |
| | 100 | 10 | 1.64 ± 0.30 | 1.12 ± 0.07 | 2.08 ± 0.16 |
| | 330 | 10 | 1.24 ± 0.26 | 1.03 ± 0.09 | 2.11 ± 0.19 |
| | 1,000 | 10 | 1.58 ± 0.34 | 1.03 ± 0.07 | 1.97 ± 0.08 |
| | 3,000 | 10 | 1.51 ± 0.30 | 1.09 ± 0.05 | 2.45 ± 0.09 |
| | | | P=0.559 | P=0.503 | |

[a] Study was performed at the United States Department of Agriculture. The detailed protocol is presented in MacGregor *et al*. (1990). PCE=polychromatic erythrocyte; NCE=normochromatic erythrocyte.
[b] Mean ± standard error
[c] Vehicle control
[d] Significance of micronucleated cells/1,000 cells tested by the one-tailed trend test, significant at $P \leq 0.025$ (Margolin *et al*., 1990)

# APPENDIX F
# CONTINUOUS BREEDING STUDY IN SPRAGUE-DAWLEY RATS

# CONTINUOUS BREEDING STUDY IN SPRAGUE-DAWLEY RATS

## INTRODUCTION

The potential reproductive toxicity of 1-chloro-2-propanol was evaluated by Research Triangle Institute (Research Triangle Park, NC) in Sprague-Dawley rats because evidence in the literature suggests that exposure to 1-chloro-2-propanol may have reproductive effects (NTP, 1987b) and because data collected at the end of the 14-week NTP study in F344/N rats indicated chemical-related effects in male rats (Appendix I).

Reproductive assessment by the methods presented in Lamb (1985), NTP (1987b), and Heindel *et al*., (1989) consists of four phases: dose setting, continuous breeding, identification of the affected sex (crossover mating trial), and offspring assessment. A 2-week dose-setting phase is conducted to determine exposure concentrations for the continuous breeding phase. During the continuous breeding phase, the effects of the maximum tolerated exposure concentration estimated in the dose-setting phase and two lower exposure concentrations on fertility and reproduction of first-generation ($F_0$) animals are determined. If fertility is significantly affected during the continuous breeding phase, crossover mating trials are performed to determine if males or females, or both, are affected. Offspring assessment includes evaluation of reproductive performance of second-generation ($F_1$) animals from the final litters of the continuous breeding phase. The $F_1$ animals are raised to sexual maturity while receiving the same exposure concentrations as their parents, are mated, and are allowed to deliver the third generation ($F_2$) offspring.

Because fertility was not significantly affected during the continuous breeding phase of the 1-chloro-2-propanol study, crossover mating trials were not conducted. The 0 and 1,300 ppm groups of the $F_1$ generation were assessed for fertility measures in the offspring assessment phase.

## MATERIALS AND METHODS

Technical grade 1-chloro-2-propanol was obtained from Eastman Kodak Laboratory Chemicals (Rochester, NY) in one lot (B15), which was also used in the 14-day, 14-week, and 2-year studies conducted at SRI International (Menlo Park, CA) and TSI Mason Laboratories (Worcester, MA). Results of purity and stability analyses of lot B15 are given in Appendix J. Dose formulations of 1-chloro-2-propanol in deionized water were prepared at least every 3 weeks, and analyses by the study laboratory indicated that the dose formulations were within 10% of the target concentration.

Male and female VAF Crl:CD BR outbred Sprague-Dawley albino rats were obtained from Charles River Breeding Laboratories, Inc. (Portage, MI). Upon receipt, serum samples were collected from sentinel male and female rats, and the serum samples were analyzed for antibody titers to rodent viruses. All sera were negative. Rats were quarantined for approximately 2 weeks and were 10 weeks old at the start of the dose-setting phase and the continuous breeding phase. Rats were housed two per cage by sex during quarantine and the dose-setting phase. NIH-07 open formula pelleted diet and deionized water containing the appropriate concentrations of 1-chloro-2-propanol were available *ad libitum* for all phases of the study.

For the 2-week dose-setting phase, groups of eight male and eight female rats received 0, 1,000, 2,000, 4,000, 6,000, or 8,000 ppm 1-chloro-2-propanol in drinking water. Survival, clinical findings, body weights, and water consumption were recorded.

During the continuous breeding phase, rats were housed two per cage by sex for 1 week while being exposed to 0, 300, 650, or 1,300 ppm 1-chloro-2-propanol; rats were then housed in breeding pairs (40 control pairs

and 20 dosed pairs per group) for 112 days during exposure. After the mating period, rats continued to be exposed while housed separately for approximately 21 days to allow delivery of the final litter of pups. Clinical observations, water consumption, pregnancy index, litters per pair, cumulative number of days to litter, dam body weights, live pups per litter, proportion of pups born alive, sex of live pups, and pup body weights were recorded. For the last litter, pup survival and body weights were recorded on lactation days 0, 4, 7, 14, and 21.

To assess the offspring of exposed rats, the final litter of pups born to each $F_0$ rat in the 0 and 1,300 ppm groups was raised to sexual maturity. After weaning, siblings were housed two per cage by sex and were administered the same exposure concentrations as their parents. At sexual maturity (88 ± 10 days of age), nonsibling male and female rats from within the same exposure group (20 pairs per group) were housed as breeding pairs for 7 days. Female rats were examined for a copulatory plug or sperm, and rats were then housed individually through the delivery of the pups. Clinical observations, water consumption, mating index, pregnancy index, fertility index, dam body weights, length of gestation, live pups per litter, proportion of pups born alive, sex of live pups, and pup body weights were recorded. For the 12 days before necropsy of the $F_1$ rats, estrous cycle data were collected. At necropsy, epididymal spermatozoal data were collected, and the following organs were weighed: right cauda epididymis, right epididymis, kidneys, liver, right ovary, prostate gland, seminal vesicles, and right testis. Selected organs were fixed in 10% neutral buffered formalin or Bouin's fixative (ovaries only) and embedded in plastic or paraffin. Sections were stained with hematoxylin and eosin (testis only) or PAS and hematoxylin.

For data expressed as proportions (fertility, mating, and pregnancy indices), the Cochran-Armitage test (Armitage, 1971) was used to test for exposure-related trends, and pairwise comparisons were performed with a chi-square test (Conover, 1971). The number of litters and the number of live pups per litter were determined per fertile pair and then exposure group means were determined. The proportion of live pups was defined as the number of pups born alive divided by the total number of pups produced by each pair. The sex ratio was expressed as the number of male pups born alive divided by the total number of live pups born to each fertile pair.

Exposure group means for data with skewed distributions were analyzed by the nonparametric multiple comparisons methods of Shirley (1977) or Dunn (1964). Jonkheere's test (Jonkheere, 1954) or Wilcoxon's test (Conover, 1971) was used to assess the significance of exposure-response trends and to determine whether a trend-sensitive test (Shirley's) was more appropriate for pairwise comparisons than a test that does not assume a monotonic exposure-related trend (Dunn's). Multiple comparisons in the offspring assessment phase were made with Dunn's test or Wilcoxon's test (Conover, 1971).

Analysis of covariance (Neter and Wasserman, 1974), with average litter size as the covariate, was performed to remove the potential effect of number of pups per litter on average pup weight. Analysis of covariance was also used to adjust organ weights for total body weight. Least-square estimates of exposure group means adjusted for litter size were tested for overall equality by an F-test and for pairwise equality by Dunnett's test (Dunnett, 1955) or a *t*-test; these tests were performed on the data from males, females, and males and females (combined) to analyze potential sex differences. Unadjusted body and organ weights were analyzed by the Kruskal-Wallis (Kruskal and Wallis, 1952) and the Mann-Whitney-U test (Mann and Whitney, 1947).

For vaginal cytology data, an arcsine transformation was used to bring the data into closer conformance with a normality assumption. Treatment effects were investigated by applying a multivariate analysis of variance (Morrison, 1976) to the transformed data to test for simultaneous equality of measurements across exposure concentrations.

## RESULTS

All rats survived to the end of the dose setting study. Final mean body weights were less in 8,000 ppm males and females than in the controls; rats in these two groups lost weight during the study. Water consumption decreased with increasing exposure concentration throughout the study. Estimated daily exposure concentrations ranged from 0.9 to 0.16 g 1-chloro-2-propanol/kg body weight. Based on the adverse effects on mean body weights and water consumption, the exposure concentrations selected for the continuous breeding phase were 0, 300, 650, and 1,300 ppm.

During the continuous breeding phase, exposure to 1-chloro-2-propanol did not cause significant reproductive toxicity in rats (Table F1). All exposed and control pairs except one 300 ppm pair were fertile; all pairs exposed to 1,300 ppm delivered five litters. The average numbers of litters per pair of all exposed groups were similar to that of the controls. The cumulative number of days to litter for the 1,300 ppm group was slightly but significantly greater than that of the controls for litter 5. At delivery of each litter, the mean body weights of dams in the 650 ppm group (except for the second litter) and the 1,300 ppm group were significantly less than those of the controls. Mean body weights of litter 5 dams in the 650 ppm exposure group were significantly less than those of the controls from lactation days 0 to 14, and the mean body weights of dams in the 1,300 ppm group were significantly less than those of the controls throughout lactation. Total and adjusted pup weights, sex ratios, and number of live pups per litter were similar to those of the controls for all exposed groups for all litters (Tables F1 and F2).

The survival of the final litters of exposed $F_1$ pups was similar to that of the controls throughout lactation (Table F3). Male and female $F_1$ pup weights were significantly less than those of the controls in the 1,300 ppm group on days 7, 14, and 21 and in the 650 ppm group on days 14 and 21 (Table F3).

During the offspring assessment phase of the continuous breeding study, the mean body weight of dams in the 1,300 ppm group at delivery was significantly less than that of the controls (Table F4). Exposure to 1,300 ppm 1-chloro-2-propanol did not affect the number of live pups per litter, the sex ratio, or pup weights (Table F4) or organ weights (Table F5). The percentage of abnormal sperm was significantly greater in 1,300 ppm male rats than in the controls (Table F6). There were no significant differences in estrous cycle parameters between control and 1,300 ppm females.

**TABLE F1**
**Fertility, Reproductive Performance, Length of Gestation, and Body Weight Data for $F_0$ and $F_1$ Sprague-Dawley Rats in the Continuous Breeding Study of 1-Chloro-2-propanol**[a]

| | 0 ppm | 300 ppm | 650 ppm | 1,300 ppm |
|---|---|---|---|---|
| **$F_0$ Adult Data** | | | | |
| Pregnancy index[b] | | | | |
| Litter 1 | 40/40 (100%) | 18/19 (95%) | 20/20 (100%) | 20/20 (100%) |
| Litter 2 | 40/40 (100%) | 18/19 (95%) | 20/20 (100%) | 20/20 (100%) |
| Litter 3 | 39/40 (98%) | 18/19 (95%) | 20/20 (100%) | 20/20 (100%) |
| Litter 4 | 38/40 (95%) | 17/19 (89%) | 20/20 (100%) | 20/20 (100%) |
| Litter 5 | 34/40 (85%) | 17/19 (89%) | 19/20 (95%) | 20/20 (100%) |
| Average litters/pair | 4.8 ± 0.1 | 4.9 ± 0.1 | 5.0 ± 0.1 | 5.0 ± 0.0 |
| Cumulative days to litter | | | | |
| Litter 1 | 27.00 ± 1.92 | 25.78 ± 0.92 | 25.80 ± 0.87 | 26.05 ± 0.91 |
| Litter 2 | 50.13 ± 2.04 | 49.94 ± 1.63 | 48.50 ± 0.90 | 48.95 ± 0.86 |
| Litter 3 | 71.10 ± 1.06 | 73.89 ± 2.92 | 71.55 ± 0.95 | 71.65 ± 0.89 |
| Litter 4 | 94.11 ± 1.06 | 94.24 ± 0.98 | 95.60 ± 1.42 | 94.75 ± 0.91 |
| Litter 5 | 116.74 ± 1.08 | 118.24 ± 1.33 | 118.74 ± 1.24 | 118.75 ± 1.00* |
| Dam weight at delivery (g) | | | | |
| n | 40 | 18 | 20 | 20 |
| Litter 1 | 282 ± 4 | 277 ± 6 | 269 ± 5* | 253 ± 5** |
| Litter 2 | 305 ± 5 | 303 ± 7 | 293 ± 6 | 272 ± 7** |
| Litter 3 | 330 ± 6[c] | 322 ± 8 | 311 ± 7* | 287 ± 8** |
| Litter 4 | 355 ± 7[d] | 343 ± 10[e] | 331 ± 8* | 303 ± 7** |
| Litter 5 | 370 ± 7[f] | 361 ± 11[e] | 342 ± 9*[g] | 314 ± 9** |
| Dam weight during lactation of litter 5 (g) | | | | |
| n | 35 | 18 | 20 | 19 |
| Lactation day 0 | 372 ± 7 | 363 ± 10 | 342 ± 8* | 315 ± 9* |
| Lactation day 4 | 370 ± 6 | 362 ± 1 | 347 ± 7* | 311 ± 8* |
| Lactation day 7 | 374 ± 5 | 368 ± 8 | 351 ± 7* | 319 ± 9* |
| Lactation day 14 | 379 ± 5 | 370 ± 8 | 355 ± 7* | 316 ± 9* |
| Lactation day 21 | 355 ± 6 | 349 ± 7 | 342 ± 7 | 303 ± 7* |

**TABLE F1**
**Fertility, Reproductive Performance, Length of Gestation, and Body Weight Data for $F_0$ and $F_1$ Sprague-Dawley Rats in the Continuous Breeding Study of 1-Chloro-2-propanol**

| | 0 ppm | 300 ppm | 650 ppm | 1,300 ppm |
|---|---|---|---|---|
| **$F_1$ Pup Data (Litters 1 Through 5)** | | | | |
| Number of breeding pairs | 40 | 18 | 20 | 20 |
| Live male pups/litter | 5.7 ± 0.2 | 6.3 ± 0.3 | 5.5 ± 0.2 | 5.5 ± 0.2 |
| Live female pups/litter | 6.4 ± 0.2 | 6.3 ± 0.3 | 6.3 ± 0.3 | 6.1 ± 0.2 |
| Total live pups/litter | 12.2 ± 0.2 | 12.7 ± 0.6 | 11.8 ± 0.4 | 11.6 ± 0.3 |
| Average live pups/litter (%) | 97 ± 0 | 98 ± 0 | 98 ± 0 | 98 ± 0 |
| Sex ratio[h] (%) | 47 ± 0 | 50 ± 0 | 47 ± 0 | 48 ± 0 |
| Male pup weight (g) | 6.22 ± 0.06 | 6.36 ± 0.09 | 6.23 ± 0.10 | 6.22 ± 0.09 |
| Female pup weight (g) | 5.85 ± 0.05 | 5.85 ± 0.08 | 5.96 ± 0.09 | 5.93 ± 0.10 |
| Total live pup weight[i] (g) | 6.01 ± 0.05 | 6.11 ± 0.09 | 6.08 ± 0.09 | 6.07 ± 0.09 |
| Adjusted total pup weight[j] (g) | 6.02 ± 0.06 | 6.13 ± 0.09 | 6.07 ± 0.08 | 6.04 ± 0.08 |

* Significantly different ($P \leq 0.05$) from the control group by Shirley's test
** $P \leq 0.01$
[a] Data for average litters/pair, cumulative days to litter, body weights, live pups/litter, and sex ratio are given as mean ± standard error. Differences from the control group were not significant by the chi-square test (pregnancy index), Shirley's test (average litters/pair), Dunn's test (live pups/litter, sex ratio, and pup weights), or Dunnett's test (adjusted total pup weight).
[b] Pregnant females/cohabiting pairs
[c] n=39
[d] n=38
[e] n=17
[f] n=34
[g] n=19
[h] Live male pups/live pups
[i] Mean of average live pup weight for each fertile pair
[j] Least-squares estimate of the mean of the average pup weight for each fertile pair, adjusted for average litter size

**TABLE F2**
**Litter and Body Weight Data for $F_1$ Sprague-Dawley Rat Pups in the Continuous Breeding Study of 1-Chloro-2-propanol**[a]

| | 0 ppm | 300 ppm | 650 ppm | 1,300 ppm |
|---|---|---|---|---|
| **Litter 1** | | | | |
| Number of pairs delivering | 40 | 18 | 20 | 20 |
| Live pups/litter[b] | 14.05 ± 0.35 | 14.50 ± 0.53 | 12.85 ± 0.89 | 12.85 ± 0.50 |
| Total live pup weight[c] (g) | 5.72 ± 0.07 | 5.69 ± 0.10 | 5.93 ± 0.16 | 5.87 ± 0.14 |
| Adjusted total live pup weight[d] (g) | 5.78 ± 0.07 | 5.78 ± 0.11 | 5.82 ± 0.11 | 5.78 ± 0.11 |
| **Litter 2** | | | | |
| Number of pairs delivering | 40 | 18 | 20 | 20 |
| Live pups/litter | 13.00 ± 0.44 | 11.03 ± 0.92 | 11.35 ± 0.75 | 12.40 ± 0.52 |
| Total live pup weight (g) | 5.91 ± 0.11 | 6.23 ± 0.13 | 6.28 ± 0.17 | 6.03 ± 0.15 |
| Adjusted total live pup weight (g) | 6.00 ± 0.09 | 6.16 ± 0.13 | 6.15 ± 0.13 | 6.04 ± 0.12 |
| **Litter 3** | | | | |
| Number of pairs delivering | 39 | 18 | 20 | 20 |
| Live pups/litter | 12.31 ± 0.58 | 12.03 ± 0.80 | 11.60 ± 0.59 | 11.45 ± 0.44 |
| Total live pup weight (g) | 6.20 ± 0.10 | 6.10 ± 0.11 | 6.16 ± 0.11 | 6.19 ± 0.11 |
| Adjusted total live pup weight (g) | 6.22 ± 0.08 | 6.15 ± 0.12 | 6.13 ± 0.11 | 6.14 ± 0.11 |
| **Litter 4** | | | | |
| Number of pairs delivering | 38 | 17 | 20 | 20 |
| Live pups/litter | 10.26 ± 0.53 | 12.53 ± 0.66 | 10.70 ± 0.76 | 11.45 ± 0.63 |
| Total live pup weight (g) | 6.44 ± 0.09 | 6.35 ± 0.14 | 6.39 ± 0.16 | 6.29 ± 0.11 |
| Adjusted total live pup weight (g) | 6.36 ± 0.08 | 6.52 ± 0.12 | 6.37 ± 0.11 | 6.33 ± 0.11 |
| **Litter 5** | | | | |
| Number of pairs delivering | 34 | 17 | 19 | 20 |
| Live pups/litter | 10.68 ± 0.53 | 12.18 ± 0.89 | 12.74 ± 0.62 | 9.80 ± 0.79 |
| Total live pup weight (g) | 6.33 ± 0.11 | 6.52 ± 0.17 | 6.13 ± 0.14 | 6.29 ± 0.15 |
| Adjusted total live pup weight (g) | 6.29 ± 0.09 | 6.61 ± 0.13 | 6.29 ± 0.12 | 6.12 ± 0.12 |
| **Litters 1 Through 5** | | | | |
| Number of pairs delivering | 40 | 18 | 20 | 20 |
| Live pups/litter | 12.16 ± 0.21 | 12.65 ± 0.55 | 11.80 ± 0.44 | 11.59 ± 0.31 |
| Total live pup weight (g) | 6.01 ± 0.05 | 6.11 ± 0.09 | 6.08 ± 0.09 | 6.07 ± 0.09 |
| Adjusted total live pup weight[e] (g) | 6.02 ± 0.06 | 6.13 ± 0.09 | 6.07 ± 0.08 | 6.04 ± 0.08 |

[a] Data given as mean ± standard error. Differences from the control group were not significant by Shirley's or Dunn's test (live pups/litter), Dunn's test (weights), or Dunnett's test (adjusted weights)
[b] Mean of average number of live pups/litter for each fertile pair
[c] Mean of average live pup weight for each fertile pair
[d] Least-squares estimate of the mean pup weight adjusted for average litter size
[e] Least-squares estimate of the mean of the average pup weight for each fertile pair, adjusted for average litter size

**TABLE F3**
**Survival and Body Weight Data for $F_1$ Sprague-Dawley Rat Pups (Final Litter) in the Continuous Breeding Study of 1-Chloro-2-propanol**[a]

| | 0 ppm | 300 ppm | 650 ppm | 1,300 ppm |
|---|---|---|---|---|
| **Day 0** | | | | |
| Number of litters | 35 | 18 | 20 | 19[b] |
| Male pup weight (g) | 6.51 ± 0.14 | 6.64 ± 0.15 | 6.33 ± 0.14 | 6.37 ± 0.15 |
| Female pup weight (g) | 6.16 ± 0.10 | 6.33 ± 0.17 | 5.91 ± 0.13 | 6.22 ± 0.17 |
| **Day 4** | | | | |
| Male survival (%) | 98 ± 0 | 98 ± 0 | 99 ± 0 | 97 ± 0 |
| Female survival (%) | 98 ± 0 | 100 ± 0 | 98 ± 0 | 100 ± 0 |
| Total survival (%) | 98 ± 0 | 99 ± 0 | 99 ± 0 | 99 ± 0 |
| Male pup weight (g) | 10.61 ± 0.25 | 10.67 ± 0.47 | 10.08 ± 0.34 | 10.04 ± 0.30 |
| Female pup weight (g) | 10.15 ± 0.19 | 10.36 ± 0.51 | 9.35 ± 0.28 | 9.61 ± 0.36 |
| **Day 7** | | | | |
| Male survival (%) | 97 ± 0 | 96 ± 0 | 96 ± 0 | 95 ± 0 |
| Female survival (%) | 98 ± 0 | 100 ± 0 | 95 ± 0 | 99 ± 0 |
| Total survival (%) | 98 ± 0 | 98 ± 0 | 95 ± 0 | 98 ± 0 |
| Male pup weight (g) | 15.62 ± 0.38 | 15.78 ± 0.75 | 14.89 ± 0.54 | 14.06 ± 0.58* |
| Female pup weight (g) | 15.00 ± 0.35 | 15.10 ± 0.77 | 13.88 ± 0.45 | 13.17 ± 0.55* |
| **Day 14** | | | | |
| Male survival (%) | 95 ± 0 | 91 ± 0 | 92 ± 0 | 90 ± 0 |
| Female survival (%) | 93 ± 0 | 95 ± 0 | 92 ± 0 | 91 ± 0 |
| Total survival (%) | 94 ± 0 | 94 ± 0 | 91 ± 0 | 90 ± 0 |
| Male pup weight (g) | 30.24 ± 0.72 | 30.80 ± 1.18 | 20.04 ± 0.75* | 24.52 ± 1.39* |
| Female pup weight (g) | 29.47 ± 0.58[c] | 29.67 ± 1.11 | 26.30 ± 0.58* | 24.00 ± 1.21* |
| **Day 21** | | | | |
| Male survival (%) | 94 ± 0 | 91 ± 0 | 92 ± 0 | 90 ± 0 |
| Female survival (%) | 93 ± 0 | 94 ± 0 | 91 ± 0 | 89 ± 0 |
| Total survival (%) | 93 ± 0 | 93 ± 0 | 91 ± 0 | 89 ± 0 |
| Male pup weight (g) | 48.90 ± 1.22 | 49.44 ± 1.88 | 45.31 ± 1.40* | 37.83 ± 2.87* |
| Female pup weight (g) | 46.96 ± 0.92[d] | 46.78 ± 1.88 | 41.82 ± 1.07* | 37.52 ± 2.37* |

* Significantly different ($P \leq 0.05$) from the control group by Shirley's test
[a] Data are given as mean ± standard error. Differences from the control group for survival were not significant by Shirley's or Dunn's test.
[b] Because no live male pups were born in two litters, n=17 for male pup survival and body weights.
[c] n=34
[d] n=33

**TABLE F4**
**Fertility, Reproductive Performance, Length of Gestation, and Body Weight Data for $F_1$ and $F_2$ Sprague-Dawley Rats in the Offspring Assessment Phase of the Continuous Breeding Study of 1-Chloro-2-propanol[a]**

| | 0 ppm | 1,300 ppm |
|---|---|---|
| **$F_1$ Adult Data** | | |
| Mating index[b] | 18/20 (90%) | 18/20 (90%) |
| Pregnancy index[c] | 17/20 (85%) | 18/20 (90%) |
| Fertility index[d] | 17/18 (94%) | 18/18 (100%) |
| Mean dam weight at delivery (g) | 317 ± 9 | 264 ± 4** |
| Days to litter | 22.2 ± 0.1 | 22.1 ± 0.1 |
| **$F_2$ Pup Data** | | |
| Number of litters | 17 | 18 |
| Live male pups/litter | 7.1 ± 0.7 | 7.1 ± 0.6 |
| Live female pups/litter | 7.1 ± 0.6 | 6.7 ± 0.4 |
| Total live pups/litter | 14.1 ± 0.8 | 13.8 ± 0.5 |
| Total live pups/litter (%) | 99 ± 0 | 100 ± 0 |
| Sex ratio[e] (%) | 50 ± 0 | 51 ± 0 |
| Male pup weight (g) | 6.18 ± 0.16 | 6.04 ± 0.12 |
| Female pup weight (g) | 5.84 ± 0.16 | 5.72 ± 0.10 |
| Total live pup weight (g) | 6.01 ± 0.15 | 5.88 ± 0.11 |
| Adjusted total live pup weight[f] (g) | 6.03 ± 0.12 | 5.87 ± 0.11 |

** Significantly different ($P \leq 0.01$) from the controls by Wilcoxon's test
[a] Data for body weights, days to litter, live pups/litter, and sex ratio are given as mean ± standard error. Differences from the control group were not significant by the chi-square test (mating and fertility indexes), Wilcoxon's test (days to litter, pups/litter, live pups, and weights), or Dunnett's test (adjusted pup weight).
[b] Females with sperm plug/cohabiting pairs
[c] Pregnant females/cohabiting pairs
[d] Pregnant females/females with sperm plug
[e] Live male pups/live pups
[f] Least-squares estimate of the mean pup weight adjusted for average litter size

**TABLE F5**
**Organ Weights and Organ-Weight-to-Body-Weight Ratios for $F_1$ Sprague-Dawley Rats in the Offspring Assessment Phase of the Continuous Breeding Study of 1-Chloro-2-propanol**[a]

| | 0 ppm | 1,300 ppm |
|---|---|---|
| n | 20 | 20 |
| **Male** | | |
| Necropsy body wt | 520 ± 8 | 448 ± 8 |
| R. Cauda Epididymis | | |
| Absolute | 224.74 ± 6.64 | 215.17 ± 6.61 |
| Relative | 0.434 ± 0.013 | 0.481 ± 0.014 |
| R. Epididymis | | |
| Absolute | 550.86 ± 10.15 | 509.08 ± 10.75 |
| Relative | 1.06 ± 0.022 | 1.14 ± 0.022 |
| Kidneys | | |
| Absolute | 3.85 ± 0.082 | 3.54 ± 0.077 |
| Relative | 7.40 ± 0.133 | 7.91 ± 0.070 |
| Liver | | |
| Absolute | 22.41 ± 0.593 | 19.39 ± 0.554 |
| Relative | 43.12 ± 1.14 | 43.20 ± 0.672 |
| Prostate Gland | | |
| Absolute | 644.88 ± 33.74 | 594.45 ± 31.88 |
| Relative | 1.25 ± 0.071 | 1.33 ± 0.073 |
| Seminal Vesicles | | |
| Absolute | 2,424.71 ± 78.25 | 2,224.54 ± 72.94 |
| Relative | 4.67 ± 0.152 | 4.99 ± 0.175 |
| R. Testis | | |
| Absolute | 1,741.02 ± 43.95 | 1,594.86 ± 36.26 |
| Relative | 3.35 ± 0.084 | 3.57 ± 0.066 |
| **Female** | | |
| Necropsy body wt | 316 ± 8 | 280 ± 4 |
| Kidneys | | |
| Absolute | 2.44 ± 0.057 | 2.33 ± 0.034 |
| Relative | 7.76 ± 0.131 | 8.36 ± 0.137 |
| Liver | | |
| Absolute | 12.74 ± 0.416 | 11.43 ± 0.249 |
| Relative | 40.35 ± 0.776 | 40.81 ± 0.600 |
| R. Ovary | | |
| Absolute | 56.26 ± 2.44 | 47.84 ± 1.79 |
| Relative | 0.181 ± 0.008 | 0.171 ± 0.006 |

[a] Liver, kidney, and body weights are given in grams; all other organ weights (absolute weights) are in milligrams; organ weights and organ-weight-to-body-weight ratios (relative weights) are given as mg organ weight/g body weight (mean ± standard error). Differences from the controls were not significant by Wilcoxon's test.

**TABLE F6**
**Sperm Parameters and Estrous Cycle Characterization for $F_1$ Sprague-Dawley Rats in the Offspring Assessment Phase of the Continuous Breeding Study of 1-Chloro-2-propanol[a]**

| | 0 ppm | 1,300 ppm |
|---|---|---|
| **Male** | | |
| n | 19 | 20 |
| Epididymal spermatozoal measurements | | |
| Motility (%) | 85.0 ± 1.4[b] | 86.7 ± 1.7 |
| Abnormal (%) | 0.78 ± 0.11 | 2.4 ± 0.53* |
| Concentration ($10^6$/g cauda epididymal tissue) | 497 ± 25 | 488 ± 20 |
| **Female** | | |
| n | 20 | 20 |
| Estrous cycle length (days) | 4.20 ± 0.08 | 4.55 ± 0.18 |
| Estrous stages (% of cycle) | | |
| Diestrus | 30.8 | 38.3 |
| Proestrus | 22.1 | 19.6 |
| Estrus | 26.2 | 24.6 |
| Metestrus | 20.4 | 16.2 |
| Uncertain diagnosis | 0.4 | 1.2 |

* Significantly different ($P \leq 0.05$) from the control group by Wilcoxon's test
[a] Epididymal spermatozoal measurements and estrous cycle length data are given as mean ± standard error. Differences from the control group are not significant by Dunn's test (motility and concentration) or Wilcoxon's test (estrous cycle length). By multivariate analysis of variance, exposed females do not differ significantly from control females in the relative length of time spent in estrous stages.
[b] n=20

# APPENDIX G
# HEMATOLOGY, CLINICAL CHEMISTRY, AND URINALYSIS RESULTS

**TABLE G1**
**Hematology, Clinical Chemistry, and Urinalysis Data for Rats in the 14-Week Drinking Water Study of 1-Chloro-2-propanol**[a]

| | 0 ppm | 33 ppm | 100 ppm | 330 ppm | 1,000 ppm | 3,300 ppm |
|---|---|---|---|---|---|---|
| **Male** | | | | | | |
| n | 10 | 10 | 10 | 10 | 10 | 10 |
| Hematology | | | | | | |
| Hematocrit (%) | 45.7 ± 0.6 | 46.7 ± 0.4 | 45.2 ± 0.5 | 47.1 ± 0.7 | 46.7 ± 0.4 | 45.8 ± 0.5 |
| Hemoglobin (g/dL) | 16.4 ± 0.2 | 16.7 ± 0.1 | 16.5 ± 0.1 | 16.7 ± 0.3 | 16.4 ± 0.1 | 15.7 ± 0.1** |
| Erythrocytes ($10^6$/µL) | 8.71 ± 0.12 | 8.92 ± 0.08 | 8.72 ± 0.09 | 9.05 ± 0.16 | 8.94 ± 0.07 | 8.59 ± 0.08 |
| Reticulocytes ($10^6$/µL) | 0.26 ± 0.03 | 0.22 ± 0.02 | 0.21 ± 0.02 | 0.22 ± 0.01 | 0.22 ± 0.02 | 0.27 ± 0.02 |
| Nucleated erythrocytes ($10^3$/µL) | 0.01 ± 0.01 | 0.00 ± 0.00 | 0.01 ± 0.01 | 0.02 ± 0.01 | 0.01 ± 0.01 | 0.01 ± 0.01 |
| Mean cell volume (fL) | 51.4 ± 0.3 | 51.3 ± 0.2 | 50.9 ± 0.2 | 51.4 ± 0.3 | 51.1 ± 0.3 | 52.3 ± 0.2 |
| Mean cell hemoglobin (pg) | 18.8 ± 0.1 | 18.6 ± 0.2 | 18.8 ± 0.3 | 18.3 ± 0.2 | 18.1 ± 0.1** | 18.0 ± 0.0** |
| Mean cell hemoglobin concentration (g/dL) | 36.0 ± 0.0 | 36.0 ± 0.1 | 36.7 ± 0.4 | 35.3 ± 0.2* | 35.1 ± 0.2** | 34.2 ± 0.1** |
| Platelets ($10^3$/µL) | 687.0 ± 22.1 | 687.4 ± 21.8 | 708.0 ± 17.0 | 649.8 ± 15.8 | 667.4 ± 10.7 | 615.0 ± 21.1 |
| Mean platelet volume (fL) | 7.35 ± 0.03 | 7.18 ± 0.07 | 7.32 ± 0.08 | 7.23 ± 0.07 | 7.17 ± 0.06 | 7.36 ± 0.08 |
| Leukocytes ($10^3$/µL) | 10.36 ± 0.36 | 10.04 ± 0.38 | 10.24 ± 0.34 | 9.53 ± 0.42 | 9.93 ± 0.33 | 7.72 ± 0.37** |
| Segmented neutrophils ($10^3$/µL) | 1.16 ± 0.11 | 1.10 ± 0.17 | 1.54 ± 0.12 | 1.04 ± 0.12 | 1.25 ± 0.19 | 1.04 ± 0.07 |
| Lymphocytes ($10^3$/µL) | 8.91 ± 0.35 | 8.47 ± 0.35 | 8.12 ± 0.31 | 8.29 ± 0.43 | 8.15 ± 0.28 | 6.50 ± 0.36** |
| Monocytes ($10^3$/µL) | 0.21 ± 0.06 | 0.43 ± 0.09 | 0.50 ± 0.16 | 0.08 ± 0.03 | 0.42 ± 0.15 | 0.05 ± 0.02* |
| Eosinophils ($10^3$/µL) | 0.07 ± 0.02 | 0.05 ± 0.02 | 0.07 ± 0.03 | 0.05 ± 0.02 | 0.06 ± 0.02 | 0.07 ± 0.03 |
| Clinical Chemistry | | | | | | |
| Creatinine (mg/dL) | | | | | | |
| Day 3 | 0.66 ± 0.03 | 0.55 ± 0.04 | 0.45 ± 0.02** | 0.47 ± 0.02** | 0.51 ± 0.01* | 0.53 ± 0.02[b] |
| Day 15 | 0.35 ± 0.02 | 0.47 ± 0.02* | 0.50 ± 0.05 | 0.55 ± 0.02** | 0.36 ± 0.02 | 0.34 ± 0.02 |
| Day 45 | 0.68 ± 0.03 | 0.58 ± 0.03 | 0.58 ± 0.05 | 0.62 ± 0.03 | 0.63 ± 0.03 | 0.67 ± 0.03 |
| Week 14 | 0.56 ± 0.03 | 0.58 ± 0.05 | 0.58 ± 0.06[b] | 0.66 ± 0.04 | 0.60 ± 0.05 | 0.63 ± 0.03 |
| Albumin (g/dL) | | | | | | |
| Day 3 | 4.5 ± 0.1 | 4.0 ± 0.1**[b] | 4.0 ± 0.1** | 3.8 ± 0.0** | 4.0 ± 0.1** | 4.0 ± 0.1**[b] |
| Day 15 | 4.4 ± 0.1[b] | 4.7 ± 0.1 | 4.6 ± 0.1 | 4.5 ± 0.1[b] | 4.3 ± 0.1[b] | 4.0 ± 0.1* |
| Day 45 | 4.3 ± 0.1 | 4.3 ± 0.2 | 4.4 ± 0.2 | 4.4 ± 0.1 | 4.3 ± 0.1 | 4.4 ± 0.1 |
| Week 14 | 4.9 ± 0.1[b] | 4.8 ± 0.1[c] | 4.7 ± 0.1[b] | 4.7 ± 0.1 | 4.9 ± 0.1 | 4.6 ± 0.1 |
| Alanine aminotransferase (IU/L) | | | | | | |
| Day 3 | 33 ± 1 | 31 ± 1 | 33 ± 1 | 30 ± 2 | 19 ± 1** | 16 ± 1** |
| Day 15 | 31 ± 1 | 28 ± 1* | 24 ± 1** | 22 ± 1** | 16 ± 0** | 6 ± 1** |
| Day 45 | 34 ± 2 | 35 ± 2 | 34 ± 1 | 31 ± 1 | 20 ± 1** | 11 ± 0** |
| Week 14 | 30 ± 1 | 34 ± 1 | 31 ± 1 | 33 ± 2 | 22 ± 1** | 12 ± 2** |
| Creatine kinase (IU/L) | | | | | | |
| Day 3 | 266 ± 41 | 462 ± 129 | 334 ± 76 | 478 ± 124 | 413 ± 121 | 444 ± 92 |
| Day 15 | 619 ± 122 | 831 ± 244 | 368 ± 58 | 588 ± 161 | 719 ± 119 | 579 ± 141 |
| Day 45 | 267 ± 47 | 305 ± 31 | 476 ± 88 | 305 ± 33 | 245 ± 32 | 315 ± 54 |
| Week 14 | 175 ± 36 | 236 ± 41 | 220 ± 37 | 227 ± 54 | 226 ± 32 | 154 ± 15 |
| Sorbitol dehydrogenase (IU/L) | | | | | | |
| Day 3 | 14 ± 1[b] | 15 ± 1 | 14 ± 0 | 14 ± 1 | 13 ± 1 | 23 ± 2** |
| Day 15 | 20 ± 3[b] | 14 ± 0 | 13 ± 0 | 14 ± 1 | 16 ± 1[c] | 14 ± 1 |
| Day 45 | 25 ± 2 | 22 ± 1 | 22 ± 1 | 19 ± 1** | 20 ± 1* | 18 ± 2** |
| Week 14 | 20 ± 2 | 21 ± 2 | 19 ± 1 | 18 ± 1 | 19 ± 2 | 19 ± 2 |

**TABLE G1**
**Hematology, Clinical Chemistry, and Urinalysis Data for Rats in the 14-Week Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 33 ppm | 100 ppm | 330 ppm | 1,000 ppm | 3,300 ppm |
|---|---|---|---|---|---|---|
| **Male** (continued) | | | | | | |
| n | 10 | 10 | 10 | 10 | 10 | 10 |
| Clinical Chemistry (continued) | | | | | | |
| γ-Glutamyltransferase (IU/L) | | | | | | |
| Day 3 | 2.3 ± 0.7[b] | 1.7 ± 0.2[b] | 1.8 ± 0.3[d] | 2.3 ± 0.2[e] | 2.3 ± 0.4 | 2.4 ± 0.3[c] |
| Day 15 | —[f] | — | — | — | — | — |
| Day 45 | — | — | — | — | — | — |
| Week 14 | — | — | — | — | — | — |
| Urinalysis | | | | | | |
| Glucose (mg/100 g per 16 hr) | | | | | | |
| Day 15 | 0.599 ± 0.028 | 0.884 ± 0.021** | 0.622 ± 0.055 | 0.680 ± 0.044 | 0.695 ± 0.034 | 0.491 ± 0.044 |
| Week 14 | 0.441 ± 0.046 | 0.430 ± 0.029 | 0.417 ± 0.026 | 0.424 ± 0.032 | 0.389 ± 0.022 | 0.618 ± 0.038* |
| Protein (mg/100 g per 16 hr) | | | | | | |
| Day 15 | 2.048 ± 0.220 | 2.391 ± 0.086 | 1.872 ± 0.234 | 1.364 ± 0.153* | 1.423 ± 0.145* | 0.486 ± 0.082** |
| Week 14 | 0.985 ± 0.104 | 1.217 ± 0.096 | 1.145 ± 0.088 | 1.199 ± 0.103 | 1.006 ± 0.131 | 0.829 ± 0.073 |
| Volume (mL/16 hr) | | | | | | |
| Day 15 | 5.6 ± 0.8 | 8.0 ± 0.1 | 6.6 ± 0.8 | 5.0 ± 0.6 | 4.5 ± 0.6 | 0.9 ± 0.1** |
| Week 14 | 5.9 ± 0.9 | 6.8 ± 0.7 | 6.2 ± 0.6 | 5.6 ± 0.5 | 4.7 ± 0.4 | 2.7 ± 0.3** |
| Specific gravity | | | | | | |
| Day 15 | 1.030 ± 0.003 | 1.024 ± 0.002 | 1.025 ± 0.003 | 1.033 ± 0.003 | 1.038 ± 0.004 | 1.099 ± 0.012** |
| Week 14 | 1.039 ± 0.004 | 1.034 ± 0.004 | 1.040 ± 0.004 | 1.039 ± 0.002 | 1.047 ± 0.004 | 1.070 ± 0.004** |
| **Female** | | | | | | |
| n | 10 | 10 | 10 | 10 | 9 | 10 |
| Hematology | | | | | | |
| Hematocrit (%) | 47.6 ± 0.4 | 45.2 ± 0.5** | 45.7 ± 0.4** | 46.5 ± 0.3** | 44.7 ± 0.3** | 45.6 ± 0.4** |
| Hemoglobin (g/dL) | 16.9 ± 0.1 | 16.3 ± 0.1** | 16.7 ± 0.1 | 16.7 ± 0.1 | 15.9 ± 0.1** | 16.0 ± 0.1** |
| Erythrocytes ($10^6$/μL) | 8.34 ± 0.07 | 8.14 ± 0.08 | 8.29 ± 0.06 | 8.27 ± 0.06 | 7.83 ± 0.05** | 7.61 ± 0.06** |
| Reticulocytes ($10^6$/μL) | 0.15 ± 0.01 | 0.20 ± 0.02* | 0.20 ± 0.02* | 0.19 ± 0.02 | 0.18 ± 0.02 | 0.33 ± 0.03** |
| Nucleated erythrocytes ($10^3$/μL) | 0.01 ± 0.01 | 0.02 ± 0.01 | 0.00 ± 0.00 | 0.00 ± 0.00 | 0.01 ± 0.01 | 0.01 ± 0.01 |
| Mean cell volume (fL) | 55.8 ± 0.2 | 54.4 ± 0.3 | 53.8 ± 0.1 | 54.9 ± 0.2 | 56.1 ± 0.4 | 58.2 ± 0.2* |
| Mean cell hemoglobin (pg) | 20.0 ± 0.0 | 20.0 ± 0.1 | 20.0 ± 0.0 | 20.0 ± 0.0 | 20.1 ± 0.1 | 21.0 ± 0.0** |
| Mean cell hemoglobin concentration (g/dL) | 35.6 ± 0.2 | 36.3 ± 0.3 | 36.5 ± 0.2 | 36.1 ± 0.2 | 35.6 ± 0.2 | 35.1 ± 0.1 |
| Platelets ($10^3$/μL) | 633.8 ± 20.8 | 668.6 ± 23.5 | 674.2 ± 25.5 | 727.2 ± 16.2** | 738.4 ± 14.2** | 672.8 ± 15.0 |
| Mean platelet volume (fL) | 6.88 ± 0.05 | 7.19 ± 0.06** | 7.15 ± 0.06* | 6.89 ± 0.06 | 7.10 ± 0.05[g] | 7.09 ± 0.06 |
| Leukocytes ($10^3$/μL) | 8.41 ± 0.38 | 8.78 ± 0.48 | 9.49 ± 0.33 | 9.16 ± 0.35 | 9.16 ± 0.50 | 9.46 ± 0.30 |
| Segmented neutrophils ($10^3$/μL) | 0.98 ± 0.10 | 1.23 ± 0.14 | 1.08 ± 0.12 | 0.93 ± 0.13 | 0.96 ± 0.15 | 1.30 ± 0.14 |
| Lymphocytes ($10^3$/μL) | 7.13 ± 0.33 | 7.36 ± 0.48 | 7.97 ± 0.25 | 7.97 ± 0.33 | 8.08 ± 0.48 | 7.69 ± 0.37 |
| Monocytes ($10^3$/μL) | 0.27 ± 0.06 | 0.09 ± 0.02 | 0.34 ± 0.07 | 0.21 ± 0.06 | 0.08 ± 0.02 | 0.36 ± 0.05 |
| Eosinophils ($10^3$/μL) | 0.04 ± 0.02 | 0.07 ± 0.02 | 0.06 ± 0.02 | 0.02 ± 0.01 | 0.03 ± 0.02 | 0.07 ± 0.03 |

**TABLE G1**
**Hematology, Clinical Chemistry, and Urinalysis Data for Rats in the 14-Week Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 33 ppm | 100 ppm | 330 ppm | 1,000 ppm | 3,300 ppm |
|---|---|---|---|---|---|---|
| **Female** (continued) | | | | | | |
| n | 10 | 10 | 10 | 10 | 10 | 10 |
| Clinical Chemistry | | | | | | |
| Creatinine (mg/dL) | | | | | | |
| Day 3 | 0.58 ± 0.03 | 0.55 ± 0.02 | 0.58 ± 0.02 | 0.45 ± 0.03* | 0.57 ± 0.03 | 0.49 ± 0.02 |
| Day 15 | 0.57 ± 0.03 | 0.50 ± 0.04 | 0.56 ± 0.04 | 0.52 ± 0.03 | 0.57 ± 0.03 | 0.64 ± 0.02 |
| Day 45 | 0.49 ± 0.03 | 0.36 ± 0.02* | 0.49 ± 0.05 | 0.51 ± 0.02 | 0.42 ± 0.02 | 0.55 ± 0.03 |
| Week 14 | 0.57 ± 0.02 | 0.62 ± 0.03[b] | 0.58 ± 0.06 | 0.66 ± 0.03 | 0.59 ± 0.04[b] | 0.64 ± 0.04 |
| Albumin (g/dL) | | | | | | |
| Day 3 | 4.7 ± 0.1 | 4.3 ± 0.1** | 4.3 ± 0.0* | 4.4 ± 0.1 | 4.4 ± 0.1* | 4.3 ± 0.1** |
| Day 15 | 4.8 ± 0.1 | 4.7 ± 0.1[b] | 4.6 ± 0.1 | 4.3 ± 0.1**[b] | 4.6 ± 0.1[b] | 5.0 ± 0.1 |
| Day 45 | 5.2 ± 0.1 | 4.8 ± 0.1* | 4.7 ± 0.1** | 4.9 ± 0.1 | 5.0 ± 0.1 | 4.9 ± 0.1 |
| Week 14 | 5.1 ± 0.1[b] | 4.5 ± 0.4[b] | 5.0 ± 0.1 | 5.0 ± 0.1 | 4.8 ± 0.1*[b] | 5.2 ± 0.1 |
| Alanine aminotransferase (IU/L) | | | | | | |
| Day 3 | 29 ± 1 | 28 ± 1 | 22 ± 1** | 22 ± 2** | 16 ± 1** | 17 ± 1** |
| Day 15 | 23 ± 2 | 26 ± 1 | 24 ± 1 | 19 ± 1* | 11 ± 1** | 7 ± 1** |
| Day 45 | 25 ± 1 | 24 ± 2 | 22 ± 1* | 23 ± 2 | 16 ± 1** | 10 ± 1** |
| Week 14 | 28 ± 2 | 36 ± 3 | 29 ± 2 | 24 ± 1 | 18 ± 1** | 9 ± 1**[b] |
| Creatine kinase (IU/L) | | | | | | |
| Day 3 | 347 ± 75 | 416 ± 69 | 670 ± 331 | 731 ± 272 | 246 ± 57 | 251 ± 32 |
| Day 15 | 306 ± 76 | 396 ± 113 | 285 ± 31 | 318 ± 61 | 318 ± 78 | 296 ± 63 |
| Day 45 | 197 ± 26 | 200 ± 32 | 134 ± 14[h] | 286 ± 76[h] | 263 ± 45[h] | 186 ± 34 |
| Week 14 | 186 ± 40 | 214 ± 59 | 160 ± 27 | 178 ± 17 | 176 ± 30 | 278 ± 63 |
| Sorbitol dehydrogenase (IU/L) | | | | | | |
| Day 3 | 12 ± 0 | 12 ± 1 | 12 ± 0 | 11 ± 0 | 11 ± 0 | 16 ± 2 |
| Day 15 | 18 ± 1 | 19 ± 2 | 17 ± 1 | 20 ± 2 | 17 ± 1 | 16 ± 1 |
| Day 45 | 19 ± 1 | 18 ± 2 | 21 ± 1 | 23 ± 2 | 21 ± 1 | 21 ± 2 |
| Week 14 | 18 ± 2 | 16 ± 1 | 15 ± 1 | 17 ± 1 | 16 ± 1 | 18 ± 2 |
| γ-Glutamyltransferase (IU/L) | | | | | | |
| Day 3 | 1.8 ± 0.2 | 3.2 ± 0.4*[b] | 1.8 ± 0.3[b] | 3.4 ± 0.4*[c] | 2.6 ± 0.2[b] | 2.7 ± 0.4[b] |
| Day 15 | — | — | — | — | — | — |
| Day 45 | — | — | — | — | — | — |
| Week 14 | — | — | — | — | — | — |

**TABLE G1**
**Hematology, Clinical Chemistry, and Urinalysis Data for Rats in the 14-Week Drinking Water Study of 1-Chloro-2-propanol**

| | 0 ppm | 33 ppm | 100 ppm | 330 ppm | 1,000 ppm | 3,300 ppm |
|---|---|---|---|---|---|---|
| **Female** (continued) | | | | | | |
| n | | | | | | |
| Day 15 | 10 | 10 | 10 | 10 | 10 | 10 |
| Week 14 | 10 | 10 | 10 | 10 | 10 | 9 |
| Urinalysis | | | | | | |
| Glucose (mg/100 g per 16 hr) | | | | | | |
| Day 15 | 0.781 ± 0.072 | 0.403 ± 0.056** | 0.676 ± 0.049 | 0.724 ± 0.040 | 0.732 ± 0.030 | 0.787 ± 0.043 |
| Week 14 | 0.495 ± 0.022 | 0.529 ± 0.040 | 0.405 ± 0.029 | 0.484 ± 0.036 | 0.487 ± 0.032 | 0.418 ± 0.046 |
| Protein (mg/100 g per 16 hr) | | | | | | |
| Day 15 | 6.311 ± 0.614 | 5.386 ± 0.680 | 6.520 ± 0.517 | 5.479 ± 0.468 | 4.332 ± 0.185 | 4.805 ± 0.358 |
| Week 14 | 0.359 ± 0.029 | 0.418 ± 0.027 | 0.318 ± 0.029 | 0.330 ± 0.031 | 0.299 ± 0.017 | 0.262 ± 0.041 |
| Volume (mL/16 hr) | | | | | | |
| Day 15 | 8.7 ± 1.2 | 10.9 ± 1.7 | 9.5 ± 1.0 | 7.7 ± 0.8 | 8.5 ± 0.8 | 3.3 ± 0.3** |
| Week 14 | 6.7 ± 1.1 | 5.2 ± 0.7 | 3.8 ± 1.0* | 7.3 ± 1.4 | 4.5 ± 0.9 | 1.8 ± 0.4** |
| Specific gravity | | | | | | |
| Day 15 | 1.021 ± 0.002 | 1.016 ± 0.002 | 1.019 ± 0.002 | 1.022 ± 0.003 | 1.019 ± 0.001 | 1.040 ± 0.003** |
| Week 14 | 1.031 ± 0.004 | 1.031 ± 0.004 | 1.043 ± 0.006 | 1.027 ± 0.005 | 1.036 ± 0.004 | 1.072 ± 0.007** |

* Significantly different ($P \leq 0.05$) from the control group by Dunn's or Shirley's test
** $P \leq 0.01$
[a] Mean ± standard error. Statistical tests were performed on unrounded data.
[b] n=9
[c] n=8
[d] n=6
[e] n=7
[f] Data for γ-glutamyltransferase were below 1 IU/L; therefore, no mean or standard error was calculated.
[g] n=10
[h] n=5

**TABLE G2**
**Hematology Data for Mice in the 14-Week Drinking Water Study of 1-Chloro-2-propanol[a]**

| | 0 ppm | 33 ppm | 100 ppm | 330 ppm | 1,000 ppm | 3,300 ppm |
|---|---|---|---|---|---|---|
| **Male** | | | | | | |
| n | 10 | 10 | 10 | 9 | 10 | 9 |
| Hematocrit (%) | 52.9 ± 0.9 | 53.0 ± 0.8 | 52.5 ± 0.7 | 54.5 ± 0.8 | 52.4 ± 0.4 | 49.4 ± 1.3 |
| Hemoglobin (g/dL) | 17.6 ± 0.3 | 17.6 ± 0.3 | 17.5 ± 0.1 | 17.7 ± 0.3 | 17.1 ± 0.1* | 15.9 ± 0.4** |
| Erythrocytes ($10^6$/µL) | 10.46 ± 0.16 | 10.49 ± 0.19 | 10.31 ± 0.16 | 10.53 ± 0.17 | 10.17 ± 0.07 | 9.49 ± 0.24** |
| Reticulocytes ($10^6$/µL) | 0.23 ± 0.02 | 0.26 ± 0.02 | 0.19 ± 0.02 | 0.22 ± 0.03 | 0.24 ± 0.03 | 0.25 ± 0.03 |
| Nucleated erythrocytes ($10^3$/µL) | 0.00 ± 0.00 | 0.00 ± 0.00 | 0.01 ± 0.01 | 0.00 ± 0.00 | 0.00 ± 0.00 | 0.00 ± 0.00 |
| Mean cell volume (fL) | 49.3 ± 0.2 | 49.5 ± 0.4 | 49.9 ± 0.2 | 50.7 ± 0.3** | 50.2 ± 0.1** | 50.9 ± 0.3** |
| Mean cell hemoglobin (pg) | 17.0 ± 0.0 | 16.8 ± 0.1 | 17.2 ± 0.2 | 16.8 ± 0.1 | 17.0 ± 0.0 | 16.9 ± 0.1 |
| Mean cell hemoglobin concentration (g/dL) | 33.5 ± 0.2 | 32.9 ± 0.2 | 33.4 ± 0.3 | 32.4 ± 0.2** | 32.6 ± 0.2** | 32.2 ± 0.2** |
| Platelets ($10^3$/µL) | 1,058.2 ± 18.4[b] | 1,005.6 ± 22.8 | 1,059.2 ± 23.0 | 1,033.6 ± 28.7 | 1,053.8 ± 15.6 | 917.0 ± 22.2** |
| Mean platelet volume (fL) | 5.66 ± 0.05 | 5.75 ± 0.02 | 5.73 ± 0.04 | 5.58 ± 0.03 | 5.72 ± 0.04 | 5.66 ± 0.06 |
| Leukocytes ($10^3$/µL) | 5.19 ± 0.28 | 4.84 ± 0.33 | 5.18 ± 0.34 | 3.09 ± 0.28** | 4.52 ± 0.28 | 4.56 ± 0.26 |
| Segmented neutrophils ($10^3$/µL) | 0.64 ± 0.07 | 0.49 ± 0.03 | 0.63 ± 0.12 | 0.32 ± 0.04** | 0.43 ± 0.03 | 0.47 ± 0.04 |
| Lymphocytes ($10^3$/µL) | 4.49 ± 0.24 | 4.13 ± 0.32 | 4.41 ± 0.25 | 2.67 ± 0.24** | 3.99 ± 0.25 | 3.96 ± 0.24 |
| Monocytes ($10^3$/µL) | 0.02 ± 0.01 | 0.16 ± 0.06* | 0.05 ± 0.01 | 0.09 ± 0.03 | 0.04 ± 0.01 | 0.04 ± 0.01 |
| Eosinophils ($10^3$/µL) | 0.03 ± 0.01 | 0.02 ± 0.01 | 0.05 ± 0.02 | 0.01 ± 0.00 | 0.03 ± 0.02 | 0.05 ± 0.02 |
| **Female** | | | | | | |
| n | 10 | 10 | 10 | 9 | 10 | 10 |
| Hematocrit (%) | 51.4 ± 1.3 | 55.0 ± 0.9 | 54.9 ± 0.6 | 54.8 ± 0.7 | 53.9 ± 1.1 | 56.0 ± 1.7 |
| Hemoglobin (g/dL) | 18.6 ± 0.3 | 18.2 ± 0.2 | 17.8 ± 0.2 | 18.4 ± 0.2 | 17.3 ± 0.3* | 18.0 ± 0.5 |
| Erythrocytes ($10^6$/µL) | 9.62 ± 0.30 | 10.28 ± 0.14 | 10.16 ± 0.15 | 10.36 ± 0.15 | 9.97 ± 0.20 | 10.52 ± 0.29* |
| Reticulocytes ($10^6$/µL) | 0.20 ± 0.01 | 0.18 ± 0.02 | 0.17 ± 0.01 | 0.19 ± 0.02 | 0.18 ± 0.01 | 0.24 ± 0.01 |
| Nucleated erythrocytes ($10^3$/µL) | 0.00 ± 0.00 | 0.00 ± 0.00 | 0.00 ± 0.00 | 0.00 ± 0.00 | 0.00 ± 0.00 | 0.00 ± 0.00 |
| Mean cell volume (fL) | 51.8 ± 0.3 | 52.3 ± 0.3 | 52.8 ± 0.4 | 51.8 ± 0.4 | 53.0 ± 0.3 | 52.2 ± 0.2 |
| Mean cell hemoglobin (pg) | 19.5 ± 0.4 | 17.7 ± 0.2** | 17.3 ± 0.2** | 17.7 ± 0.2** | 17.4 ± 0.2** | 17.1 ± 0.1** |
| Mean cell hemoglobin concentration (g/dL) | 36.4 ± 0.6 | 32.9 ± 0.2** | 32.5 ± 0.3** | 33.8 ± 0.3** | 32.2 ± 0.2** | 32.2 ± 0.2** |
| Platelets ($10^3$/µL) | 893.1 ± 32.2[b] | 942.4 ± 36.4 | 912.2 ± 31.5 | 882.8 ± 17.1[c] | 915.8 ± 34.5 | 804.2 ± 73.8 |
| Mean platelet volume (fL) | 5.54 ± 0.04 | 5.79 ± 0.03** | 5.77 ± 0.05* | 5.70 ± 0.06[c] | 5.58 ± 0.04 | 5.85 ± 0.05** |
| Leukocytes ($10^3$/µL) | 5.18 ± 0.20 | 6.14 ± 0.33 | 5.22 ± 0.29 | 5.24 ± 0.51 | 5.86 ± 0.28 | 3.62 ± 0.26 |
| Segmented neutrophils ($10^3$/µL) | 0.58 ± 0.06 | 0.62 ± 0.06 | 0.63 ± 0.07 | 0.51 ± 0.09 | 0.46 ± 0.05 | 0.24 ± 0.05** |
| Lymphocytes ($10^3$/µL) | 4.32 ± 0.17 | 5.18 ± 0.32 | 4.30 ± 0.24 | 4.50 ± 0.46 | 5.04 ± 0.28 | 3.18 ± 0.25 |
| Monocytes ($10^3$/µL) | 0.21 ± 0.05 | 0.29 ± 0.10 | 0.25 ± 0.08 | 0.18 ± 0.05 | 0.32 ± 0.10 | 0.14 ± 0.04 |
| Eosinophils ($10^3$/µL) | 0.04 ± 0.01 | 0.02 ± 0.01 | 0.02 ± 0.02 | 0.05 ± 0.03 | 0.02 ± 0.01 | 0.03 ± 0.01 |

* Significantly different ($P \le 0.05$) from the control group by Dunn's or Shirley's test
** $P \le 0.01$
[a] Mean ± standard error. Statistical tests were performed on unrounded data.
[b] n=9
[c] n=10

# APPENDIX H
# ORGAN WEIGHTS
# AND ORGAN-WEIGHT-TO-BODY-WEIGHT RATIOS

**TABLE H1**
**Organ Weights and Organ-Weight-to-Body-Weight Ratios for Rats in the 14-Day Drinking Water Study of 1-Chloro-2-propanol**[a]

| | 0 ppm | 100 ppm | 330 ppm | 1,000 ppm | 3,300 ppm | 10,000 ppm |
|---|---|---|---|---|---|---|
| **Male** | | | | | | |
| n | 10 | 10 | 10 | 10 | 10 | 10 |
| Necropsy body wt | 196 ± 3 | 193 ± 5 | 198 ± 3 | 195 ± 5 | 162 ± 4** | 88 ± 2** |
| Brain | | | | | | |
| Absolute | 1.899 ± 0.011 | 1.875 ± 0.012 | 1.848 ± 0.027 | 1.888 ± 0.014 | 1.804 ± 0.020** | 1.740 ± 0.012** |
| Relative | 9.73 ± 0.11 | 9.78 ± 0.23 | 9.35 ± 0.13 | 9.72 ± 0.25 | 11.16 ± 0.23** | 19.99 ± 0.48** |
| Heart | | | | | | |
| Absolute | 0.805 ± 0.033 | 0.787 ± 0.015 | 0.810 ± 0.012 | 0.822 ± 0.027 | 0.636 ± 0.014** | 0.417 ± 0.013** |
| Relative | 4.11 ± 0.13 | 4.10 ± 0.09 | 4.10 ± 0.07 | 4.21 ± 0.09 | 3.93 ± 0.08 | 4.77 ± 0.12** |
| R. Kidney | | | | | | |
| Absolute | 1.044 ± 0.020 | 1.031 ± 0.020 | 1.074 ± 0.038 | 1.041 ± 0.025 | 0.967 ± 0.014* | 0.686 ± 0.016** |
| Relative | 5.34 ± 0.08 | 5.37 ± 0.13 | 5.42 ± 0.14 | 5.34 ± 0.10 | 5.98 ± 0.09** | 7.85 ± 0.14** |
| Liver | | | | | | |
| Absolute | 10.796 ± 0.288 | 11.039 ± 0.307 | 11.440 ± 0.262 | 11.638 ± 0.387 | 9.613 ± 0.187** | 4.562 ± 0.176** |
| Relative | 55.21 ± 1.16 | 57.36 ± 1.22 | 57.76 ± 0.66 | 59.46 ± 0.82* | 59.35 ± 0.76* | 52.02 ± 0.94 |
| Lung | | | | | | |
| Absolute | 1.232 ± 0.035 | 1.217 ± 0.035 | 1.200 ± 0.030 | 1.177 ± 0.035 | 0.955 ± 0.020** | 0.709 ± 0.017** |
| Relative | 6.30 ± 0.16 | 6.34 ± 0.20 | 6.07 ± 0.14 | 6.03 ± 0.15 | 5.90 ± 0.11 | 8.15 ± 0.27** |
| R. Testis | | | | | | |
| Absolute | 1.181 ± 0.021 | 1.135 ± 0.024 | 1.163 ± 0.020 | 1.143 ± 0.025 | 1.110 ± 0.028 | 0.898 ± 0.036** |
| Relative | 6.04 ± 0.10 | 5.90 ± 0.10 | 5.88 ± 0.10 | 5.87 ± 0.13 | 6.85 ± 0.14** | 10.24 ± 0.22** |
| Thymus | | | | | | |
| Absolute | 0.517 ± 0.012 | 0.540 ± 0.019 | 0.557 ± 0.019 | 0.553 ± 0.013 | 0.455 ± 0.018** | 0.136 ± 0.013** |
| Relative | 2.64 ± 0.05 | 2.81 ± 0.12 | 2.82 ± 0.09 | 2.84 ± 0.09 | 2.81 ± 0.11 | 1.54 ± 0.12** |
| **Female** | | | | | | |
| n | 10 | 10 | 10 | 10 | 10 | 8 |
| Necropsy body wt | 136 ± 2 | 139 ± 2 | 139 ± 2 | 139 ± 3 | 123 ± 1** | 67 ± 3** |
| Brain | | | | | | |
| Absolute | 1.781 ± 0.022 | 1.829 ± 0.013 | 1.797 ± 0.017 | 1.793 ± 0.015 | 1.753 ± 0.016 | 1.625 ± 0.022** |
| Relative | 13.09 ± 0.22 | 13.18 ± 0.29 | 12.98 ± 0.17 | 12.96 ± 0.25 | 14.28 ± 0.14* | 24.39 ± 0.90** |
| Heart | | | | | | |
| Absolute | 0.605 ± 0.014 | 0.596 ± 0.015 | 0.612 ± 0.011 | 0.616 ± 0.013 | 0.559 ± 0.009* | 0.356 ± 0.016** |
| Relative | 4.44 ± 0.07 | 4.28 ± 0.10 | 4.42 ± 0.09 | 4.44 ± 0.06 | 4.55 ± 0.06 | 5.31 ± 0.16** |
| R. Kidney | | | | | | |
| Absolute | 0.733 ± 0.017 | 0.739 ± 0.017 | 0.753 ± 0.019 | 0.789 ± 0.022 | 0.774 ± 0.017 | 0.556 ± 0.019** |
| Relative | 5.38 ± 0.09 | 5.31 ± 0.12 | 5.43 ± 0.09 | 5.69 ± 0.10 | 6.30 ± 0.10** | 8.30 ± 0.21** |
| Liver | | | | | | |
| Absolute | 6.775 ± 0.123 | 7.025 ± 0.098 | 7.430 ± 0.148* | 7.656 ± 0.173** | 6.789 ± 0.104 | 3.471 ± 0.246** |
| Relative | 49.73 ± 0.71 | 50.50 ± 0.55 | 53.58 ± 0.52** | 55.20 ± 0.73** | 55.27 ± 0.57** | 51.19 ± 2.07** |
| Lung | | | | | | |
| Absolute | 0.995 ± 0.015 | 0.988 ± 0.016 | 0.969 ± 0.026 | 0.997 ± 0.021 | 0.839 ± 0.011** | 0.641 ± 0.018** |
| Relative | 7.31 ± 0.15 | 7.11 ± 0.13 | 6.98 ± 0.11 | 7.20 ± 0.13 | 6.83 ± 0.06 | 9.58 ± 0.25** |
| Thymus | | | | | | |
| Absolute | 0.420 ± 0.015 | 0.413 ± 0.013 | 0.465 ± 0.014 | 0.435 ± 0.015 | 0.421 ± 0.014 | 0.093 ± 0.026** |
| Relative | 3.08 ± 0.10 | 2.97 ± 0.09 | 3.36 ± 0.08 | 3.13 ± 0.08 | 3.42 ± 0.10 | 1.32 ± 0.35** |

* Significantly different ($P \leq 0.05$) from the control group by Williams' or Dunnett's test
** $P \leq 0.01$
[a] Organ weights (absolute weights) and body weights are given in grams; organ-weight-to-body-weight ratios (relative weights) are given as mg organ weight/g body weight (mean ± standard error).

**TABLE H2**
**Organ Weights and Organ-Weight-to-Body-Weight Ratios for Rats in the 14-Week Drinking Water Study of 1-Chloro-2-propanol**[a]

| | 0 ppm | 33 ppm | 100 ppm | 330 ppm | 1,000 ppm | 3,300 ppm |
|---|---|---|---|---|---|---|
| n | 10 | 10 | 10 | 10 | 10 | 10 |
| **Male** | | | | | | |
| Necropsy body wt | 379 ± 6 | 377 ± 9 | 377 ± 9 | 385 ± 8 | 383 ± 6 | 322 ± 5** |
| Brain | | | | | | |
| Absolute | 1.985 ± 0.023 | 2.004 ± 0.027 | 2.036 ± 0.019 | 1.999 ± 0.024 | 1.986 ± 0.016 | 1.937 ± 0.015 |
| Relative | 5.24 ± 0.05 | 5.34 ± 0.09 | 5.42 ± 0.11 | 5.20 ± 0.08 | 5.20 ± 0.09 | 6.02 ± 0.08** |
| Heart | | | | | | |
| Absolute | 1.148 ± 0.029 | 1.112 ± 0.032 | 1.167 ± 0.038 | 1.147 ± 0.028 | 1.124 ± 0.017 | 1.034 ± 0.032* |
| Relative | 3.03 ± 0.04 | 2.95 ± 0.03 | 3.09 ± 0.06 | 2.98 ± 0.04 | 2.94 ± 0.05 | 3.20 ± 0.07 |
| R. Kidney | | | | | | |
| Absolute | 1.268 ± 0.029 | 1.238 ± 0.041 | 1.448 ± 0.049** | 1.316 ± 0.035 | 1.393 ± 0.035 | 1.258 ± 0.022 |
| Relative | 3.35 ± 0.05 | 3.28 ± 0.04 | 3.84 ± 0.09** | 3.42 ± 0.06** | 3.64 ± 0.05** | 3.90 ± 0.06** |
| Liver | | | | | | |
| Absolute | 14.030 ± 0.355 | 14.181 ± 0.404 | 15.281 ± 0.696 | 16.100 ± 0.468* | 16.374 ± 0.292** | 14.103 ± 0.444 |
| Relative | 37.01 ± 0.65 | 37.64 ± 0.37 | 40.53 ± 1.51** | 41.76 ± 0.54** | 42.79 ± 0.56** | 43.73 ± 1.16** |
| Lung | | | | | | |
| Absolute | 1.648 ± 0.048 | 1.656 ± 0.065 | 1.524 ± 0.031 | 1.724 ± 0.030 | 1.542 ± 0.056 | 1.422 ± 0.041** |
| Relative | 4.35 ± 0.12 | 4.40 ± 0.13 | 4.05 ± 0.07 | 4.49 ± 0.10 | 4.03 ± 0.13 | 4.41 ± 0.12 |
| R. Testis | | | | | | |
| Absolute | 1.514 ± 0.028 | 1.489 ± 0.033 | 1.561 ± 0.034 | 1.547 ± 0.031 | 1.505 ± 0.024 | 1.487 ± 0.025 |
| Relative | 4.00 ± 0.03 | 3.96 ± 0.06 | 4.14 ± 0.05 | 4.02 ± 0.05 | 3.93 ± 0.03 | 4.61 ± 0.05** |
| Thymus | | | | | | |
| Absolute | 0.290 ± 0.009 | 0.314 ± 0.013 | 0.283 ± 0.008 | 0.304 ± 0.009 | 0.312 ± 0.010 | 0.285 ± 0.011 |
| Relative | 0.77 ± 0.02 | 0.83 ± 0.03 | 0.75 ± 0.02 | 0.79 ± 0.03 | 0.82 ± 0.03 | 0.88 ± 0.03* |
| **Female** | | | | | | |
| Necropsy body wt | 212 ± 7 | 207 ± 4 | 218 ± 4 | 209 ± 3 | 207 ± 3 | 185 ± 3** |
| Brain | | | | | | |
| Absolute | 1.816 ± 0.016 | 1.819 ± 0.015 | 1.835 ± 0.010 | 1.834 ± 0.013 | 1.816 ± 0.013 | 1.770 ± 0.025 |
| Relative | 8.66 ± 0.33 | 8.83 ± 0.10 | 8.43 ± 0.14 | 8.81 ± 0.14 | 8.80 ± 0.12 | 9.60 ± 0.11** |
| Heart | | | | | | |
| Absolute | 0.730 ± 0.016 | 0.714 ± 0.011 | 0.764 ± 0.017 | 0.729 ± 0.015 | 0.709 ± 0.012 | 0.644 ± 0.011** |
| Relative | 3.49 ± 0.18 | 3.46 ± 0.05 | 3.51 ± 0.07 | 3.50 ± 0.04 | 3.43 ± 0.06 | 3.49 ± 0.03 |
| R. Kidney | | | | | | |
| Absolute | 0.720 ± 0.019 | 0.743 ± 0.018 | 0.821 ± 0.014** | 0.758 ± 0.023 | 0.797 ± 0.010* | 0.762 ± 0.019 |
| Relative | 3.40 ± 0.05 | 3.60 ± 0.08* | 3.77 ± 0.04** | 3.63 ± 0.09** | 3.86 ± 0.05** | 4.13 ± 0.08** |
| Liver | | | | | | |
| Absolute | 7.273 ± 0.221 | 7.286 ± 0.204 | 7.963 ± 0.170* | 7.785 ± 0.154 | 8.077 ± 0.168* | 6.777 ± 0.150 |
| Relative | 34.37 ± 0.59 | 35.27 ± 0.68 | 36.52 ± 0.56* | 37.40 ± 0.83** | 39.06 ± 0.51** | 36.72 ± 0.63** |
| Lung | | | | | | |
| Absolute | 1.155 ± 0.052 | 1.210 ± 0.044 | 1.110 ± 0.019 | 1.211 ± 0.037 | 1.048 ± 0.023* | 0.960 ± 0.013** |
| Relative | 5.45 ± 0.18 | 5.86 ± 0.20 | 5.09 ± 0.06 | 5.82 ± 0.18 | 5.07 ± 0.09 | 5.21 ± 0.06 |
| Thymus | | | | | | |
| Absolute | 0.261 ± 0.011 | 0.237 ± 0.009 | 0.261 ± 0.006 | 0.254 ± 0.010 | 0.238 ± 0.007 | 0.227 ± 0.008* |
| Relative | 1.24 ± 0.06 | 1.15 ± 0.04 | 1.20 ± 0.02 | 1.22 ± 0.04 | 1.16 ± 0.04 | 1.23 ± 0.03 |

* Significantly different ($P \leq 0.05$) from the control group by Williams' or Dunnett's test
** $P \leq 0.01$
[a] Organ weights (absolute weights) and body weights are given in grams; organ-weight-to-body-weight ratios (relative weights) are given as mg organ weight/g body weight (mean ± standard error).

**TABLE H3**
**Organ Weights and Organ-Weight-to-Body-Weight Ratios for Mice in the 14-Day Drinking Water Study of 1-Chloro-2-propanol**[a]

| | 0 ppm | 100 ppm | 330 ppm | 1,000 ppm | 3,300 ppm | 10,000 ppm |
|---|---|---|---|---|---|---|
| **Male** | | | | | | |
| n | 10 | 10 | 10 | 10 | 10 | 9 |
| Necropsy body wt | 28.1 ± 0.6 | 27.7 ± 0.5 | 27.5 ± 0.7 | 28.7 ± 0.4 | 28.4 ± 0.5 | 24.3 ± 0.6** |
| Brain | | | | | | |
| Absolute | 0.525 ± 0.009 | 0.515 ± 0.010 | 0.509 ± 0.009 | 0.534 ± 0.009 | 0.502 ± 0.008 | 0.510 ± 0.009 |
| Relative | 18.75 ± 0.34 | 18.61 ± 0.42 | 18.60 ± 0.54 | 18.65 ± 0.43 | 17.73 ± 0.34 | 21.10 ± 0.71** |
| Heart | | | | | | |
| Absolute | 0.167 ± 0.005 | 0.150 ± 0.005 | 0.154 ± 0.008 | 0.159 ± 0.006 | 0.156 ± 0.009 | 0.141 ± 0.009 |
| Relative | 5.97 ± 0.20 | 5.41 ± 0.14 | 5.58 ± 0.21 | 5.55 ± 0.22 | 5.49 ± 0.29 | 5.82 ± 0.37 |
| R. Kidney | | | | | | |
| Absolute | 0.325 ± 0.010 | 0.319 ± 0.012 | 0.321 ± 0.012 | 0.356 ± 0.010 | 0.337 ± 0.012 | 0.336 ± 0.017 |
| Relative | 11.59 ± 0.30 | 11.48 ± 0.28 | 11.66 ± 0.29 | 12.41 ± 0.28 | 11.85 ± 0.26 | 13.76 ± 0.44** |
| Liver | | | | | | |
| Absolute | 1.697 ± 0.042 | 1.723 ± 0.038 | 1.749 ± 0.071 | 1.966 ± 0.051* | 2.041 ± 0.045* | 1.671 ± 0.081 |
| Relative | 60.52 ± 1.09 | 62.11 ± 0.69 | 63.42 ± 1.61 | 68.44 ± 0.98** | 71.98 ± 1.33** | 68.46 ± 1.91** |
| Lung | | | | | | |
| Absolute | 0.217 ± 0.007 | 0.221 ± 0.008 | 0.223 ± 0.006 | 0.220 ± 0.004 | 0.219 ± 0.006 | 0.214 ± 0.013 |
| Relative | 7.77 ± 0.31 | 7.99 ± 0.32 | 8.14 ± 0.28 | 7.68 ± 0.16 | 7.72 ± 0.16 | 8.81 ± 0.46 |
| R. Testis | | | | | | |
| Absolute | 0.120 ± 0.003 | 0.116 ± 0.002 | 0.118 ± 0.002 | 0.116 ± 0.002 | 0.115 ± 0.004 | 0.113 ± 0.003 |
| Relative | 4.27 ± 0.06 | 4.19 ± 0.07 | 4.30 ± 0.10 | 4.06 ± 0.08 | 4.05 ± 0.11 | 4.64 ± 0.09* |
| Thymus | | | | | | |
| Absolute | 0.065 ± 0.004 | 0.070 ± 0.004 | 0.062 ± 0.004 | 0.070 ± 0.003 | 0.065 ± 0.004 | 0.031 ± 0.002** |
| Relative | 2.32 ± 0.13 | 2.53 ± 0.14 | 2.24 ± 0.13 | 2.43 ± 0.13 | 2.28 ± 0.14 | 1.26 ± 0.09** |
| **Female** | | | | | | |
| n | 10 | 10 | 10 | 10 | 10 | 10 |
| Necropsy body wt | 21.6 ± 0.2 | 22.0 ± 0.4 | 21.6 ± 0.4 | 22.0 ± 0.3 | 22.9 ± 0.3 | 19.8 ± 0.8* |
| Brain | | | | | | |
| Absolute | 0.507 ± 0.006 | 0.518 ± 0.008 | 0.510 ± 0.006 | 0.508 ± 0.008 | 0.516 ± 0.005 | 0.519 ± 0.016 |
| Relative | 23.55 ± 0.44 | 23.53 ± 0.21 | 23.64 ± 0.41 | 23.13 ± 0.43 | 22.59 ± 0.33 | 27.09 ± 2.39 |
| Heart | | | | | | |
| Absolute | 0.132 ± 0.009 | 0.129 ± 0.005 | 0.132 ± 0.004 | 0.134 ± 0.005 | 0.139 ± 0.005 | 0.130 ± 0.006 |
| Relative | 6.12 ± 0.38 | 5.85 ± 0.15 | 6.10 ± 0.16 | 6.09 ± 0.19 | 6.08 ± 0.18 | 6.68 ± 0.46 |
| R. Kidney | | | | | | |
| Absolute | 0.214 ± 0.005 | 0.212 ± 0.004 | 0.214 ± 0.005 | 0.209 ± 0.004 | 0.229 ± 0.005 | 0.224 ± 0.007 |
| Relative | 9.93 ± 0.21 | 9.64 ± 0.16 | 9.90 ± 0.21 | 9.50 ± 0.11 | 10.01 ± 0.17 | 11.48 ± 0.50** |
| Liver | | | | | | |
| Absolute | 1.412 ± 0.017 | 1.390 ± 0.022 | 1.486 ± 0.031 | 1.551 ± 0.030* | 1.704 ± 0.032* | 1.427 ± 0.084 |
| Relative | 65.51 ± 0.61 | 63.13 ± 0.56 | 68.79 ± 1.26 | 70.59 ± 1.27** | 74.50 ± 0.98** | 71.69 ± 2.05** |
| Lung | | | | | | |
| Absolute | 0.204 ± 0.008 | 0.217 ± 0.007 | 0.213 ± 0.006 | 0.206 ± 0.007 | 0.205 ± 0.007 | 0.203 ± 0.007 |
| Relative | 9.45 ± 0.30 | 9.86 ± 0.28 | 9.87 ± 0.32 | 9.39 ± 0.37 | 8.95 ± 0.25 | 10.43 ± 0.52 |
| Thymus | | | | | | |
| Absolute | 0.094 ± 0.003 | 0.096 ± 0.003 | 0.096 ± 0.002 | 0.095 ± 0.007 | 0.099 ± 0.003 | 0.066 ± 0.009** |
| Relative | 4.37 ± 0.16 | 4.37 ± 0.10 | 4.44 ± 0.12 | 4.31 ± 0.29 | 4.31 ± 0.12 | 3.20 ± 0.40** |

* Significantly different ($P \leq 0.05$) from the control group by Williams' or Dunnett's test
** $P \leq 0.01$
[a] Organ weights (absolute weights) and body weights are given in grams; organ-weight-to-body-weight ratios (relative weights) are given as mg organ weight/g body weight (mean ± standard error).

**TABLE H4**
**Organ Weights and Organ-Weight-to-Body-Weight Ratios for Mice in the 14-Week Drinking Water Study of 1-Chloro-2-propanol**[a]

| | 0 ppm | 33 ppm | 100 ppm | 330 ppm | 1,000 ppm | 3,300 ppm |
|---|---|---|---|---|---|---|
| **Male** | | | | | | |
| n | 10 | 10 | 10 | 9 | 10 | 10 |
| Necropsy body wt | 39.2 ± 1.0 | 41.0 ± 1.2 | 40.3 ± 1.1 | 40.3 ± 1.3 | 40.0 ± 0.8 | 40.2 ± 0.8 |
| Brain | | | | | | |
| Absolute | 0.460 ± 0.007 | 0.472 ± 0.005 | 0.477 ± 0.007 | 0.477 ± 0.014 | 0.460 ± 0.005 | 0.456 ± 0.005 |
| Relative | 11.80 ± 0.27 | 11.62 ± 0.38 | 11.90 ± 0.33 | 11.86 ± 0.25 | 11.54 ± 0.30 | 11.38 ± 0.24 |
| Heart | | | | | | |
| Absolute | 0.202 ± 0.009 | 0.189 ± 0.011 | 0.202 ± 0.009 | 0.187 ± 0.007 | 0.212 ± 0.006 | 0.214 ± 0.011 |
| Relative | 5.18 ± 0.22 | 4.64 ± 0.29 | 5.04 ± 0.26 | 4.66 ± 0.18 | 5.30 ± 0.13 | 5.32 ± 0.24 |
| R. Kidney | | | | | | |
| Absolute | 0.316 ± 0.010 | 0.334 ± 0.018 | 0.357 ± 0.013 | 0.321 ± 0.012 | 0.352 ± 0.011 | 0.389 ± 0.008** |
| Relative | 8.08 ± 0.21 | 8.22 ± 0.49 | 8.87 ± 0.29 | 7.99 ± 0.27 | 8.80 ± 0.27 | 9.69 ± 0.20** |
| Liver | | | | | | |
| Absolute | 1.812 ± 0.063 | 1.762 ± 0.096 | 1.999 ± 0.094 | 1.624 ± 0.082 | 2.094 ± 0.048* | 1.915 ± 0.019 |
| Relative | 46.29 ± 1.07 | 42.84 ± 1.46 | 49.69 ± 2.22 | 40.36 ± 1.63* | 52.30 ± 0.52* | 47.74 ± 0.75 |
| Lung | | | | | | |
| Absolute | 0.293 ± 0.013 | 0.339 ± 0.015 | 0.325 ± 0.021 | 0.319 ± 0.022 | 0.315 ± 0.012 | 0.323 ± 0.012 |
| Relative | 7.47 ± 0.25 | 8.37 ± 0.52 | 8.04 ± 0.39 | 7.91 ± 0.44 | 7.87 ± 0.24 | 8.04 ± 0.26 |
| R. Testis | | | | | | |
| Absolute | 0.121 ± 0.003 | 0.120 ± 0.002 | 0.136 ± 0.004 | 0.121 ± 0.003 | 0.137 ± 0.004** | 0.127 ± 0.001** |
| Relative | 3.10 ± 0.11 | 2.95 ± 0.10 | 3.38 ± 0.11 | 3.01 ± 0.08 | 3.44 ± 0.11 | 3.18 ± 0.06 |
| Thymus | | | | | | |
| Absolute | 0.039 ± 0.003 | 0.043 ± 0.003 | 0.048 ± 0.005 | 0.040 ± 0.002 | 0.047 ± 0.004 | 0.041 ± 0.003 |
| Relative | 1.00 ± 0.06 | 1.06 ± 0.07 | 1.21 ± 0.14 | 0.99 ± 0.03 | 1.16 ± 0.08 | 1.02 ± 0.08 |
| **Female** | | | | | | |
| n | 10 | 10 | 10 | 10 | 10 | 10 |
| Necropsy body wt | 33.2 ± 0.9 | 32.6 ± 0.9 | 32.6 ± 1.6 | 33.5 ± 0.9 | 34.7 ± 1.2 | 33.3 ± 0.9 |
| Brain | | | | | | |
| Absolute | 0.482 ± 0.004 | 0.481 ± 0.007 | 0.483 ± 0.005 | 0.477 ± 0.006 | 0.484 ± 0.008 | 0.469 ± 0.004 |
| Relative | 14.62 ± 0.47 | 14.87 ± 0.45 | 15.09 ± 0.66 | 14.31 ± 0.42 | 14.13 ± 0.60 | 14.17 ± 0.35 |
| Heart | | | | | | |
| Absolute | 0.157 ± 0.004[b] | 0.166 ± 0.006 | 0.168 ± 0.008 | 0.170 ± 0.010 | 0.166 ± 0.005 | 0.177 ± 0.006 |
| Relative | 4.76 ± 0.14[b] | 5.14 ± 0.24 | 5.28 ± 0.39 | 5.08 ± 0.28 | 4.83 ± 0.19 | 5.32 ± 0.15 |
| R. Kidney | | | | | | |
| Absolute | 0.210 ± 0.005 | 0.216 ± 0.006 | 0.218 ± 0.007 | 0.212 ± 0.006 | 0.225 ± 0.008 | 0.246 ± 0.008** |
| Relative | 6.37 ± 0.26 | 6.65 ± 0.17 | 6.77 ± 0.24 | 6.35 ± 0.21 | 6.51 ± 0.17 | 7.39 ± 0.18** |
| Liver | | | | | | |
| Absolute | 1.430 ± 0.025 | 1.597 ± 0.054* | 1.725 ± 0.054* | 1.478 ± 0.030* | 1.698 ± 0.056** | 1.783 ± 0.049** |
| Relative | 43.23 ± 0.87 | 49.10 ± 1.20** | 53.44 ± 1.52** | 44.21 ± 0.90** | 49.11 ± 1.01** | 53.65 ± 1.21** |
| Lung | | | | | | |
| Absolute | 0.312 ± 0.013 | 0.325 ± 0.018 | 0.352 ± 0.015 | 0.313 ± 0.010 | 0.325 ± 0.015 | 0.340 ± 0.011 |
| Relative | 9.45 ± 0.45 | 9.99 ± 0.48 | 10.94 ± 0.56 | 9.35 ± 0.23 | 9.44 ± 0.44 | 10.22 ± 0.22 |
| Thymus | | | | | | |
| Absolute | 0.046 ± 0.002 | 0.051 ± 0.003 | 0.055 ± 0.003 | 0.050 ± 0.003 | 0.060 ± 0.003** | 0.056 ± 0.003** |
| Relative | 1.39 ± 0.08 | 1.58 ± 0.09 | 1.70 ± 0.10* | 1.50 ± 0.10 | 1.74 ± 0.06* | 1.68 ± 0.06 |

* Significantly different ($P \leq 0.05$) from the control group by Williams' or Dunnett's test
** $P \leq 0.01$
[a] Organ weights (absolute weights) and body weights are given in grams; organ-weight-to-body-weight ratios (relative weights) are given as mg organ weight/g body weight (mean ± standard error).
[b] n=9

# APPENDIX I
# REPRODUCTIVE TISSUE EVALUATIONS AND ESTROUS CYCLE CHARACTERIZATION

**TABLE I1**
**Summary of Reproductive Tissue Evaluations for Male Rats in the 14-Week Drinking Water Study of 1-Chloro-2-propanol**[a]

| | 0 ppm | 33 ppm | 330 ppm | 3,300 ppm |
|---|---|---|---|---|
| n | 10 | 10 | 10 | 10 |
| Weights (g) | | | | |
| Necropsy body wt | 379 ± 6 | 376 ± 9 | 385 ± 8 | 322 ± 5** |
| R. cauda epididymis | 0.1490 ± 0.0051 | 0.1370 ± 0.0061 | 0.1371 ± 0.0051 | 0.1152 ± 0.0046** |
| R. epididymis | 0.4650 ± 0.0091 | 0.4501 ± 0.0197 | 0.4720 ± 0.0092 | 0.4188 ± 0.0077* |
| R. testis | 1.5141 ± 0.0284 | 1.4878 ± 0.0336 | 1.5465 ± 0.0311 | 1.4871 ± 0.0252 |
| Epididymal spermatozoal measurements | | | | |
| Motility (%) | 67.20 ± 2.00 | 64.20 ± 2.59 | 64.20 ± 3.82 | 67.00 ± 3.28 |
| Abnormal (%) | 0.78 ± 0.17 | 0.90 ± 0.11 | 0.86 ± 0.11 | 1.50 ± 0.16** |
| Concentration ($10^6$/g cauda epididymal tissue) | 742 ± 45 | 812 ± 46 | 887 ± 32* | 725 ± 41 |

* Significantly different ($P \leq 0.05$) from the control group by Dunnett's test (right epididymis weight) or by Dunn's test (concentration)
** Significantly different ($P \leq 0.01$) from the control group by Williams' test (body and tissue weights) or by Shirley's test (abnormal sperm)
[a] Data are presented as mean ± standard error.

**TABLE I2**
**Summary of Estrous Cycle Characterization for Female Rats in the 14-Week Drinking Water Study of 1-Chloro-2-propanol**[a]

| | 0 ppm | 33 ppm | 330 ppm | 3,300 ppm |
|---|---|---|---|---|
| n | 10 | 10 | 10 | 10 |
| Necropsy body wt (g) | 212 ± 7 | 206 ± 4 | 208 ± 3 | 185 ± 3** |
| Estrous cycle length (days) | 4.89 ± 0.2[b] | 4.78 ± 0.15[b] | 5.22 ± 0.22[b] | 4.40 ± 0.22 |
| Estrous stages (% of cycle) | | | | |
| Diestrus | 34.3 | 24.3 | 31.4 | 30.0 |
| Proestrus | 15.7 | 14.3 | 11.4 | 21.4 |
| Estrus | 31.4 | 40.0 | 37.1 | 30.0 |
| Metestrus | 18.6 | 20.0 | 20.0 | 18.6 |
| Uncertain diagnoses | 0.0 | 1.4 | 0.0 | 0.0 |

** Significantly different ($P \leq 0.01$) from the control group by Williams' test
[a] Necropsy body weight and estrous cycle length data are presented as mean ± standard error. Differences from the control group for estrous cycle length are not significant by Dunn's test. By multivariate analysis of variance, exposed females do not differ significantly from the control females in the relative length of time spent in the estrous stages.
[b] Estrous cycle was longer than 12 days or unclear in 1 of 10 animals.

**TABLE I3**
**Summary of Reproductive Tissue Evaluations for Male Mice in the 14-Week Drinking Water Study of 1-Chloro-2-propanol**[a]

| | 0 ppm | 33 ppm | 330 ppm | 3,300 ppm |
|---|---|---|---|---|
| n | 10 | 10 | 9 | 10 |
| Weights (g) | | | | |
| Necropsy body wt | 39.0 ± 1.0 | 41.0 ± 1.2 | 40.3 ± 1.3 | 40.2 ± 0.8 |
| R. cauda epididymis | 0.0113 ± 0.0012 | 0.0108 ± 0.0005 | 0.0111 ± 0.0006 | 0.0123 ± 0.0010 |
| R. epididymis | 0.0530 ± 0.0021 | 0.0493 ± 0.0012 | 0.0484 ± 0.0009 | 0.0586 ± 0.0014* |
| R. testis | 0.1205 ± 0.0028 | 0.1198 ± 0.0022 | 0.1203 ± 0.0027 | 0.1273 ± 0.0011 |
| Epididymal spermatozoal measurements | | | | |
| Motility (%) | 74.22 ± 4.31[b] | 76.60 ± 4.58 | 70.22 ± 4.47 | 71.00 ± 4.14 |
| Abnormal (%) | 1.40 ± 0.26[b] | 1.82 ± 0.23 | 1.64 ± 0.16 | 1.66 ± 0.16 |
| Concentration ($10^6$/g cauda epididymal tissue) | 1,237 ± 208[b] | 1,504 ± 134 | 1,285 ± 87 | 1,140 ± 126 |

* Significantly different ($P \leq 0.05$) from the control group by Dunnett's test
[a] Data are presented as mean ± standard error. Differences from the control group are not significant by Dunnett's test (body weight) or Dunn's test (epididymal spermatozoal measurements).
[b] n=9

**TABLE I4**
**Summary of Estrous Cycle Characterization for Female Mice in the 14-Week Drinking Water Study of 1-Chloro-2-propanol**[a]

| | 0 ppm | 33 ppm | 330 ppm | 3,300 ppm |
|---|---|---|---|---|
| n | 10 | 10 | 10 | 10 |
| Necropsy body wt (g) | 33.2 ± 0.9 | 32.6 ± 0.9 | 33.5 ± 0.9 | 33.3 ± 0.9 |
| Estrous cycle length (days) | 4.25 ± 0.16[b] | 4.13 ± 0.13[b] | 4.33 ± 0.17[c] | 4.60 ± 0.16 |
| Estrous stages (% of cycle) | | | | |
| Diestrus | 24.3 | 31.4 | 25.7 | 14.3 |
| Proestrus | 18.6 | 22.9 | 18.6 | 25.7 |
| Estrus | 30.0 | 32.9 | 34.3 | 37.1 |
| Metestrus | 27.1 | 12.9 | 21.4 | 22.9 |

[a] Weights and estrous cycle lengths are presented as mean ± standard error. Differences from the control group are not significant by Dunnett's test (body weight) or Dunn's test (estrous cycle length). By multivariate analysis of variance, exposed females do not differ significantly from the control females in the relative length of time spent in the estrous stages.
[b] Estrous cycle was longer than 12 days or unclear in 2 of 10 animals.
[c] Estrous cycle was longer than 12 days or unclear in 1 of 10 animals.

# APPENDIX J
# CHEMICAL CHARACTERIZATION AND DOSE FORMULATION STUDIES

# CHEMICAL CHARACTERIZATION AND DOSE FORMULATION STUDIES

## PROCUREMENT AND CHARACTERIZATION OF 1-CHLORO-2-PROPANOL

Technical grade 1-chloro-2-propanol (approximately 75% 1-chloro-2-propanol and 25% 2-chloro-1-propanol) was obtained from Eastman Kodak Laboratory Chemicals (Rochester, NY) in one lot (B15), which was used during the 14-day, 14-week, and 2-year studies. Identity, purity, and stability analyses were conducted by the analytical chemistry laboratory, Midwest Research Institute (Kansas City, MO). Reports on analyses performed in support of the 1-chloro-2-propanol studies are on file at the National Institute of Environmental Health Sciences.

The major component of the test chemical, a clear, colorless liquid, was identified as 1-chloro-2-propanol by infrared, ultraviolet/visible, and nuclear magnetic resonance (NMR) spectroscopy. The infrared and ultraviolet/visible spectra were consistent with those expected for 1-chloro-2-propanol; the NMR spectrum was consistent with a mixture of isomers (1-chloro-2-propanol and 2-chloro-1-propanol). The NMR and infrared spectra were also consistent with a literature reference (*Sadtler Standard Spectra*). The infrared and nuclear magnetic spectra are presented in Figures J1 and J2. The boiling point and density of lot B15 were consistent with a literature reference (*Merck Index*, 1989).

The purity of lot B15 was determined by elemental analyses, Karl Fischer water analysis, free acid titration, and gas chromatography. For free acid titration, samples were dissolved in methanol and titrated with 0.01N sodium hydroxide to a potentiometric endpoint; free acid was detected with a combination pH/mV electrode filled with aqueous 4M potassium chloride. Gas chromatography was performed using a flame ionization detector with a nitrogen carrier gas at a flow rate of 70 mL/minute. Two systems were used:

A) 10% SP-1000 on 80/100 Supelcoport glass column, with an oven temperature program of 50° C for 5 minutes, then 50° to 250° C at 10° C per minute, and

B) 20% SP-2100/0.1% Carbowax 1500 on 100/120 Supelcoport glass column, with an oven temperature program of 30° C for 5 minutes, then 30° to 175° C at 10° C per minute.

Elemental analyses for carbon, chlorine, and hydrogen were in agreement with the theoretical values for 1-chloro-2-propanol. Karl Fischer water analysis indicated 0.62% ± 0.02% water. Free acid titration indicated a hydrochloric acid content of 1,149 ± 2 ppm, equivalent to 0.0315 ± 0.0001 mEq of acid per gram of sample. Gas chromatography using system A indicated two major peaks and two impurities with a combined area of 0.47% relative to the total major peak area. Gas chromatography using system B indicated two major peaks and three impurities with a combined area of 0.67% relative to the total major peak area. No additional impurities with areas of 0.1% or greater relative to the major peak were detected using either system. The second major peak represents 2-chloro-1-propanol, a positional isomer of 1-chloro-2-propanol. The concentrations of 1-chloro-2-propanol and 2-chloro-1-propanol were estimated to be approximately 75% to 76% and 24% to 25%, respectively.

Stability studies of the bulk chemical were performed by the analytical chemistry laboratory. Gas chromatography was performed using system A as described above with an oven temperature program of 100° C for 5 minutes, then 100° to 110° C at 30° C per minute with a 2-minute hold at 110° C. Heptyl alcohol was added as an internal standard. These studies indicated that 1-chloro-2-propanol was stable as a bulk chemical for 2 weeks when stored protected from light at temperatures up to 60° C. To ensure stability, the bulk chemical was stored at 5.5° C (14-day and 14-week studies) or 1° to 8° C (2-year studies) protected from light in sealed glass containers. Stability was monitored during the 14-week studies using gas

chromatography and free acid titration and during the 14-day and 2-year studies using gas chromatography. No degradation of the bulk chemical was detected.

## PREPARATION AND ANALYSIS OF DOSE FORMULATIONS

The dose formulations were prepared twice during the 14-day studies, every 2 weeks in the 14-week studies, and as needed in the 2-year studies by mixing 1-chloro-2-propanol with ultraviolet light-treated, deionized water for the 14-day and 14-week studies and with deionized water for the 2-year studies (Table J1). Formulations were stored in amber glass jars at room temperature.

Stability studies of the 100 ppm dose formulation were performed at the analytical chemistry laboratory using gas chromatography with flame ionization detection with system A with a flow rate of 55 mL/minute and an isothermal column oven temperature of 105° C. The isothermal column oven temperature was changed to 87° C and the nitrogen flow rate was changed to 30 mL/minute for the analyses conducted during the 2-year studies. The internal standard was 1-heptanol for the 14-day and 14-week studies. The stability of the dose formulation was confirmed for 3 weeks when stored at room temperature protected from light and for 72 hours when stored in drinking water bottles at room temperature exposed to light.

Periodic analyses of the dose formulations of 1-chloro-2-propanol were conducted at the study laboratory using gas chromatography with the same system used for the stability studies. During the 14-day studies, formulations were analyzed once per week (Table J2). For the 14-week studies, formulations were analyzed at the beginning, midpoint, and end of the studies (Table J3). During the 2-year studies, formulations were analyzed approximately every 8 weeks (Table J4). Of the dose formulations analyzed and used during the 14-day studies, 95% (19/20) were within 10% of the target concentration, with no value greater than 10% of the target concentration. A 1,000 ppm dose prepared on 10 September 1986 was –39% of the target and was remixed; the reformulated dose was found to be within the acceptable range. All five of the animal room samples analyzed were within 10% of the target concentration. All 25 of the dose formulations analyzed and used during the 14-week studies were within 10% of the target concentration with no value greater than 106% of the target concentration, and all 15 of the animal room samples analyzed were within 10% of the target concentration. All 104 of the dose formulations analyzed and used during the 2-year studies were within 10% of the target concentration with no value greater than 104% of the target concentration, and 33/34 of the animal room samples analyzed were within 10% of the target concentration. The high concentration determined for the 250 ppm animal room sample was attributed to technical error; the sample was contaminated with the 650 ppm rat dose formulation. Results of periodic referee analyses performed by the analytical chemistry laboratory agreed with the results obtained by the study laboratory for the 14-week studies (Table J5).

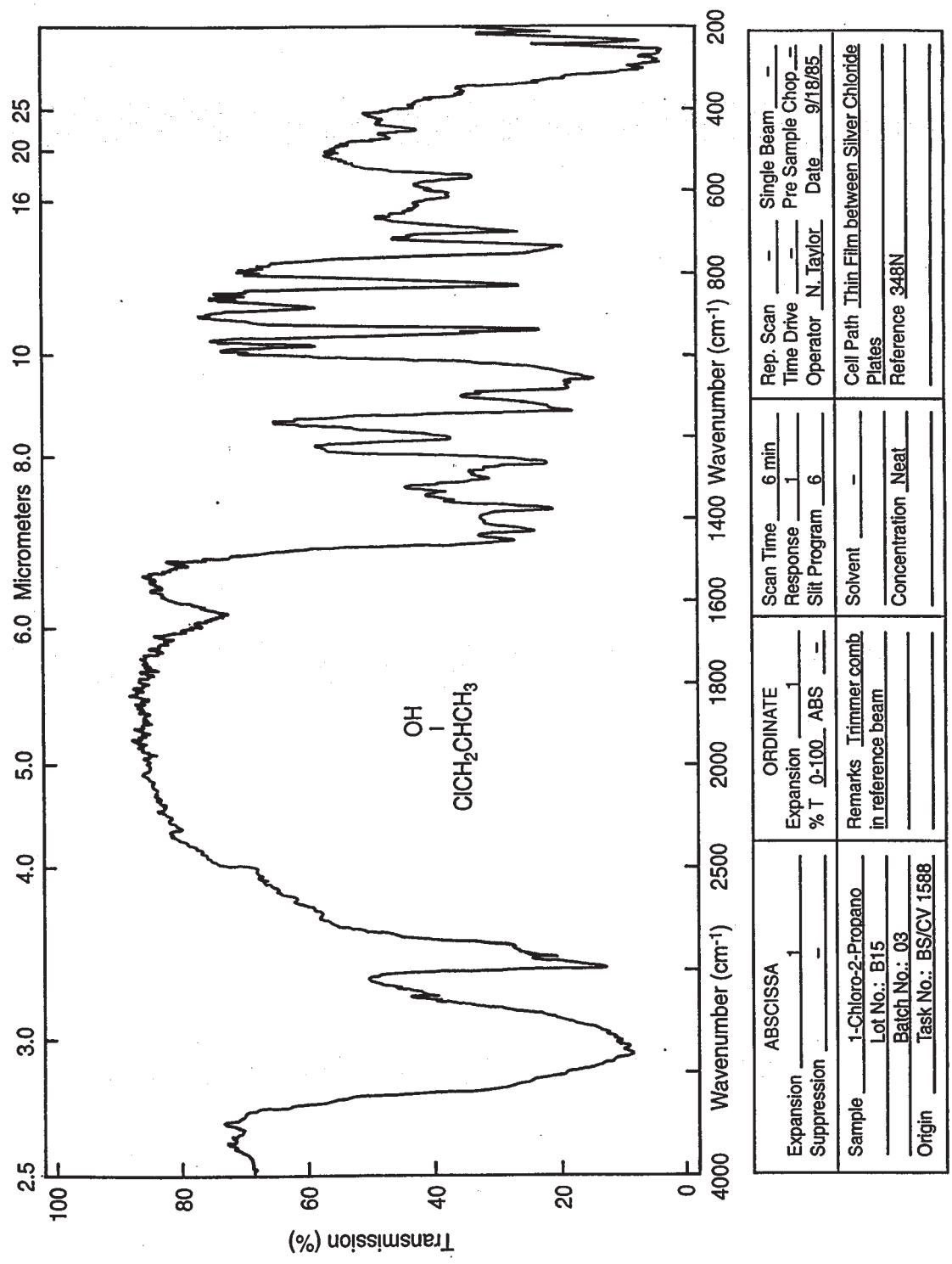


**FIGURE J1**
**Infrared Absorption Spectrum of 1-Chloro-2-propanol**

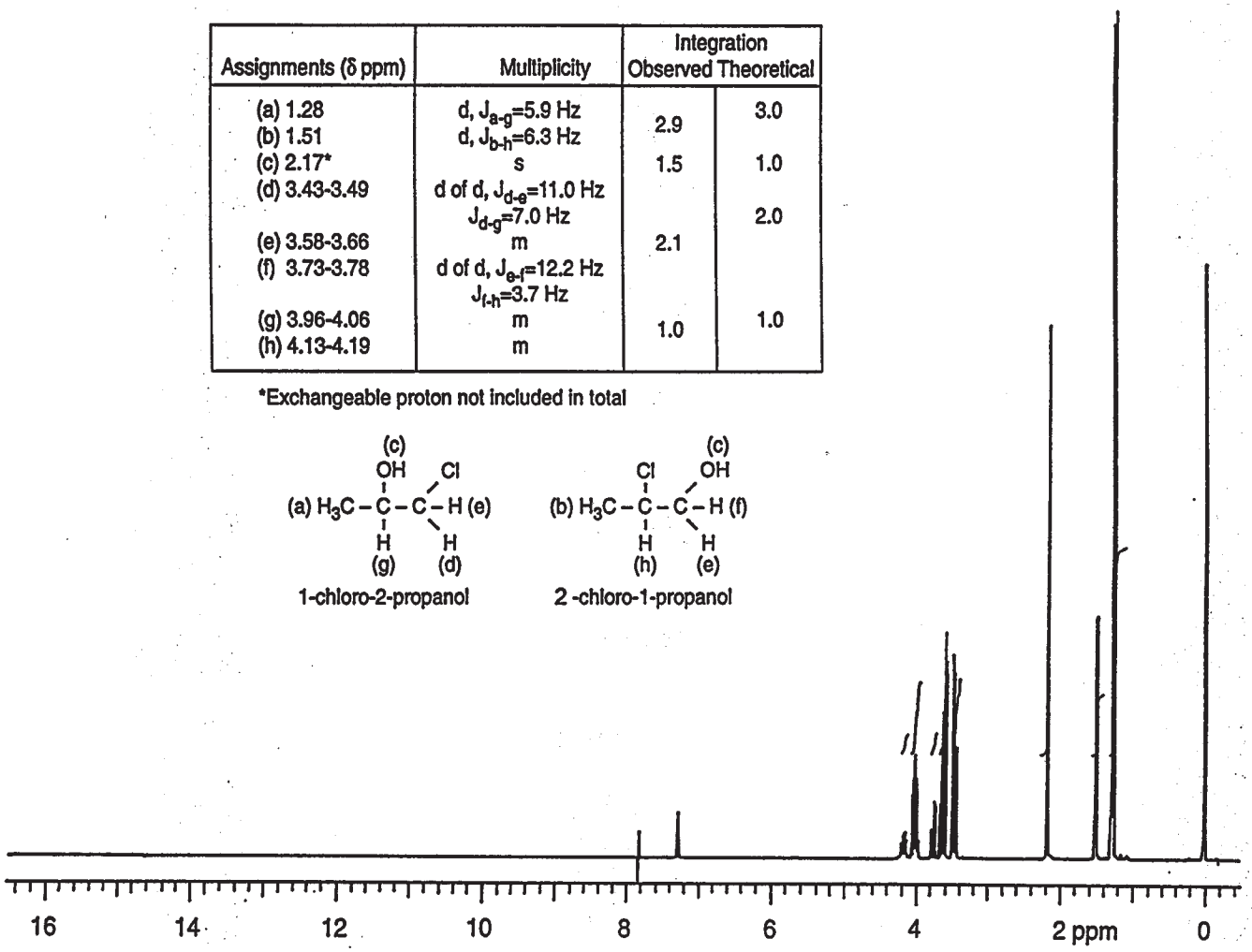


FIGURE J2
**Nuclear Magnetic Resonance Spectrum of 1-Chloro-2-propanol**

**TABLE J1**
**Preparation and Storage of Dose Formulations in the Drinking Water Studies of 1-Chloro-2-propanol**

| 14-Day Studies | 14-Week Studies | 2-Year Studies |
|---|---|---|
| **Preparation**<br>A mixture of ultraviolet light-treated deionized water and 1-chloro-2-propanol was prepared. Doses were prepared weekly. | A mixture of ultraviolet light-treated deionized water and 1-chloro-2-propanol was prepared. Doses were prepared every 2 weeks. | A mixture of deionized water and 1-chloro-2-propanol was prepared. Doses were prepared as needed. |
| **Chemical Lot Number**<br>B15 | B15 | B15 |
| **Maximum Storage Time**<br>Approximately 15 days | 3 weeks | 3 weeks |
| **Storage Conditions**<br>Stored in amber glass bottles, protected from light, at room temperature | Same as 14-day studies | Same as 14-day studies |
| **Study Laboratory**<br>SRI International<br>(Menlo Park, CA) | SRI International<br>(Menlo Park, CA) | TSI Mason Laboratories<br>(Worcester, MA) |
| **Referee Laboratory**<br>None | Midwest Research Institute<br>(Kansas City, MO) | None |

**TABLE J2**
**Results of Analyses of Dose Formulations Administered to Rats and Mice in the 14-Day Drinking Water Studies of 1-Chloro-2-propanol**

| Date Prepared | Target Concentration (ppm) | Determined Concentration[a] (ppm) | Difference from Target (%) |
|---|---|---|---|
| 10 September 1986 | 100 | 105 | +5 |
| | 100 | 96 | −4 |
| | 330 | 335 | +2 |
| | 330 | 334 | +1 |
| | 1,000 | 614 | −39 |
| | 1,000 | 993 | −1 |
| | 3,300 | 3,213 | −3 |
| | 3,300 | 3,206 | −3 |
| | 10,000 | 9,727 | −3 |
| | 10,000 | 9,252 | −7 |
| 16 September 1986 | 1,000 | 1,062[b] | +6 |
| 23 September 1986[c] | 100 | 98 | −2 |
| | 330 | 316 | −4 |
| | 1,000 | 974 | −3 |
| | 3,300 | 3,120 | −5 |
| | 10,000 | 9,460 | −5 |
| 17 September 1986 | 100 | 103 | +3 |
| | 100 | 106 | +6 |
| | 330 | 339 | +3 |
| | 330 | 342 | +4 |
| | 1,000 | 998 | 0 |
| | 1,000 | 970 | −3 |
| | 3,300 | 3,325 | +1 |
| | 3,300 | 3,309 | 0 |
| | 10,000 | 9,814 | −2 |
| | 10,000 | 10,181 | +2 |

[a] Results of duplicate analyses
[b] Results of remix
[c] Animal room samples (taken from first batch of dose formulations prepared and from 16 September 1986 remix)

**TABLE J3**
**Results of Analyses of Dose Formulations Administered to Rats and Mice in the 14-Week Drinking Water Studies of 1-Chloro-2-propanol**

| Date Prepared | Target Concentration (ppm) | Determined Concentration[a] (ppm) | Difference from Target (%) |
|---|---|---|---|
| 28 January 1987 | 33 | 32 | −3 |
| | 100 | 95 | −5 |
| | 330 | 323 | −2 |
| | 1,000 | 982 | −2 |
| | 3,300 | 3,246 | −2 |
| 17 February 1987[b] | 33 | 33 | 0 |
| | 100 | 101 | +1 |
| | 330 | 343 | +4 |
| | 1,000 | 1,007 | +1 |
| | 3,300 | 3,315 | 0 |
| 12 March 1987 | 33 | 33 | 0 |
| | 33 | 35 | +6 |
| | 100 | 98 | −2 |
| | 100 | 98 | −2 |
| | 330 | 323 | −2 |
| | 330 | 325 | −2 |
| | 1,000 | 998 | 0 |
| | 1,000 | 1,017 | +2 |
| | 3,300 | 3,200 | −3 |
| | 3,300 | 3,230 | −2 |
| 1 April 1987[b] | 33 | 30 | −9 |
| | 100 | 94 | −6 |
| | 330 | 315 | −5 |
| | 1,000 | 978 | −2 |
| | 3,300 | 3,395 | +3 |
| 23 April 1987 | 33 | 32 | −3 |
| | 33 | 33 | 0 |
| | 100 | 99 | −1 |
| | 100 | 98 | −2 |
| | 330 | 323 | −2 |
| | 330 | 323 | −2 |
| | 1,000 | 1,008 | +1 |
| | 1,000 | 998 | 0 |
| | 3,300 | 3,375 | +2 |
| | 3,300 | 3,275 | −1 |
| 12 May 1987[b] | 33 | 30 | −9 |
| | 100 | 96 | −4 |
| | 330 | 321 | −3 |
| | 1,000 | 964 | −4 |
| | 3,300 | 3,320 | +1 |

[a] Results of duplicate analyses
[b] Animal room samples (taken from first batch of dose formulations prepared)

**TABLE J4**
**Results of Analyses of Dose Formulations Administered to Rats and Mice in the 2-Year Drinking Water Studies of 1-Chloro-2-propanol**

| Date Prepared | Date Analyzed | Target Concentration (ppm) | Determined Concentration[a] (ppm) | Difference from Target (%) |
|---|---|---|---|---|
| **Rats** | | | | |
| 23 January 1991 | 23 January 1991 | 150 | 147 | −2 |
| | | 325 | 319 | −2 |
| | | 650 | 631 | −3 |
| | 7 February 1991[b] | 150 | 144 | −4 |
| | | 325 | 322 | −1 |
| | | 650 | 644 | −1 |
| 27 March 1991 | 28 March 1991 | 150 | 146 | −3 |
| | | 150 | 146 | −3 |
| | | 325 | 316 | −3 |
| | | 325 | 317 | −2 |
| | | 650 | 638 | −2 |
| | | 650 | 631 | −3 |
| 22 May 1991 | 23 May 1991 | 150 | 147 | −2 |
| | | 150 | 148 | −1 |
| | | 325 | 320 | −2 |
| | | 650 | 640 | −2 |
| 17 July 1991 | 17 July 1991 | 150 | 151 | +1 |
| | | 325 | 324 | 0 |
| | | 650 | 644 | −1 |
| | 31 July 1991[b] | 150 | 146 | −3 |
| | | 325 | 314 | −3 |
| | | 650 | 630 | −3 |
| 11 September 1991 | 12–13 September 1991 | 150 | 150 | 0 |
| | | 325 | 321 | −1 |
| | | 650 | 647 | 0 |
| 6 November 1991 | 7 November 1991 | 150 | 147 | −2 |
| | | 325 | 314 | −3 |
| | | 650 | 617 | −5 |
| 31 December 1991 | 2 January 1992 | 150 | 147 | −2 |
| | | 325 | 316 | −3 |
| | | 650 | 632 | −3 |
| | 15 January 1992[b] | 150 | 147 | −2 |
| | | 325 | 318 | −2 |
| | | 650 | 643 | −1 |
| 26 February 1992 | 27 February 1992 | 150 | 147 | −2 |
| | | 150 | 149 | −1 |
| | | 325 | 319 | −2 |
| | | 325 | 323 | −1 |
| | | 650 | 638 | −2 |
| | | 650 | 640 | −2 |

**TABLE J4**
**Results of Analyses of Dose Formulations Administered to Rats and Mice in the 2-Year Drinking Water Studies of 1-Chloro-2-propanol**

| Date Prepared | Date Analyzed | Target Concentration (ppm) | Determined Concentration (ppm) | Difference from Target (%) |
|---|---|---|---|---|
| **Rats** (continued) | | | | |
| 22 April 1992 | 23 April 1992 | 150 | 147 | −2 |
| | | 325 | 316 | −3 |
| | | 650 | 628 | −3 |
| 17 June 1992 | 18 June 1992 | 150 | 150 | 0 |
| | | 325 | 314 | −3 |
| | | 650 | 628 | −3 |
| 12 August 1992 | 13 August 1992 | 150 | 150 | 0 |
| | | 325 | 327 | +1 |
| | | 650 | 649 | 0 |
| | 9 September 1992[b] | 150 | 147 | −2 |
| | | 325 | 320 | −2 |
| | | 650 | 642 | −1 |
| 13 October 1992 | 14 October 1992 | 150 | 148 | −1 |
| | | 325 | 319 | −2 |
| | | 650 | 637 | −2 |
| 2 December 1992 | 3 December 1992 | 150 | 148 | −1 |
| | | 150 | 148 | −1 |
| | | 325 | 322 | −1 |
| | | 325 | 325 | 0 |
| | | 650 | 639 | −2 |
| | | 650 | 640 | −2 |
| 14 January 1993 | 14 January 1993 | 150 | 147 | −2 |
| | | 325 | 323 | −1 |
| | | 650 | 644 | −1 |
| | 3 February 1993[b] | 150 | 149 | −1 |
| | | 325 | 323 | −1 |
| | | 650 | 643 | −1 |
| **Mice** | | | | |
| 19 December 1990 | 19 December 1990 | 250 | 246 | −2 |
| | | 500 | 492 | −2 |
| | | 1,000 | 984 | −2 |
| | 9 January 1991[b] | 250 | 244 | −2 |
| | | 500 | 477 | −5 |
| | | 1,000 | 969 | −3 |
| 6 February 1991 | 7 February 1991 | 250 | 243 | −3 |
| | | 500 | 490 | −2 |
| | | 1,000 | 1,002 | 0 |
| 27 March 1991 | 28 March 1991 | 250 | 247 | −1 |
| | | 500 | 491 | −2 |
| | | 1,000 | 990 | −1 |

**TABLE J4**
**Results of Analyses of Dose Formulations Administered to Rats and Mice in the 2-Year Drinking Water Studies of 1-Chloro-2-propanol**

| Date Prepared | Date Analyzed | Target Concentration (ppm) | Determined Concentration (ppm) | Difference from Target (%) |
|---|---|---|---|---|
| **Mice** (continued) | | | | |
| 22 May 1991 | 23 May 1991 | 250 | 248 | −1 |
| | | 500 | 487 | −3 |
| | | 1,000 | 990 | −1 |
| | | 1,000 | 991 | −1 |
| | 5 June 1991[b] | 250 | 240 | −4 |
| | | 500 | 490 | −2 |
| | | 1,000 | 982 | −2 |
| | | 1,000 | 989 | −1 |
| 17 July 1991 | 17 July 1991 | 250 | 261 | +4 |
| | | 500 | 499 | 0 |
| | | 1,000 | 991 | −1 |
| 11 September 1991 | 12–13 September 1991 | 250 | 250 | 0 |
| | | 500 | 496 | −1 |
| | | 1,000 | 999 | 0 |
| 6 November 1991 | 7 November 1991 | 250 | 246 | −2 |
| | | 500 | 486 | −3 |
| | | 1,000 | 983 | −2 |
| | 22 November 1991[b] | 250 | 247 | −1 |
| | | 500 | 492 | −2 |
| | | 1,000 | 975 | −2 |
| 31 December 1991 | 2 January 1992 | 250 | 244 | −2 |
| | | 500 | 482 | −4 |
| | | 1,000 | 992 | −1 |
| 26 February 1992 | 27 February 1992 | 250 | 252 | +1 |
| | | 500 | 489 | −2 |
| | | 1,000 | 983 | −2 |
| 22 April 1992 | 23 April 1992 | 250 | 243 | −3 |
| | | 250 | 244 | −2 |
| | | 500 | 481 | −4 |
| | | 500 | 484 | −3 |
| | | 1,000 | 969 | −3 |
| | | 1,000 | 980 | −2 |
| | 14 May 1992[b] | 250 | 250 | 0 |
| | | 250 | 420 | +68 |
| | | 500 | 487 | −3 |
| | | 500 | 495 | −1 |
| | | 1,000 | 993 | −1 |
| | | 1,000 | 1,005 | +1 |

**TABLE J4**
**Results of Analyses of Dose Formulations Administered to Rats and Mice in the 2-Year Drinking Water Studies of 1-Chloro-2-propanol**

| Date Prepared | Date Analyzed | Target Concentration (ppm) | Determined Concentration (ppm) | Difference from Target (%) |
|---|---|---|---|---|
| **Mice** (continued) | | | | |
| 17 June 1992 | 18 June 1992 | 250 | 246 | −2 |
| | | 250 | 240 | −4 |
| | | 500 | 481 | −4 |
| | | 500 | 482 | −4 |
| | | 1,000 | 971 | −3 |
| | | 1,000 | 969 | −3 |
| 12 August 1992 | 13 August 1992 | 250 | 251 | 0 |
| | | 500 | 497 | −1 |
| | | 1,000 | 998 | 0 |
| 13 October 1992 | 14 October 1992 | 250 | 246 | −2 |
| | | 500 | 497 | −1 |
| | | 1,000 | 989 | −1 |
| | 2 November 1992[b] | 250 | 242 | −3 |
| | | 500 | 491 | −2 |
| | | 1,000 | 1,004 | 0 |
| 2 December 1992 | 3 December 1992 | 250 | 251 | 0 |
| | | 250 | 248 | −1 |
| | | 500 | 492 | −2 |
| | | 500 | 496 | −1 |
| | | 1,000 | 982 | −2 |
| | | 1,000 | 989 | −1 |

[a] Results of duplicate analyses
[b] Animal room samples

**TABLE J5**
**Results of Referee Analyses of Dose Formulations Administered to Rats and Mice in the 14-Week Drinking Water Studies of 1-Chloro-2-propanol**

| Date Prepared | Target Concentration (ppm) | Determined Concentration (ppm) | |
|---|---|---|---|
| | | Study Laboratory[a] | Referee Laboratory[b] |
| 28 January 1987 | 1,000 | 982 | 992 ± 8 |
| 23 April 1987 | 100 | 99 | 96.4 ± 1.9 |

[a] Results of duplicate analyses
[b] Results of triplicate analyses

# APPENDIX K
# WATER AND COMPOUND CONSUMPTION IN THE 2-YEAR DRINKING WATER STUDIES OF 1-CHLORO-2-PROPANOL

**TABLE K1**
**Water and Compound Consumption by Male Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| Week | 0 ppm | | 150 ppm | | | 325 ppm | | | 650 ppm | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Water (g/day)[a] | Body Weight (g) | Water (g/day) | Body Weight (g) | Dose/ Day[b] (mg/kg) | Water (g/day) | Body Weight (g) | Dose/ Day (mg/kg) | Water (g/day) | Body Weight (g) | Dose/ Day (mg/kg) |
| 1 | 18.3 | 132 | 18.2 | 130 | 21 | 18.1 | 131 | 45 | 18.8 | 131 | 93 |
| 2 | 23.4 | 166 | 23.3 | 163 | 21 | 24.2 | 166 | 47 | 23.6 | 167 | 92 |
| 4 | 19.2 | 224 | 20.2 | 225 | 13 | 21.9 | 231 | 31 | 21.0 | 230 | 59 |
| 5 | 18.0 | 247 | 18.3 | 249 | 11 | 19.0 | 256 | 24 | 19.7 | 253 | 51 |
| 8 | 24.0 | 289 | 23.2 | 293 | 12 | 22.5 | 296 | 25 | 22.7 | 294 | 50 |
| 9 | 22.1 | 306 | 22.6 | 306 | 11 | 21.7 | 312 | 23 | 21.7 | 308 | 46 |
| 12 | 18.0 | 337 | 18.1 | 341 | 8 | 19.7 | 346 | 19 | 19.8 | 340 | 38 |
| 13 | 22.1 | 349 | 21.3 | 351 | 9 | 22.8 | 355 | 21 | 24.6 | 351 | 46 |
| 17 | 22.1 | 375 | 21.2 | 378 | 8 | 22.8 | 383 | 19 | 21.3 | 382 | 36 |
| 21 | 21.0 | 410 | 20.4 | 409 | 7 | 20.0 | 414 | 16 | 20.4 | 413 | 32 |
| 25 | 21.1 | 426 | 19.8 | 424 | 7 | 21.8 | 432 | 16 | 22.5 | 428 | 34 |
| 29 | 19.8 | 445 | 20.7 | 444 | 7 | 22.1 | 451 | 16 | 22.7 | 450 | 33 |
| 33 | 22.1 | 454 | 21.2 | 454 | 7 | 23.6 | 462 | 17 | 22.7 | 461 | 32 |
| 37 | 20.8 | 462 | 20.2 | 462 | 7 | 21.3 | 473 | 15 | 22.2 | 470 | 31 |
| 41 | 23.6 | 478 | 22.5 | 478 | 7 | 23.3 | 491 | 15 | 22.9 | 488 | 31 |
| 45 | 24.4 | 488 | 24.8 | 487 | 8 | 23.9 | 501 | 15 | 27.2 | 496 | 36 |
| 49 | 25.4 | 484 | 22.8 | 485 | 7 | 25.9 | 497 | 17 | 27.4 | 494 | 36 |
| 53 | 24.4 | 503 | 23.4 | 500 | 7 | 22.9 | 516 | 14 | 24.9 | 507 | 32 |
| 57 | 21.8 | 504 | 20.3 | 503 | 6 | 22.2 | 517 | 14 | 23.0 | 509 | 29 |
| 61 | 21.7 | 505 | 20.2 | 507 | 6 | 21.1 | 523 | 13 | 22.2 | 516 | 28 |
| 65 | 22.9 | 502 | 22.2 | 502 | 7 | 24.1 | 518 | 15 | 23.8 | 508 | 30 |
| 69 | 22.6 | 502 | 21.4 | 504 | 6 | 24.4 | 520 | 15 | 23.6 | 508 | 30 |
| 73 | 20.9 | 510 | 20.6 | 514 | 6 | 25.5 | 529 | 16 | 24.4 | 510 | 31 |
| 77 | 23.6 | 512 | 25.3 | 513 | 7 | 25.9 | 524 | 16 | 28.8 | 509 | 37 |
| 81 | 20.0 | 513 | 20.3 | 516 | 6 | 21.7 | 532 | 13 | 21.0 | 503 | 27 |
| 85 | 24.2 | 514 | 25.9 | 516 | 8 | 26.0 | 537 | 16 | 26.3 | 505 | 34 |
| 89 | 22.5 | 512 | 21.4 | 504 | 6 | 28.5 | 524 | 18 | 25.3 | 497 | 33 |
| 93 | 23.4 | 516 | 23.1 | 497 | 7 | 25.5 | 522 | 16 | 27.9 | 487 | 37 |
| 97 | 28.7 | 516 | 26.1 | 502 | 8 | 29.1 | 506 | 19 | 31.3 | 477 | 43 |
| 101 | 28.2 | 481 | 24.1 | 492 | 7 | 30.8 | 495 | 20 | 30.9 | 468 | 43 |
| 104 | 26.0 | 464 | 26.1 | 479 | 8 | 30.3 | 488 | 20 | 26.9 | 460 | 38 |
| **Mean for weeks** | | | | | | | | | | | |
| 1-13 | 20.6 | 256 | 20.6 | 257 | 13 | 21.2 | 262 | 29 | 21.5 | 260 | 59 |
| 14-52 | 22.3 | 447 | 21.5 | 447 | 7 | 22.8 | 456 | 16 | 23.3 | 454 | 33 |
| 53-104 | 23.6 | 504 | 22.9 | 504 | 7 | 25.6 | 518 | 16 | 25.7 | 498 | 34 |

[a] Grams of water consumed per animal per day
[b] Milligrams of 1-chloro-2-propanol consumed per kilogram body weight per day

**TABLE K2**
**Water and Compound Consumption by Female Rats in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| Week | 0 ppm | | 150 ppm | | | 325 ppm | | | 650 ppm | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Water (g/day)[a] | Body Weight (g) | Water (g/day) | Body Weight (g) | Dose/ Day[b] (mg/kg) | Water (g/day) | Body Weight (g) | Dose/ Day (mg/kg) | Water (g/day) | Body Weight (g) | Dose/ Day (mg/kg) |
| 1 | 16.3 | 111 | 16.0 | 111 | 22 | 15.7 | 111 | 46 | 16.1 | 110 | 95 |
| 2 | 17.8 | 128 | 16.9 | 128 | 20 | 18.9 | 128 | 48 | 17.8 | 127 | 91 |
| 4 | 13.4 | 152 | 14.1 | 151 | 14 | 14.5 | 152 | 31 | 14.5 | 153 | 61 |
| 8 | 14.5 | 182 | 14.8 | 180 | 12 | 15.5 | 180 | 28 | 15.0 | 182 | 54 |
| 12 | 12.0 | 198 | 13.7 | 198 | 10 | 13.3 | 199 | 22 | 13.1 | 201 | 42 |
| 17 | 14.2 | 216 | 15.9 | 216 | 11 | 15.5 | 213 | 24 | 14.7 | 218 | 44 |
| 21 | 12.5 | 224 | 13.9 | 221 | 9 | 15.2 | 220 | 22 | 14.6 | 224 | 42 |
| 25 | 13.2 | 230 | 13.6 | 228 | 9 | 13.7 | 227 | 20 | 13.6 | 231 | 38 |
| 29 | 12.8 | 240 | 14.5 | 238 | 9 | 14.2 | 238 | 19 | 14.5 | 242 | 39 |
| 33 | 13.1 | 246 | 13.9 | 244 | 9 | 14.3 | 244 | 19 | 14.5 | 247 | 38 |
| 37 | 13.5 | 254 | 14.1 | 252 | 8 | 14.0 | 252 | 18 | 14.4 | 255 | 37 |
| 41 | 14.2 | 266 | 15.9 | 265 | 9 | 16.6 | 266 | 20 | 16.6 | 268 | 40 |
| 45 | 12.9 | 269 | 13.9 | 268 | 8 | 13.7 | 269 | 16 | 13.7 | 270 | 33 |
| 49 | 13.7 | 281 | 14.9 | 278 | 8 | 14.9 | 280 | 17 | 14.8 | 282 | 34 |
| 53 | 13.3 | 292 | 13.9 | 293 | 7 | 14.5 | 290 | 16 | 14.2 | 297 | 31 |
| 57 | 13.7 | 296 | 14.4 | 298 | 7 | 15.1 | 295 | 17 | 14.6 | 301 | 31 |
| 61 | 13.0 | 305 | 14.3 | 305 | 7 | 14.9 | 302 | 16 | 15.0 | 309 | 31 |
| 65 | 14.1 | 305 | 14.9 | 307 | 7 | 15.6 | 303 | 17 | 15.9 | 311 | 33 |
| 69 | 15.7 | 315 | 16.2 | 315 | 8 | 17.0 | 311 | 18 | 17.1 | 318 | 35 |
| 73 | 15.3 | 321 | 16.7 | 323 | 8 | 16.7 | 316 | 17 | 16.7 | 324 | 33 |
| 77 | 15.7 | 329 | 16.9 | 332 | 8 | 17.2 | 328 | 17 | 17.3 | 333 | 34 |
| 81 | 15.9 | 326 | 16.6 | 334 | 7 | 16.6 | 326 | 17 | 16.5 | 331 | 32 |
| 85 | 17.3 | 333 | 17.7 | 337 | 8 | 17.5 | 327 | 17 | 17.7 | 338 | 34 |
| 89 | 16.4 | 339 | 17.3 | 343 | 8 | 18.5 | 337 | 18 | 18.0 | 348 | 34 |
| 93 | 16.5 | 338 | 18.1 | 344 | 8 | 18.7 | 336 | 18 | 17.9 | 353 | 33 |
| 97 | 18.0 | 345 | 19.9 | 336 | 9 | 20.5 | 337 | 20 | 20.7 | 358 | 38 |
| 101 | 16.5 | 345 | 18.1 | 341 | 8 | 19.4 | 333 | 19 | 18.5 | 367 | 33 |
| 105 | 18.9 | 348 | 18.8 | 354 | 8 | 20.8 | 334 | 20 | 20.3 | 350 | 38 |
| **Mean for weeks** | | | | | | | | | | | |
| 1-13 | 14.8 | 154 | 15.1 | 153 | 16 | 15.6 | 154 | 35 | 15.3 | 155 | 69 |
| 14-52 | 13.3 | 247 | 14.5 | 246 | 9 | 14.7 | 246 | 20 | 14.6 | 249 | 38 |
| 53-105 | 15.7 | 324 | 16.7 | 326 | 8 | 17.4 | 320 | 18 | 17.2 | 331 | 34 |

[a] Grams of water consumed per animal per day
[b] Milligrams of 1-chloro-2-propanol consumed per kilogram body weight per day

**TABLE K3**
**Water and Compound Consumption by Male Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| Week | 0 ppm | | 250 ppm | | | 500 ppm | | | 1,000 ppm | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Water (g/day)[a] | Body Weight (g) | Water (g/day) | Body Weight (g) | Dose/ Day[b] (mg/kg) | Water (g/day) | Body Weight (g) | Dose/ Day (mg/kg) | Water (g/day) | Body Weight (g) | Dose/ Day (mg/kg) |
| 2 | 6.8 | 25.8 | 7.2 | 25.9 | 70 | 5.7 | 26.5 | 107 | 5.8 | 26.4 | 221 |
| 5 | 5.1 | 31.5 | 5.4 | 30.9 | 44 | 4.9 | 31.7 | 77 | 4.6 | 31.9 | 145 |
| 8 | 4.5 | 36.6 | 5.3 | 36.3 | 36 | 4.4 | 36.9 | 59 | 4.5 | 37.2 | 121 |
| 12 | 4.2 | 39.5 | 4.4 | 39.6 | 28 | 4.1 | 39.8 | 52 | 4.4 | 40.2 | 108 |
| 17 | 4.6 | 44.6 | 4.2 | 44.8 | 24 | 4.3 | 45.3 | 47 | 4.2 | 45.5 | 93 |
| 21 | 4.4 | 46.9 | 4.3 | 47.5 | 23 | 4.4 | 47.7 | 46 | 4.3 | 47.9 | 90 |
| 25 | 5.0 | 48.6 | 4.5 | 48.9 | 23 | 4.6 | 49.6 | 46 | 4.3 | 49.7 | 87 |
| 29 | 4.9 | 50.7 | 4.7 | 50.5 | 24 | 4.7 | 51.0 | 46 | 4.6 | 50.9 | 91 |
| 33 | 4.6 | 51.3 | 4.8 | 50.8 | 24 | 4.7 | 51.1 | 46 | 4.7 | 51.3 | 92 |
| 37 | 4.5 | 51.9 | 4.5 | 51.0 | 22 | 4.5 | 51.2 | 44 | 4.6 | 51.6 | 89 |
| 41 | 4.4 | 52.4 | 4.6 | 52.0 | 22 | 4.7 | 52.7 | 45 | 4.6 | 52.4 | 87 |
| 45 | 5.1 | 53.1 | 5.0 | 52.2 | 24 | 4.8 | 53.5 | 45 | 4.7 | 53.4 | 89 |
| 49 | 5.2 | 52.4 | 5.0 | 51.8 | 24 | 4.9 | 52.7 | 46 | 4.9 | 52.9 | 93 |
| 53 | 5.8 | 52.4 | 5.7 | 52.0 | 27 | 5.7 | 52.9 | 54 | 5.3 | 53.2 | 99 |
| 57 | 5.6 | 52.1 | 5.3 | 51.7 | 26 | 5.3 | 52.5 | 51 | 5.3 | 52.8 | 100 |
| 61 | 5.7 | 52.3 | 5.0 | 52.1 | 24 | 5.6 | 52.7 | 53 | 5.2 | 53.1 | 98 |
| 65 | 5.6 | 51.7 | 5.0 | 52.1 | 24 | 5.3 | 52.3 | 50 | 5.1 | 52.9 | 97 |
| 69 | 5.2 | 51.8 | 4.9 | 52.1 | 24 | 5.1 | 51.8 | 50 | 5.0 | 51.9 | 97 |
| 73 | 5.4 | 51.4 | 5.1 | 51.5 | 25 | 5.6 | 51.4 | 55 | 5.1 | 51.2 | 100 |
| 77 | 5.7 | 49.8 | 5.3 | 51.0 | 26 | 5.8 | 50.3 | 58 | 5.4 | 49.2 | 110 |
| 81 | 5.4 | 50.1 | 5.0 | 50.4 | 25 | 5.2 | 49.7 | 52 | 5.0 | 48.5 | 103 |
| 85 | 5.8 | 50.1 | 5.2 | 50.1 | 26 | 5.8 | 49.5 | 59 | 6.3 | 47.6 | 133 |
| 89 | 6.1 | 48.7 | 5.6 | 49.4 | 28 | 5.3 | 48.0 | 55 | 5.8 | 47.2 | 123 |
| 93 | 5.9 | 47.6 | 5.1 | 49.3 | 26 | 5.4 | 47.4 | 57 | 5.6 | 45.1 | 125 |
| 97 | 6.2 | 47.0 | 5.2 | 48.6 | 27 | 5.2 | 46.8 | 55 | 5.4 | 44.6 | 120 |
| 104 | 6.6 | 44.3 | 5.4 | 47.5 | 28 | 5.2 | 45.5 | 57 | 5.6 | 43.6 | 129 |
| **Mean for weeks** | | | | | | | | | | | |
| 1-13 | 5.2 | 33.3 | 5.6 | 33.2 | 44 | 4.8 | 33.7 | 74 | 4.8 | 33.9 | 149 |
| 14-52 | 4.7 | 50.2 | 4.6 | 50.0 | 23 | 4.6 | 50.6 | 46 | 4.6 | 50.6 | 90 |
| 53-104 | 5.8 | 49.9 | 5.2 | 50.6 | 26 | 5.4 | 50.1 | 54 | 5.4 | 49.3 | 110 |

[a] Grams of water consumed per animal per day
[b] Milligrams of 1-chloro-2-propanol consumed per kilogram body weight per day

**TABLE K4**
**Water and Compound Consumption by Female Mice in the 2-Year Drinking Water Study of 1-Chloro-2-propanol**

| Week | 0 ppm | | 250 ppm | | | 500 ppm | | | 1,000 ppm | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Water (g/day)[a] | Body Weight (g) | Water (g/day) | Body Weight (g) | Dose/ Day[b] (mg/kg) | Water (g/day) | Body Weight (g) | Dose/ Day (mg/kg) | Water (g/day) | Body Weight (g) | Dose/ Day (mg/kg) |
| 2 | 4.9 | 21.9 | 6.3 | 21.6 | 73 | 5.2 | 21.6 | 121 | 5.4 | 21.5 | 250 |
| 5 | 4.9 | 25.5 | 5.8 | 24.2 | 60 | 5.4 | 24.6 | 110 | 5.8 | 24.5 | 236 |
| 7 | 5.0 | 28.8 | 6.4 | 27.3 | 58 | 6.5 | 28.0 | 117 | 6.2 | 28.0 | 222 |
| 8 | 5.2 | 29.6 | 6.0 | 27.4 | 55 | 5.6 | 28.6 | 98 | 5.4 | 28.9 | 186 |
| 12 | 5.2 | 33.9 | 5.4 | 32.0 | 43 | 5.2 | 33.6 | 77 | 5.3 | 33.8 | 157 |
| 17 | 5.2 | 37.6 | 5.0 | 35.8 | 35 | 4.8 | 37.1 | 65 | 5.0 | 37.4 | 132 |
| 21 | 4.6 | 40.7 | 5.1 | 39.1 | 33 | 4.6 | 40.7 | 56 | 4.5 | 40.6 | 111 |
| 25 | 4.8 | 44.0 | 5.0 | 42.2 | 29 | 4.9 | 43.6 | 56 | 4.9 | 44.1 | 111 |
| 29 | 4.5 | 45.7 | 4.9 | 44.1 | 28 | 4.8 | 45.3 | 53 | 4.0 | 45.7 | 88 |
| 33 | 4.5 | 47.4 | 4.9 | 45.1 | 27 | 4.7 | 46.5 | 51 | 4.5 | 46.4 | 97 |
| 37 | 4.1 | 50.0 | 4.3 | 47.6 | 23 | 4.2 | 49.5 | 43 | 4.3 | 49.0 | 88 |
| 41 | 4.5 | 51.1 | 4.4 | 48.9 | 23 | 4.4 | 50.8 | 43 | 4.4 | 49.8 | 89 |
| 45 | 4.6 | 53.0 | 4.5 | 50.9 | 22 | 4.5 | 52.8 | 42 | 5.1 | 52.4 | 97 |
| 49 | 4.7 | 53.3 | 4.7 | 52.0 | 22 | 4.6 | 53.9 | 42 | 4.4 | 52.8 | 84 |
| 53 | 4.7 | 54.4 | 4.7 | 52.7 | 22 | 4.8 | 55.3 | 43 | 4.6 | 54.4 | 85 |
| 57 | 5.0 | 54.7 | 4.8 | 53.5 | 23 | 4.9 | 55.9 | 44 | 4.9 | 55.2 | 89 |
| 61 | 4.6 | 55.8 | 5.0 | 54.9 | 23 | 4.9 | 58.2 | 42 | 4.8 | 56.7 | 85 |
| 65 | 4.8 | 57.4 | 4.9 | 55.6 | 22 | 5.1 | 59.4 | 43 | 4.9 | 58.6 | 83 |
| 69 | 4.8 | 59.1 | 4.9 | 57.4 | 21 | 4.9 | 60.5 | 40 | 4.6 | 59.0 | 78 |
| 73 | 5.3 | 58.7 | 5.4 | 57.8 | 23 | 5.2 | 61.1 | 43 | 5.0 | 60.3 | 84 |
| 77 | 5.6 | 59.3 | 5.5 | 58.1 | 23 | 5.7 | 61.2 | 47 | 5.6 | 60.7 | 92 |
| 81 | 4.9 | 59.5 | 5.3 | 59.3 | 22 | 5.0 | 62.9 | 40 | 4.7 | 61.2 | 78 |
| 85 | 5.2 | 60.1 | 5.4 | 59.8 | 23 | 5.1 | 62.4 | 41 | 4.8 | 61.0 | 78 |
| 89 | 5.7 | 59.8 | 5.2 | 59.5 | 22 | 5.4 | 61.0 | 45 | 5.2 | 59.5 | 87 |
| 93 | 5.7 | 57.6 | 5.3 | 58.6 | 23 | 5.7 | 60.8 | 47 | 5.5 | 59.7 | 92 |
| 97 | 5.8 | 56.2 | 5.3 | 58.9 | 23 | 5.3 | 61.7 | 43 | 5.5 | 59.7 | 92 |
| 101 | 5.8 | 54.2 | 5.9 | 57.6 | 26 | 5.7 | 59.6 | 48 | 5.6 | 58.6 | 96 |
| 105 | 5.9 | 52.1 | 5.8 | 54.5 | 26 | 6.3 | 55.4 | 57 | 6.2 | 55.5 | 111 |
| **Mean for weeks** | | | | | | | | | | | |
| 1-13 | 5.0 | 27.9 | 6.0 | 26.5 | 58 | 5.6 | 27.3 | 104 | 5.6 | 27.3 | 210 |
| 14-52 | 4.6 | 47.0 | 4.8 | 45.1 | 27 | 4.6 | 46.7 | 50 | 4.6 | 46.5 | 100 |
| 53-105 | 5.3 | 57.1 | 5.2 | 57.0 | 23 | 5.3 | 59.7 | 44 | 5.1 | 58.6 | 88 |

[a] Grams of water consumed per animal per day
[b] Milligrams of 1-chloro-2-propanol consumed per kilogram body weight per day

# APPENDIX L
# INGREDIENTS, NUTRIENT COMPOSITION, AND CONTAMINANT LEVELS IN NIH-07 RAT AND MOUSE RATION

**TABLE L1**
**Ingredients of NIH-07 Rat and Mouse Ration**[a]

| Ingredients[b] | Percent by Weight |
|---|---|
| Ground #2 yellow shelled corn | 24.50 |
| Ground hard winter wheat | 23.00 |
| Soybean meal (49% protein) | 12.00 |
| Fish meal (60% protein) | 10.00 |
| Wheat middlings | 10.00 |
| Dried skim milk | 5.00 |
| Alfalfa meal (dehydrated, 17% protein) | 4.00 |
| Corn gluten meal (60% protein) | 3.00 |
| Soy oil | 2.50 |
| Dried brewer's yeast | 2.00 |
| Dry molasses | 1.50 |
| Dicalcium phosphate | 1.25 |
| Ground limestone | 0.50 |
| Salt | 0.50 |
| Premixes (vitamin and mineral) | 0.25 |

[a] NCI, 1976; NIH, 1978
[b] Ingredients were ground to pass through a U.S. Standard Screen No. 16 before being mixed.

**TABLE L2**
**Vitamins and Minerals in NIH-07 Rat and Mouse Ration**[a]

| | Amount | Source |
|---|---|---|
| **Vitamins** | | |
| A | 5,500,000 IU | Stabilized vitamin A palmitate or acetate |
| $D_3$ | 4,600,000 IU | D-activated animal sterol |
| $K_3$ | 2.8 g | Menadione |
| *d*-α-Tocopheryl acetate | 20,000 IU | |
| Choline | 560.0 g | Choline chloride |
| Folic acid | 2.2 g | |
| Niacin | 30.0 g | |
| *d*-Pantothenic acid | 18.0 g | *d*-Calcium pantothenate |
| Riboflavin | 3.4 g | |
| Thiamine | 10.0 g | Thiamine mononitrate |
| $B_{12}$ | 4,000 µg | |
| Pyridoxine | 1.7 g | Pyridoxine hydrochloride |
| Biotin | 140.0 mg | *d*-Biotin |
| **Minerals** | | |
| Iron | 120.0 g | Iron sulfate |
| Manganese | 60.0 g | Manganous oxide |
| Zinc | 16.0 g | Zinc oxide |
| Copper | 4.0 g | Copper sulfate |
| Iodine | 1.4 g | Calcium iodate |
| Cobalt | 0.4 g | Cobalt carbonate |

[a] Per ton (2,000 lb) of finished product

**TABLE L3**
**Nutrient Composition of NIH-07 Rat and Mouse Ration**

| Nutrient | Mean ± Standard Deviation | Range | Number of Samples |
|---|---|---|---|
| Protein (% by weight) | 23.44 ± 0.51 | 22.2 ) 24.3 | 25 |
| Crude fat (% by weight) | 5.32 ± 0.19 | 5.00 ) 5.90 | 25 |
| Crude fiber (% by weight) | 3.34 ± 0.32 | 2.60 ) 4.30 | 25 |
| Ash (% by weight) | 6.45 ± 0.18 | 6.12 ) 6.81 | 25 |
| **Amino Acids (% of total diet)** | | | |
| Arginine | 1.273 ± 0.083 | 1.100 ) 1.390 | 12 |
| Cystine | 0.307 ± 0.068 | 0.181 ) 0.400 | 12 |
| Glycine | 1.152 ± 0.051 | 1.060 ) 1.220 | 12 |
| Histidine | 0.581 ± 0.029 | 0.531 ) 0.630 | 12 |
| Isoleucine | 0.913 ± 0.034 | 0.867 ) 0.965 | 12 |
| Leucine | 1.969 ± 0.053 | 1.850 ) 2.040 | 12 |
| Lysine | 1.269 ± 0.050 | 1.200 ) 1.370 | 12 |
| Methionine | 0.436 ± 0.104 | 0.306 ) 0.699 | 12 |
| Phenylalanine | 0.999 ± 0.114 | 0.665 ) 1.110 | 12 |
| Threonine | 0.899 ± 0.059 | 0.824 ) 0.985 | 12 |
| Tryptophan | 0.216 ± 0.146 | 0.107 ) 0.671 | 12 |
| Tyrosine | 0.690 ± 0.091 | 0.564 ) 0.794 | 12 |
| Valine | 1.079 ± 0.057 | 0.962 ) 1.170 | 12 |
| **Essential Fatty Acids (% of total diet)** | | | |
| Linoleic | 2.389 ± 0.223 | 1.830 ) 2.570 | 11 |
| Linolenic | 0.273 ± 0.034 | 0.210 ) 0.320 | 11 |
| **Vitamins** | | | |
| Vitamin A (IU/kg) | 6,584 ± 1,215 | 5,280 ) 11,450 | 25 |
| Vitamin D (IU/kg) | 4,450 ± 1,382 | 3,000 ) 6,300 | 4 |
| α-Tocopherol (ppm) | 35.24 ± 8.58 | 22.5 ) 48.9 | 12 |
| Thiamine (ppm) | 17.28 ± 2.03 | 14.0 ) 22.0 | 25 |
| Riboflavin (ppm) | 7.78 ± 0.899 | 6.10 ) 9.00 | 12 |
| Niacin (ppm) | 98.73 ± 23.21 | 65.0 ) 150.0 | 12 |
| Pantothenic acid (ppm) | 32.94 ± 8.92 | 23.0 ) 59.2 | 12 |
| Pyridoxine (ppm) | 9.28 ± 2.49 | 5.60 ) 14.0 | 12 |
| Folic acid (ppm) | 2.56 ± 0.70 | 1.80 ) 3.70 | 12 |
| Biotin (ppm) | 0.265 ± 0.046 | 0.190 ) 0.354 | 12 |
| Vitamin $B_{12}$ (ppb) | 41.6 ± 18.6 | 10.6 ) 65.0 | 12 |
| Choline (ppm) | 2,995 ± 382 | 2,300 ) 3,430 | 11 |
| **Minerals** | | | |
| Calcium (%) | 1.17 ± 0.06 | 1.09 ) 1.31 | 25 |
| Phosphorus (%) | 0.92 ± 0.05 | 0.760 ) 1.00 | 25 |
| Potassium (%) | 0.886 ± 0.059 | 0.772 ) 0.971 | 10 |
| Chloride (%) | 0.531 ± 0.082 | 0.380 ) 0.635 | 10 |
| Sodium (%) | 0.316 ± 0.031 | 0.258 ) 0.370 | 12 |
| Magnesium (%) | 0.165 ± 0.010 | 0.148 ) 0.180 | 12 |
| Sulfur (%) | 0.266 ± 0.060 | 0.208 ) 0.420 | 11 |
| Iron (ppm) | 348.0 ± 83.7 | 255.0 ) 523.0 | 12 |
| Manganese (ppm) | 93.27 ± 5.62 | 81.7 ) 102.0 | 12 |
| Zinc (ppm) | 59.42 ± 9.73 | 46.1 ) 81.6 | 12 |
| Copper (ppm) | 11.63 ± 2.46 | 8.09 ) 15.4 | 12 |
| Iodine (ppm) | 3.49 ± 1.14 | 1.52 ) 5.83 | 11 |
| Chromium (ppm) | 1.57 ± 0.53 | 0.60 ) 2.09 | 12 |
| Cobalt (ppm) | 0.81 ± 0.27 | 0.49 ) 1.23 | 8 |

**TABLE L4**
**Contaminant Levels in NIH-07 Rat and Mouse Ration[a]**

| | Mean ± Standard Deviation[b] | Range | Number of Samples |
|---|---|---|---|
| **Contaminants** | | | |
| Arsenic (ppm) | 0.47 ± 0.18 | 0.10 ) 0.70 | 25 |
| Cadmium (ppm) | 0.14 ± 0.07 | 0.04 ) 0.20 | 25 |
| Lead (ppm) | 0.36 ± 0.24 | 0.10 ) 1.00 | 25 |
| Mercury (ppm)[c] | 0.02 | 0.02 ) 0.03 | 25 |
| Selenium (ppm) | 0.33 ± 0.11 | 0.05 ) 0.40 | 25 |
| Aflatoxins (ppb) | < 5.0 | | 25 |
| Nitrate nitrogen (ppm)[d] | 7.92 ± 4.09 | 2.90 ) 17.0 | 25 |
| Nitrite nitrogen (ppm)[d] | 0.14 ± 0.06 | 0.10 ) 0.30 | 25 |
| BHA (ppm)[e] | 1.76 ± 1.92 | 1.00 ) 10.0 | 25 |
| BHT (ppm)[e] | 1.60 ± 1.58 | 1.0 ) 8.00 | 25 |
| Aerobic plate count (CFU/g) | 97,244 ± 161,922 | 6,500 ) 710,000 | 25 |
| Coliform (MPN/g) | 3 ± 0.3 | 3 ) 4 | 25 |
| *Escherichia coli* (MPN/g) | < 3 | | 25 |
| *Salmonella* (MPN/g) | Negative | | 25 |
| Total nitrosoamines (ppb)[f] | 7.52 ± 1.84 | 4.7 ) 11.4 | 25 |
| *N*-Nitrosodimethylamine (ppb)[f] | 5.46 ± 1.24 | 2.9 ) 8.2 | 25 |
| *N*-Nitrosopyrrolidine (ppb)[f] | 2.06 ± 1.08 | 1.0 ) 4.3 | 25 |
| **Pesticides (ppm)** | | | |
| α-BHC | < 0.01 | | 25 |
| β-BHC | < 0.02 | | 25 |
| γ-BHC | < 0.01 | | 25 |
| δ-BHC | < 0.01 | | 25 |
| Heptachlor | < 0.01 | | 25 |
| Aldrin | < 0.01 | | 25 |
| Heptachlor epoxide | < 0.01 | | 25 |
| DDE | < 0.01 | | 25 |
| DDD | < 0.01 | | 25 |
| DDT | < 0.01 | | 25 |
| HCB | < 0.01 | | 25 |
| Mirex | < 0.01 | | 25 |
| Methoxychlor | < 0.05 | | 25 |
| Dieldrin | < 0.01 | | 25 |
| Endrin | < 0.01 | | 25 |
| Telodrin | < 0.01 | | 25 |
| Chlordane | < 0.05 | | 25 |
| Toxaphene | < 0.10 | | 25 |
| Estimated PCBs | < 0.20 | | 25 |
| Ronnel | < 0.01 | | 25 |
| Ethion | < 0.02 | | 25 |
| Trithion | < 0.05 | | 25 |
| Diazinon | < 0.10 | | 25 |
| Methyl parathion | < 0.02 | | 25 |
| Ethyl parathion | < 0.02 | | 25 |
| Malathion | 0.25 ± 0.24 | 0.05 ) 0.97 | 25 |
| Endosulfan I | < 0.01 | | 25 |
| Endosulfan II | < 0.01 | | 25 |
| Endosulfan sulfate | < 0.03 | | 25 |

[a] CFU=colony-forming units; MPN=most probable number; BHC=hexachlorocyclohexane or benzene hexachloride
[b] For values less than the limit of detection, the detection limit is given as the mean.
[c] All values except for lots milled November and December 1991 were less than the detection limit. The detection limit is given as the mean.
[d] Sources of contamination: alfalfa, grains, and fish meal
[e] Sources of contamination: soy oil and fish meal
[f] All values were corrected for percent recovery.

# APPENDIX M
# SENTINEL ANIMAL PROGRAM

# SENTINEL ANIMAL PROGRAM

## METHODS

Rodents used in the Carcinogenesis Program of the National Toxicology Program are produced in optimally clean facilities to eliminate potential pathogens that may affect study results. The Sentinel Animal Program is part of the periodic monitoring of animal health that occurs during the toxicologic evaluation of chemical compounds. Under this program, the disease state of the rodents is monitored via serology on sera from extra (sentinel) animals in the study rooms. These animals and the study animals are subject to identical environmental conditions. The sentinel animals come from the same production source and weanling groups as the animals used for the studies of chemical compounds.

Serum samples were collected from randomly selected rats and mice during the 14-week and 2-year studies. Blood from each animal was collected and allowed to clot, and the serum was separated. The samples were processed appropriately and sent to Microbiological Associates, Inc. (Bethesda, MD), for determination of antibody titers. The laboratory serology methods and viral agents for which testing was performed are tabulated below; the times at which blood was collected during the studies are also listed.

| Method and Test | Time of Analysis |
|---|---|
| **RATS** | |
| **14-Week Study** | |
| ELISA | |
| PVM (pneumonia virus of mice) | Study termination |
| RCV/SDA (rat coronavirus/ sialodacryoadenitis virus) | Study termination |
| Sendai | Study termination |
| Hemagglutination Inhibition | |
| H-1 (Toolan's H-1 virus) | Study termination |
| KRV (Kilham rat virus) | Study termination |
| **2-Year Study** | |
| ELISA | |
| *Mycoplasma arthritidis* | 22 months |
| *Mycoplasma pulmonis* | 22 months |
| PVM | 6, 10, 12, 18, and 22 months, study termination |
| RCV/SDA | 6, 10, 12, 18, and 22 months, study termination |
| Sendai | 6, 10, 12, 18, and 22 months, study termination |
| Hemagglutination Inhibition | |
| H-1 | 6, 10, 12, 18, and 22 months, study termination |
| KRV | 6, 10, 12, 18, and 22 months, study termination |

| Method and Test | Time of Analysis |
|---|---|
| **MICE** | |
| **14-Week Study** | |
| ELISA | |
| Ectromelia virus | Study termination |
| GDVII (mouse encephalomyelitis virus) | Study termination |
| LCM (lymphocytic choriomeningitis virus) | Study termination |
| MVM (minute virus of mice) | Study termination |
| PVM | Study termination |
| Reovirus 3 | Study termination |
| Sendai | Study termination |
| Hemagglutination Inhibition | |
| Polyoma virus | Study termination |
| **2-Year Study** | |
| ELISA | |
| Ectromelia virus | 6, 12, and 18 months, study termination |
| EDIM (epizootic diarrhea of infant mice) | 12 and 18 months, study termination |
| GDVII | 6, 12, and 18 months, study termination |
| LCM | 6, 12, and 18 months, study termination |
| Mouse adenoma virus-FL | 6, 12, and 18 months, study termination |
| MHV (mouse hepatitis virus) | 6, 12, and 18 months, study termination |
| PVM | 6, 12, and 18 months, study termination |
| Reovirus 3 | 6, 12, and 18 months, study termination |
| Sendai | 6, 12, and 18 months, study termination |
| Immunofluorescence Assay | |
| Ectromelia virus | 6 and 12 months |
| EDIM | 6, 12, and 18 months |
| LCM | 6 months |
| Reovirus 3 | 12 months |
| Hemagglutination Inhibition | |
| K (papovavirus) | 6, 12, and 18 months, study termination |
| MVM | 6, 12, and 18 months, study termination |
| Polyoma virus | 6, 12, and 18 months, study termination |

Results of serology tests are presented in Table M1.

**TABLE M1**
**Murine Virus Antibody Determinations for Rats and Mice in the 14-Week and 2-Year Studies of 1-Chloro-2-propanol**

| Interval | Incidence of Antibody in Sentinel Animals | Positive Serologic Reaction for |
|---|---|---|
| **14-Week Studies** | | |
| **Rats** | | |
| Study termination | 0/10 | None positive |
| **Mice** | | |
| Study termination | 0/10 | None positive |
| **2-Year Studies** | | |
| **Rats** | | |
| 6 Months | 0/10 | None positive |
| 10 Months | 0/10 | None positive |
| 12 Months | 0/10 | None positive |
| 18 Months | 0/11 | None positive |
| 22 Months | 1/1[a] | *M. arthritidis* |
| Study termination | 0/16 | None positive |
| **Mice** | | |
| 6 Months | 0/10 | None positive |
| 12 Months | 1/10[b] | Reovirus 3 |
| 18 Months | 0/8 | None positive |
| Study termination | 0/10 | None positive |

[a] One rat with clinical symptoms that could be due to an infectious disease was evaluated for murine virus antibody titers. The serum sample from this rat had a low antibody titer for *M. arthritidis*. A larger set of samples (16) evaluated at study termination was negative for the panel of viruses included in the sentinel animal program including *M. arthritidis*. Evaluation of samples positive for *M. arthritidis* in various studies by immunoblot and Western blot procedures indicated that positive titers may be due to cross reaction with antibodies of nonpathogenic *Mycoplasma* or other agents. Only one sample was positive in this study, and there were no clinical findings or histopathologic changes of *M. arthritidis* infection in the animal with the positive titer. Accordingly, the *M. arthritidis*-positive titer was considered a false positive.

[b] Only one sample was positive for Reovirus 3 at 12 months with a low antibody titer. Samples from the same colony at 18 months and 2 years were negative. Sporadic low-titer positive reactions have been associated with false positives for Reovirus 3. Accordingly, the Reovirus 3 positive titer was considered a false positive.