United States Environmental Protection Agency

Integrated Risk Information System (IRIS) Screening-Level Literature Review

Chemical Name: Mercuric chloride CASRN: 7487-94-7
Date of screening-level review: 1/1/2002

Summary of Available Toxicity Information

IRIS

RfD (mg/kg-day): 0.0003
- **Date of Last Significant Revision:** 11/16/88
- **Availability:**
- **Critical Effect:** Autoimmune effects
- **UF:** 1000
- **MF:** 1
- **Was an UF assigned based on lack of supporting data?** No
- **What was the data gap?**
- **Study Animal/Species:** Rat
- **Principal Study Description:** Subchronic feeding and subcutaneous studies
- **Principal Study Reference:** U.S. EPA, 1987

RfC (mg/m^3):
- **Date of Last Significant Revision:**
- **Availability:** Not available
- **Critical Effect:**
- **UF:**
- **MF:**
- **Was an UF assigned based on lack of supporting data?**
- **What was the data gap?**
- **Study Animal/Species:**
- **Principal Study Description:**
- **Principal Study Reference:**

CSF $(mg/kg\text{-}day)^{-1}$:
- **Date of Last Significant Revision:** 03/03/94
- **Availability:** Insufficient data
- **Tumor Type:**
- **Study Animal/Species:**
- **Principal Study Reference:**

IUR $(\mu g/m^3)^{-1}$:
- **Date of Last Significant Revision:**
- **Availability:** Not available
- **Tumor Type:**
- **Study Animal/Species:**
- **Principal Study Reference:**

WOE Classification: C
- **Date of Last Significant Revision:** 03/03/94

Information Available through the IRIS Submission Desk

Comments: Not available

ATSDR

Toxicological Profile (date of most recent update): 1999

Oral MRL (mg/kg-day): 0.002
Duration: Intermediate
Critical Organ/Effect: Renal
Study Animal/Species: Rat
Principal Study Reference: NTP, 1993

Inhalation MRL (mg/m^3):
Duration:
Critical Organ/Effect:
Study Animal/Species:
Principal Study Reference:

ATSDR Supplemental Document:

Health Canada

Health Canada Assessment (date of assessment): Not available

TDI (mg/kg-day):
Critical Organ/Effect:
Study Animal/Species:
Principal Study Reference:

TC (mg/m^3):
Critical Organ/Effect:
Study Animal/Species:
Principal Study Reference:

TD05 (mg/kg-day):
Tumor Type:
Study Animal/Species:
Principal Study Reference:

TC05 (mg/m^3):
Tumor Type:
Study Animal/Species:
Principal Study Reference:

Cancer classification:

IARC

Date of Most Recent Monograph: 1993
Classification: 3

WHO

Publication Date: Not available
Publication Type:

NTP Cancer Bioassay (published since 1986)

Publication Date: 1993
Route of exposure: Gavage
Result: SE - Some evidence of carcinogenicity

NTP Report on Carcinogens

Date Listed: Not available
Classification:

Re-registration Eligibility Decisions (RED)

Publication Date: Not available

RfD (mg/kg-day):
Critical Effect:
UF:
MF:
Study Animal/Species:
Principal Study Description:
Principal Study Reference:

RfC (mg/m^3):
Critical Effect:
UF:
MF:
Study Animal/Species:
Principal Study Description:
Principal Study Reference:

CSF $(mg/kg\text{-}day)^{-1}$:
Tumor Type:
Study Animal/Species:
Principal Study Reference:

IUR $(\mu g/m^3)^{-1}$:
Tumor Type:
Study Animal/Species:
Principal Study Reference:

NCEA Provisional Assessments

Publication Date: Not available

RfD (mg/kg-day):
Critical Effect:
UF:

MF:
Study Animal/Species:
Principal Study Description:
Principal Study Reference:

RfC (mg/m^3):

Critical Effect:
UF:
MF:
Study Animal/Species:
Principal Study Description:
Principal Study Reference:

CSF $(mg/kg\text{-}day)^{-1}$:

Tumor Type:
Study Animal/Species:
Principal Study Reference:

IUR $(\mu g/m^3)^{-1}$:

Tumor Type:
Study Animal/Species:
Principal Study Reference:

WOE Classification:

Literature Search Strategy and Screening

RfD: Conduct literature search from 1998 to January, 2002 (ATSDR, 1999).
RfC: Not available, however, ATSDR derived a chronic inhalation MRL in the 1999 Toxicological Profile.
Carcinogenicity: Conduct literature search from 1998 to January, 2002 (ATSDR, 1999).
Note: A 14-day gavage and 13-week gavage toxicity study were found while searching the NTP Management Status Report.
Note: Although some evidence of carcinogenic activity was found in male F344 rats, there was equivocal evidence in female F344 rats and male B6C3F1 mice, and no evidence in female B6C3F1 mice.

Revision History

Evaluation of the Recent Literature and Determination of Currency

Oral Reference Dose (RfD):

The literature published since the oral RfD for mercuric chloride was derived (1988) does not appear to contain study data that could potentially produce a change in the RfD.

The IRIS RfD for mercuric chloride was derived based on subchronic dietary and subcutaneous studies in Brown Norway rats, as recommended by a 1987 peer review panel. In the 1999 Toxicological Profile, ATSDR derived an intermediate oral minimal risk level (MRL) for mercuric chloride based on a 1993 National Toxicity Program (NTP) assay considered in the IRIS assessment. A literature search conducted for the years 1998 to 2002 identified no chronic toxicity studies, but identified a two-generation reproductive and fertility study in Sprague-Dawley rats (1998; 2001); reproductive toxicity studies in C57/BL6 mice (1999) and in Sprague-Dawley rats (1999); and developmental toxicity studies in MRL/lpr mice (2000) and in post-natal rats (2001). The lowest doses administered in these studies (0.25 to 0.5 milligrams per kilogram body weight per day [mg/kg/day]) were similar to the lowest-observed-adverse-effects-levels (LOAELs) used to derive the IRIS RfD. As such, data from these studies is unlikely to produce a change in the IRIS RfD.

1The IRIS RfD verification date is listed in the IRIS summary as 11/16/88. A note is also provided indicating that the IRIS summary was included in the Mercury Study Report to Congress and that peer review and public comments (1995) were evaluated and considered in the revision and finalization of the IRIS summary.

Inhalation Reference Concentration (RfC):

No assessment of the RfC is included in IRIS.

Oral Slope Factor (CSF):

A CSF for mercuric chloride is not available because EPA determined that the data were insufficient to support development of a CSF (latest assessment 1994). The literature published since 1994 does not appear to contain study data that could potentially produce a change in the CSF status. A review of the ATSDR Toxicological Profile (1999) and a literature search conducted for the years 1998 to 2002 identified no new studies that would be directly useful in the derivation of a CSF for mercuric chloride.

Inhalation Unit Risk (IUR):

No assessment of the IUR is included in IRIS.

Cancer Weight-of-Evidence (WOE) Classification:

The literature published since the WOE classification (C—possible human carcinogen) was derived (1994) does not appear to contain study data that could produce a change in the WOE classification.

A review of the ATSDR Toxicological Profile (1999) and a literature search conducted for the years 1998 to 2002 identified no human studies, but identified several genotoxicity studies of mercuric chloride, as well as studies of the mechanisms by which mercuric chloride damages DNA.

Unknown Relevance:

Eleven documents were categorized as being of unknown relevance.

Note: Because of the large number of references found in the literature search (approximately 425), search results were limited with a secondary search in EndNote to identify references containing common laboratory species and toxicological terms, including: rat, mouse/mice, gerbil, hamster, beagle, dog, human, rabbit, pig, monkey, primate, worker, subject, patient, epidemiol*, genotox*, mutat*, and mutag*. Any references not containing one of these search terms were coded as N/A. In addition, references containing the term aquatic were also coded as N/A.