

Target Organ Toxicity: Lung

Introduction

The Society of Toxicology, recognizing the need for periodic review of the methods used in the assessment of chemically induced toxicity, is sponsoring a series of symposia on Target Organ Toxicity. These meetings have considered and will consider the state of the art and the need for future developments for the assessment of toxicity. This activity is being coordinated by Drs. Joseph F. Borzelleca, Robert L. Dixon, and Perry J. Gehring. Scientists having expertise relevant to various organs and tissues will participate to: (1) review the morphology, physiology, and biochemistry; (2) describe means routinely used to assess toxicity and their reliability; (3) evaluate the utility of tests for the assessment of hazard; and (4) propose the application of recent advances in basic science to the development of practical test procedures.

The first symposium, which was organized by Drs. Jerry B. Hook and Gabriel L. Plaa and cosponsored by the National Institute of Environmental Health Sciences, considered the hepatobiliary and renal systems. The proceedings were recently published in ENVIRONMENTAL HEALTH PERSPECTIVES. The second symposium on the respiratory system was organized by Drs. Robert T. Drew and Hanspeter Witschi. It was also cosponsored by the National Institute of Environmental Health Sciences, and was held in Cincinnati, Ohio, September 16 and 17, 1975. The proceedings of this symposium make up the bulk of this issue of ENVIRONMENTAL HEALTH PERSPECTIVES. In planning this symposium we attempted to provide an equal mixture between fundamental principles and new developments. Our plan was to provide an overview of the "state of the art" and then to discuss recent developments in the field of pulmonary toxicology.

The lung is in a unique position for exposure to airborne noxious agents; in addition, its alveolar surface is by far the largest body area exposed to

the environment. Damage to the lung by airborne chemicals has been and continues to be an area of concern to industrial hygienists and toxicologists. Lung damage caused by toxicants in the air we breathe is often a consequence of living in a highly industrialized and motorized society. More recently it has become apparent that the lung can be the target organ for chemicals which enter the body from routes other than the respiratory tract and are delivered to the lung via the blood. Certain drugs cause alveolar proteinosis and fibrosis and other chemicals cause edema and pulmonary vascular disease. Since the entire blood volume passes through the lung one to five times per minute, the exposure of the lungs to toxic chemicals via this pathway can be significant.

Historically, measurement of lung damage has been accomplished by morphologic assessment of the lesions produced and by measuring changes in pulmonary mechanics. More recently investigators have begun to use biochemical techniques to assess damage. Thus, these three topics were selected for review. In addition we felt that the technology of inhalation exposure of animals including inhalation chamber design, aerosol and vapor generation and characterization should be described. Finally, we felt that the subject of deposition of vapors and both soluble and insoluble particles and their ultimate disposition should be considered.

The remainder of the symposium was more directed, with presentations on the alveolar macrophage, pulmonary secretions, a session describing several variations and uses for the isolated perfused lung, three presentations on tissue and cell culture techniques and finally a session describing the mechanism of action of specific pulmonary toxicants. An evening session devoted to developing protocols for inhalation carcinogenicity evaluation was well attended and

the presentations were followed by a lively discussion.

We have obviously touched on many questions; however, we are convinced in retrospect that the presentations provided us with useful and timely information. We hope that the data and the discussions provided the audience with new sugges-

tions as to how to study and assess lung damage by use of new and novel approaches.

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