

# **GUIDELINES – Use of Urethane as an Anesthetic for Laboratory Animals**

Version 1.1

## **I. Institutional Guidelines**

Urethane (ethyl carbamate) is a colorless, odorless powder that has been used as an anesthetic agent for laboratory animals. Urethane is slightly cytotoxic. It is a potent carcinogen known to cause lymphosarcomas, hepatic hemangiosarcomas, mammary tumors, pulmonary adenomas and adenocarcinomas. These are produced on administration via the oral, dermal, or inhalation routes in rodents. Multiple I.P. injections at an anesthetic dose can induce 75% incidence of lung tumors in mice. Urethane can promote carcinogenesis with a single application to mouse skin. Transplacental carcinogenesis is prominent in mice. Urethane is also strongly teratogenic.

Urethane can be absorbed through the skin, the intestinal and respiratory tracts, and the placenta. It represents a significant health risk and reproductive hazard to laboratory personnel. Animal carcasses and bedding containing urethane should be disposed of as medical pathological waste. There are many other anesthetic agents that can be used in laboratory animals, which are safer to both the animal and the laboratory personnel.

In light of the potential health risks for institutional personnel when urethane is used as an anesthetic agent for laboratory animals, the Animal Care Committee recommends that investigators carefully consider this usage and only do so when it represents the most appropriate anesthetic agent for the proposed study. In addition, if urethane is used Form A, item 7d.2, of the Protocol for Animal Use must be completed.

### **A. Control Measures:**

1. Respiratory protection: When appropriate NIOSH approved respirator.
2. Ventilation: Use only in a chemical fume hood.
3. Protective Gloves: Use chemical resistant gloves, such as nitrile gloves.
4. Eye Protection: Approved chemical workers goggles.

It is the responsibility of the Principal Investigator to inform all employees of these guidelines and to provide assurances that work done under his or her supervision is in compliance with these guidelines. Failure to comply could result in delays in approval of proposed activities.

#### *References:*

- *Ethyl Carbamate (Urethane, U2500), Material Safety Data Sheet, Sigma Chemical Co. 1994.*
- *Animal Anesthesia, C.J. Green, pg 82; Laboratory Animals Ltd., 1979.*
- *The Carcinogenic Action and Metabolism of Urethane and N-Hydroxyurethane. S.S. Mirvish. Adv. Cancer Res., 11:1-42. 1968.*
- *Structure-Activity Relationships of Tumor Promoters and Cocarcinogens and Interaction of Phorbol Myristate Acetate and Related Esters with Plasma Membranes. Van Duuren B.L., et al. Carcinogenesis Mechanisms of Tumor Promotion and Cocarcinogenesis: Vol. 2. Edited by Slaga T.J., Sivak A. and Boutwell R.K. Raven Press, NY, 1978.*