

## Genetic Risk Assessment for Ethylene Oxide

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The development of a genetic risk assessment process for chemicals has been far less visible than that for cancer risk, largely because it was perceived that exposure limits would be set by tumor end points. With the current appreciation that cancer is a genetic disease, and that there are subpopulations that are susceptible to cancer, the need for the development of genetic risk assessment models has taken on a renewed urgency. Ethylene oxide serves as an excellent choice for developing a genetic risk assessment model, in part because it is broad-based mutagenic and also because a genetic risk assessment had previously been conducted by the U.S. EPA, and this needed reconsideration in approach and incorporation of additional data for completeness. One aim of this project was to collect mutagenicity data for all appropriate end points in somatic and germ cells at ethylene oxide exposure to 0, 25, 50, 100, or 200 ppm for 6, 12, 24, or 48 weeks. No mutagenicity data for such extended exposures were previously available. The mutant frequency following ethylene oxide exposure has been assessed at the lacI transgene in bone marrow and testes, and sequencing of lacI mutants from these tissues has been completed. Reciprocal translocations in peripheral lymphocytes have been assessed by FISH and have been evaluated in primary spermatocytes by light microscopy.

Start and end date: January 1998 – December 2002.

Presentation(s):

Recio, L., Abernethy, D. J., Donner, M., Pluta, L., and Preston, J. (1999). Assessment of the in vivo mutagenicity of ethylene oxide in the bone marrow of B6C3F1 lacI transgenic mice following a chronic inhalation exposure. *Toxicol. Sci.* 48 (1), 368. Supplement—*The Toxicologist*. (Abstract 1735).

Peer-reviewed publication(s):

Fennell, T. R., and Brown, C. D. (2001). A physiologically based pharmacokinetic model for ethylene oxide in mouse, rat, and human. *Toxicol. Appl. Pharmacol.* 173, 161–175.

Preston, R. J. (1999). Cytogenetic effects of ethylene oxide, with an emphasis on population monitoring. *Crit. Rev. Toxicol.* 29, 263–282.

Preston, R. J. (1999). Recent advances in genetic toxicology and their relevance to risk assessment. *Inhal. Toxicol.* 11, 555–557.

Other publication(s): None to date.

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