

## **ETHYLENE THIOUREA (Group 2B)**

### **A. Evidence for carcinogenicity to humans (*inadequate*)**

In one incidence study, 1929 workers were identified as having worked at some time with ethylene thiourea in one of several rubber manufacturing companies and in one firm producing ethylene thiourea. No case of thyroid cancer was reported in this group to the regional cancer registry between 1957 and 1971, although less than one case would have been expected<sup>1</sup>.

### B. Evidence for carcinogenicity to animals (*sufficient*)

In three studies, ethylene thiourea produced high incidences of follicular carcinomas of the thyroid in rats after its oral administration; animals of each sex were affected, although male rats had a higher incidence. Lower doses produced thyroid follicular hyperplasia<sup>2-6</sup>. In mice, oral administration of ethylene thiourea produced liver tumours; the thyroids of these animals were not examined<sup>2</sup>. In dosed rats, either shortened survival due to thyroid tumours or altered body weights may have obscured a potential carcinogenic effect on the liver due to administration of ethylene thiourea. A feeding study in hamsters showed no effect<sup>6</sup>.

### C. Other relevant data

No data were available on the genetic and related effects of ethylene thiourea in humans.

Ethylene thiourea did not induce dominant lethal mutations, micronuclei or sister chromatid exchanges in mice or chromosomal aberrations in rats treated *in vivo*. It did not induce unscheduled DNA synthesis in human fibroblasts *in vitro* or chromosomal aberrations, sister chromatid exchanges, mutation or unscheduled DNA synthesis in rodent cells *in vitro*. Ethylene thiourea did not induce sex-linked recessive lethal mutations in *Drosophila*, but it induced aneuploidy and mutation in yeast. Studies on gene conversion and DNA damage in yeast and on mutation in bacteria have given conflicting results<sup>7</sup>.

### References

- <sup>1</sup>Smith, D. (1976) Ethylene thiourea — a study of possible teratogenicity and thyroid carcinogenicity. *J. Soc. occup. Med.*, 26, 92-94
- <sup>2</sup>IARC Monographs, 7, 45-52, 1974
- <sup>3</sup>Graham, S.L., Hansen, W.H., Davis, K.J. & Perry, C.H. (1973) Effects of one-year administration of ethylenethiourea upon the thyroid of the rat. *J. agric. Food Chem.*, 21, 324-329
- <sup>4</sup>Graham, S.L., Davis, K.J., Hansen, W.H. & Graham, C.H. (1975) Effects of prolonged ethylene thiourea ingestion on the thyroid of the rat. *Food Cosmet. Toxicol.*, 13, 493-499
- <sup>5</sup>Weisburger, E.K., Ulland, B.M., Nam, J.-M., Gart, J.J. & Weisburger, J.H. (1981) Carcinogenicity tests of certain environmental and industrial chemicals. *J. natl Cancer Inst.*, 67, 75-88
- <sup>6</sup>Gak, J.-C., Graillet, C. & Truhaut, R. (1976) Difference in sensitivity of the hamster and of the rat with regard to the effects of the long-term administration of ethylene thiourea (Fr.). *Eur. J. Toxicol.*, 9, 303-312
- <sup>7</sup>IARC Monographs, Suppl. 6, 304-307, 1987