

## **$\alpha$ -CHLORINATED TOLUENES (Group 2B)**

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

Six cases of respiratory cancer were reported in two small factories in Japan where benzoyl chloride (see p. 126) and chlorinated toluenes were produced<sup>1</sup>. A mortality study in the UK of 163 workers exposed to benzoyl chloride and chlorinated toluenes showed excesses for cancers of the respiratory tract (5 observed, 1.8 expected) and digestive system (5 observed, 1.2 expected). The limited data did not, however, allow any differential risk estimation for the individual chlorinated toluenes<sup>2</sup>.

### **B. Evidence for carcinogenicity to animals (*limited* for benzyl chloride and benzal chloride; *sufficient* for benzotrichloride)**

Benzyl chloride was tested in mice by skin application and in rats by subcutaneous injection. Sarcomas at the injection site were observed in rats; a few skin carcinomas were observed in some mice, but their incidence was not statistically significant<sup>1</sup>. When mice and rats were administered benzyl chloride in corn oil by gavage, increased incidences of papillomas and carcinomas of the forestomach were observed in mice of each sex, and the incidence of thyroid C-cell tumours was increased in female rats but decreased in male rats; a few neoplasms of the forestomach were observed in male rats<sup>3</sup>.

In one experiment in which benzal chloride was tested by skin application to female mice, it produced squamous-cell carcinomas of the skin. In a concurrent experiment in which it was tested for a shorter duration, a low incidence of skin papillomas was observed<sup>1</sup>.

Benzotrichloride was tested in three studies by skin application to female mice. It produced squamous-cell carcinomas of the skin and lung tumours in all three experiments; upper digestive-tract tumours were also observed in two of the three experiments. Increases in the incidence of tumours at other sites were reported<sup>1</sup>. In a mouse-lung tumour bioassay, benzotrichloride increased the incidence of lung adenomas<sup>4</sup>.

### C. Other relevant data

No data were available on the genetic and related effects of benzal chloride, benzotrichloride or benzyl chloride in humans.

Benzyl chloride did not induce micronuclei in mice treated *in vivo*. It induced DNA strand breaks but not unscheduled DNA synthesis or chromosomal aberrations in cultured human cells; conflicting results were obtained for the induction of sister chromatid exchanges. Benzyl chloride induced sister chromatid exchanges, chromosomal aberrations, mutation and DNA strand breaks in cultured rodent cells. It induced somatic and sex-linked recessive lethal mutations in *Drosophila* and mitotic recombination, gene conversion, mutation and DNA damage in fungi. Benzyl chloride induced mutation and DNA damage in bacteria<sup>5</sup>.

Benzal chloride and benzotrichloride induced mutation and DNA damage in bacteria<sup>5</sup>.

### References

- <sup>1</sup>IARC Monographs, 29, 49-63, 65-72, 73-82, 1982
- <sup>2</sup>Sorahan, T., Waterhouse, J.A.H., Cooke, M.A., Smith, E.M.B., Jackson, J.R. & Temkin, L. (1983) A mortality study of workers in a factory manufacturing chlorinated toluenes. *Ann. occup. Hyg.*, 27, 173-182
- <sup>3</sup>Lijinsky, W. (1986) Chronic bioassay of benzyl chloride in F344 rats and (C57BL/6J×BALB/c)F<sub>1</sub> mice. *J. natl Cancer Inst.*, 76, 1231-1236
- <sup>4</sup>Stoner, G.D., You, M., Morgan, M.A. & Superczynski, M.J. (1986) Lung tumor induction in strain A mice with benzotrichloride. *Cancer Lett.*, 33, 167-173
- <sup>5</sup>IARC Monographs, Suppl. 6, 89-90, 101-102, 105-109, 1987