DIMETHYL SULPHATE (Group 2A)

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

Four cases of bronchial carcinoma were reported in men exposed occupationally to dimethyl sulphate[1]. Additional case reports have since appeared: a case of pulmonary carcinoma in a man exposed for seven years to 'small amounts' of dimethyl sulphate but to larger amounts of bis(chloromethyl)ether and chloromethyl methyl ether (see p. 131)[2], and a case of choroidal melanoma in a man exposed for six years to dimethyl sulphate[3].

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

Dimethyl sulphate produced mainly local tumours in rats following its inhalation or subcutaneous injection; it produced tumours of the nervous system after prenatal exposure[1].

C. Other relevant data

Dimethyl sulphate is an alkylating agent[4]. No data were available on the genetic and related effects of this compound in humans.

Dimethyl sulphate induced both structural and numerical chromosomal aberrations in bone-marrow cells of rats treated *in vivo* and chromatid breaks in mouse embryos treated transplacentally. It alkylated DNA in rats treated *in vivo* and in cultured rodent cells. It induced sister chromatid exchanges, unscheduled DNA synthesis and DNA strand breaks in human and rodent cells *in vitro*, and chromosomal aberrations and mutation in cultured rodent cells. It induced sex-linked recessive lethal mutations in *Drosophila* and mutation and mitotic recombination in yeast. Conflicting results were obtained for chromosomal aberrations and mutation in plants. It induced mutation and DNA damage in bacteria[4].

References

[1]*IARC Monographs, 4*, 271-276, 1974

[2]Bettendorf, U. (1977) Occupational lung cancer after inhalation of alkylating compounds. Dichlorodimethyl ether, monochlorodimethyl ether and dimethyl sulphate (Ger.). *Dtsch. med. Wochenschr., 102*, 396-398

[3]Albert, D.M. & Puliafito, C.A. (1977) Choroidal melanoma: possible exposure to industrial toxins. *New Engl. J. Med., 296*, 634-635

[4]*IARC Monographs, Suppl. 6*, 269-271, 1987