

## **CARBON BLACKS (Group 3) and CARBON-BLACK EXTRACTS (Group 2B)**

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

One study of the carbon-black producing industry showed a high proportion of cancers of the skin, particularly melanomas, in equal numbers of carbon-black workers and of a comparison group consisting of other workers in the same plant<sup>1</sup>. A study from the UK in which workers were followed up beyond retirement showed excesses of cancers of the lung and bladder. The excess of lung cancer occurred in each of the five plants studied and was concentrated among persons with ten or more years of follow-up. The bladder cancer excess was based on only three deaths but was also concentrated in the group followed up longer<sup>2</sup>. Excesses of stomach cancer were reported in workers in other industries whose employment entailed exposure to dusts that included carbon blacks<sup>1,3</sup>.

### **B. Evidence for carcinogenicity to animals (*inadequate* for carbon blacks; *sufficient* for carbon-black extracts)**

In limited studies by oral administration in mice, carbon blacks were reported not to produce the gastrointestinal tumours seen after administration of solvent (benzene) extracts of one carbon black<sup>1</sup>. No increase in the development of colonic tumours occurred in mice or rats fed carbon black in the diet<sup>4</sup>. Skin-painting studies with carbon blacks showed them to have no tumorigenic activity in mice, while solvent (benzene) extracts induced benign and malignant skin tumours. Inhalation studies in mice, hamsters, guinea-pigs and monkeys with carbon blacks did not demonstrate tumorigenic activity; the studies suffered from many inadequacies, including poor characterization of the carbon-black aerosol. Studies in

mice showed that materials extracted from carbon blacks were carcinogenic, producing local tumours after their subcutaneous injection. A carbon black containing demonstrable quantities of carcinogenic polynuclear aromatic compounds also produced local sarcomas when injected subcutaneously in tricapylin. Administration of the same carbon black as pellets in the absence of that solvent produced a low incidence of subcutaneous tumours<sup>1</sup>. Carbon black given in the diet did not enhance the incidence of colonic tumours induced in mice and rats by intraperitoneal injection of 1,2-dimethylhydrazine<sup>4</sup>.

### C. Other relevant data

No data were available on the genetic and related effects of carbon blacks in humans. Extracts of various commercial carbon blacks were mutagenic to *Salmonella typhimurium* in the presence and absence of an exogenous metabolic system<sup>5</sup>.

### References

- <sup>1</sup>*IARC Monographs*, 33, 35-85, 1984
- <sup>2</sup>Hodgson, J.T. & Jones, R.D. (1985) A mortality study of carbon black workers employed at five United Kingdom factories between 1947 and 1980. *Arch. environ. Health*, 40, 261-266
- <sup>3</sup>*IARC Monographs*, 28, 183-230, 1982
- <sup>4</sup>Pence, B.C. & Buddingh, F. (1985) The effect of carbon black ingestion on 1,2-dimethylhydrazine-induced colon carcinogenesis in rats and mice. *Toxicol. Lett.*, 25, 273-277
- <sup>5</sup>*IARC Monographs, Suppl. 6*, 136, 1987