

Molybdenum Trioxide

Molybdenum trioxide has widespread industrial use. Its major use is as an additive to steel and other corrosion-resistant alloys. It is also used in the production of molybdenum products, as an industrial catalyst, a pigment, a crop nutrient, a component of glass, ceramics and enamels, a flame retardant for polyester and polyvinyl chloride resins, and as a chemical reagent. Occupational exposures are expected.

Molybdenum trioxide passed the animal data screen, underwent a preliminary toxicological evaluation, and is being brought to the Carcinogen Identification Committee for consultation. This is a compilation of the relevant studies identified during the preliminary toxicological evaluation.

Epidemiological data

- Hospital-based case-control study examining occupational risk factors for lung cancer: Droste *et al.* (1999)

Animal carcinogenicity data

- Two-year inhalation studies
 - Studies in male and female F344/N rats: NTP, (1997); Chan *et al.* (1998)
 - Studies in male and female B6C3F₁ mice: NTP, (1997); Chan *et al.* (1998)
- Short-term intraperitoneal injection studies
 - Male and female Strain A mice (three injections per week for a total of 19 injections, observed for 30 weeks after first injection): Stoner *et al.* (1976)

Other relevant data

- Genotoxicity
 - *Salmonella typhimurium* reverse mutation assays: NTP (1997)
 - Chinese hamster ovary (CHO) cell sister chromatid exchange assay: NTP (1997)
 - CHO cell chromosomal aberration assay: NTP (1997)
 - Syrian hamster embryo (SHE) cell micronucleus assay: Gibson *et al.* (1997)
 - SHE cell transformation assay: Kerckaert *et al.* (1996)
 - *In vitro* micronucleus assay in human lymphocytes: Titenko-Holland *et al.* (1998)

- *In vivo* mouse micronucleus assay: Titenko-Holland *et al.* (1998)
- Dominant lethal assay in mice: Titenko-Holland *et al.* (1998)
- Reviews: NTP (1997), Titenko-Holland *et al.* (1998, page 252)

References¹

Chan, PC, Herbert, RA, Roycroft, JH, Haseman, JK, Grumbein, SL, Miller, RA, Chou, B J (1998). Lung tumor induction by inhalation exposure to molybdenum trioxide in rats and mice. *Toxicol Sci* **45**:58-65.

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Gibson, DP, Brauninger, R, Shaffi, HS, Kerckaert, GA, LeBoeuf, RA, Isfort, RJ, Aardema, MJ (1997). Induction of micronuclei in Syrian hamster embryo cells: comparison to results in the SHE cell transformation assay for National Toxicology Program test chemicals. *Mutat Res* **392**:61-70.

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National Toxicology Program (NTP, 1997). *Toxicology and carcinogenesis studies of Molybdenum Trioxide (CAS No. 1313-27-5) in F344/N rats and B6C3F₁ mice (Inhalation Studies)*. Technical Report No. 462, Research Triangle Park, NC.

Stoner, GD, Shimkin, MB, Troxell, MC, Thompson, TL, Terry, LS (1976). Test for carcinogenicity of metallic compounds by the pulmonary tumor response in strain A mice. *Cancer Res* **36**:1744-7.

Titenko-Holland, N, Shao, J, Zhang, L, Xi, L, Ngo, H, Shang, N, Smith, MT (1998). Studies on the genotoxicity of molybdenum salts in human cells in vitro and in mice in vivo. *Environ Mol Mutagen* **32**:251-9.

¹ Copies of these listed references, as either the abstract, the relevant sections of the publication, or the complete publication, have been provided to members of the Carcinogen Identification Committee. These references have been provided in the order in which they are discussed in this document.