N-Nitroso-N-Methylaniline
(N-Methyl-N-nitrosobenzenamine)

N-Nitroso-N-methylaniline (NMA) is used in rubber manufacturing and is found in smoked meat. NMA is also used in the laboratory for studying enzymatic denitrosation.

N-Nitroso-N-methylaniline 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**

- No cancer epidemiology studies were identified.

**Animal carcinogenicity data**

- Long-term studies
  - 50-week drinking water exposure (5 days/week) studies in F344 rats followed by natural death: Kroeger-Koepke et al. (1983)
    - *Increase in esophageal tumors (mostly carcinomas) (by pairwise comparison) in male and female rats*
  - 20-week drinking water exposure (6 days/week) study in F344 female rats followed by natural death: Michejda et al. (1986)
    - *Increase in esophageal squamous cell carcinoma (by pairwise comparison) in female rats*
  - Lifetime drinking water studies in male and female rats: Boyland et al. (1964)
    - *Increase malignant esophageal tumors (by pairwise comparison) in male and female rats*
    - *Increase in liver tumors and spleen hemangiosarcoma (by pairwise comparison)*
Other relevant data

- Genotoxicity
  - Reverse mutation assay in *Salmonella typhimurium* with or without rat or hamster liver S-9 activation (negative): Andrews et al. (1984)
  - Gene conversion and reverse mutation in *Saccharomyces cerevisiae* (positive): Mehta and Borstel (1984)
  - N-Nitroso-N-methylaniline activated with microsomes forms DNA adducts: Stiborova et al. (1999)

- Structure-activity considerations
  - Similarity to 23 Proposition 65 N-nitroso carcinogens, including 16 nitrosamines:
    - N-Nitrosomethylethylamine
    - N-Carboxymethyl-N-nitrosourea
    - 1-(2-Chloroethyl)-3-cyclohexyl-1-nitrosourea
    - N-Methyl-N'-nitro-N-nitrosoguanidine
    - N-Nitrosodi-n-butylamine
    - N-Nitrosodiethanolamine
    - N-Nitrosodimethylamine
    - N-Nitrosodiphenylamine
    - N-Nitrosodiphenylamine
    - N-Nitrosodimethylamine
    - N-Nitrosodiphenylamine
    - N-Nitrosodiphenylamine
    - 3-(N-Nitrosomethylamino)-1-(3-pyridyl)1-butanone
    - N-Nitroso-N-methylurea
    - N-Nitroso-N-methylurethane
    - N-Nitroso-N-methylvinylamine

References


---

1 Excerpts or the complete publication (presenting epidemiology or toxicology information) have been provided to members of the Carcinogen Identification Committee, in the order in which they are discussed in this document.


