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***IARC Monographs on the Evaluation of
Carcinogenic Risks to Humans***

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**Some Aromatic Amines, Organic Dyes,
and Related Exposures**

This publication represents the views and expert opinions
of an IARC Monographs Working Group on the
Evaluation of Carcinogenic Risks to Humans,
which met in Lyon,

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Toluidine produced increases in intra-chromosomal recombination in *S. cerevisiae*. In cultured mammalian cells, *ortho*-toluidine showed predominantly negative results with some exceptions: in liver and peripheral blood of rats *ortho*-toluidine significantly increased the number of micronucleated hepatocytes and micronucleated reticulocytes. DNA damage measured by the alkaline filter-elution technique was induced by administration of *ortho*-toluidine to mice. In line with the hypothesis that alkylation in the *ortho*-position to the amino group enhances carcinogenicity, *ortho*-toluidine is a more potent animal carcinogen than are aniline and *p*-toluidine. Both genotoxicity and acute toxic effects, necessary to explain the experimental tumour formation by *ortho*-toluidine, have clearly been shown.

6. Evaluation

6.1 Cancer in humans

There is *sufficient evidence* in humans for the carcinogenicity of *ortho*-toluidine. *ortho*-Toluidine causes cancer of the urinary bladder.

6.2 Cancer in experimental animals

There is *sufficient evidence* in experimental animals for the carcinogenicity of *ortho*-toluidine.

6.3 Overall evaluation

ortho-Toluidine is *carcinogenic to humans (Group 1)*.

The Working Group was aware of the existence of numerous dyes and colourants that contain *ortho*-toluidine as a structural element, but a full evaluation of this group of dyes was beyond the scope of this Monograph. The local anaesthetic prilocaine, which is metabolized to *ortho*-toluidine, has been shown to cause methaemoglobinaemia and haemoglobin-adduct formation in treated patients.

7. References

- ACGIH (2001) Documentation of the Threshold Limit Values and Biological Exposure Indices, 7th Ed., American Conference of Governmental Industrial Hygienists. Cincinnati, OH.
- Akerman B, Aström A, Ross S, Telc A (1966). Studies on the absorption, distribution and metabolism of labelled prilocaine and lidocaine in some animal species. *Acta Pharmacol Toxicol (Copenh)*, 24:389–403. PMID:6013121