DIGLYCIDYL RESORCINOL ETHER

Data were last reviewed in IARC (1985) and the compound was classified in *IARC Monographs* Supplement 7 (1987).

1. Exposure Data

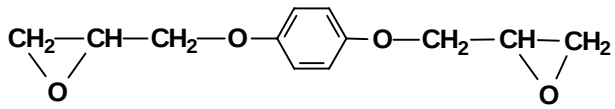
1.1 Chemical and physical data

1.1.1 *Nomenclature*

Chem. Abstr. Serv. Reg. No.: 101-90-6

Chem. Abstr. Name: Oxirane, 2,2′-[phenylenebis(oxymethylene)]bis-

1.1.2 *Structural and molecular formulae and relative molecular mass*



$C_{12}H_{14}O_4$ Relative molecular mass: 222.2

1.1.3 *Physical properties* (for details, see IARC, 1985)

(*a*) *Boiling point*: 172°C at 106 Pa

(*b*) *Conversion factor*: $mg/m^3 = 9.09 \times ppm$

1.2 Production and use

Diglycidyl resorcinol ether has been produced since at least 1974. It has only limited application, principally in the aerospace industry (IARC, 1985).

2. Studies of Cancer in Humans

No data were available to the Working Group.

3. Studies of Cancer in Experimental Animals

Diglycidyl resorcinol ether (technical grade) was tested for carcinogenicity by gavage in mice of one strain and in rats of one strain. It induced squamous-cell carcinomas and

papillomas of the forestomach in animals of both species. In female mice, an increased incidence of hepatocellular tumours was observed. In one experiment in mice, no skin tumour was observed after skin application (IARC, 1985).

4. Other Data Relevant to an Evaluation of Carcinogenicity and its Mechanisms

4.1 Absorption, distribution, metabolism and excretion

No data were available to the Working Group.

4.2 Toxic effects

4.2.1 *Humans*

Diglycidyl resorcinol ether causes burns and skin sensitization (IARC, 1985).

4.2.2 *Experimental systems*

Application of diglycidyl resorcinol ether caused irritation to the eyes and skin of rabbits. Once-monthly intravenous injection of the compound at doses of 100–200 mg/kg bw produced a progressive lowering of the leukocyte count in monkeys. Hyperkeratosis and basal-cell hyperplasia in the forestomach were observed in rats and mice exposed daily to intragastric doses of 12.5 mg/kg bw and higher for 13 weeks. In a two-year study in rats, dose-related bronchopneumonia occurred, which was not consistent with chemical pneumonitis, but was characterized by polymorphonuclear leukocytes in the alveoli. The compound also inhibited the growth of Walker carcinoma in rats (IARC, 1985). The occurrence of forestomach hyperkeratosis and epithelial cell proliferation was confirmed in a two-week study in rats with doses of 25 mg/kg bw, but not with 12 mg/kg bw (Ghanayem *et al*., 1986).

4.3 Reproductive and developmental effects

No data were available to the Working Group.

4.4 Genetic and related effects

4.4.1 *Humans*

No data were available to the Working Group.

4.4.2 *Experimental systems* (see Table 1 for references)

Diglycidyl resorcinol ether (technical grade) was mutagenic to *Salmonella typhimurium* and at the *tk* locus but not the *hprt* locus of cultured mouse lymphoma cells. It induced chromosomal aberrations in Chinese hamster ovary CHO cells, but did not increase the proportion of micronucleated cells in the bone marrow of treated mice.

Table 1. Genetic and related effects of diglycidyl resorcinol ether (technical grade)

Test system	Result[a]		Dose[b] (LED or HID)	Reference
	Without exogenous metabolic system	With exogenous metabolic system		
SA0, *Salmonella typhimurium* TA100, reverse mutation	+	NT	25	Seiler (1984)
SA0, *Salmonella typhimurium* TA100, reverse mutation	+	+	16.5	US National Toxicology Program (1986)
SA5, *Salmonella typhimurium* TA1535, reverse mutation	+	+	5	US National Toxicology Program (1986)
SA7, *Salmonella typhimurium* TA1537, reverse mutation	–	–	167	US National Toxicology Program (1986)
SA9, *Salmonella typhimurium* TA98, reverse mutation	–	–	167	US National Toxicology Program (1986)
G5T, Gene mutation, mouse lymphoma L5178Y cells, *tk* locus *in vitro*	+	NT	0.125	McGregor *et al*. (1988)
G5T, Gene mutation, mouse lymphoma L5178Y cells, *tk* locus *in vitro*	+	NT	0.1	McGregor *et al*. (1996)
G51, Gene mutation, mouse lymphoma L5178Y cells, *hprt* locus *in vitro*	–	NT	0.4	McGregor *et al*. (1996)
CIC, Chromosomal aberrations, Chinese hamster ovary CHO cells *in vitro*	+	NT	2.5	Seiler (1984)
MVM, Micronucleus test, ICR mouse bone-marrow cells *in vivo*	–		600 po × 1	Seiler (1984)

[a] +, positive; –, negative; NT, not tested

[b] LED, lowest effective dose; HID, highest ineffective dose; in-vitro tests, µg/mL; in-vivo tests, mg/kg bw/day; po, oral

5. Evaluation

No epidemiological data relevant to the carcinogenicity of diglycidyl resorcinol ether were available.

There is *sufficient evidence* for the carcinogenicity of a technical grade of diglycidyl resorcinol ether in experimental animals.

Overall evaluation

Diglycidyl resorcinol ether (technical grade) is *possibly carcinogenic to humans (Group 2B)*.

6. References

Ghanayem, B.I., Maronpot, R.R. & Matthews, H.B. (1986) Association of chemically induced forestomach cell proliferation and carcinogenesis. *Cancer Lett.*, **32**, 271–278

IARC (1985) *IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans,* Volume 36, *Allyl Compounds, Aldehydes, Epoxides and Peroxides,* Lyon, pp. 181–188

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McGregor, D.B., Brown, A., Cattanach, P., Edwards, I., McBride, D., Riach, C. & Caspary, W.J. (1988) Responses of the L5178Y tk^+/tk^- mouse lymphoma cell forward mutation assay: III. 72 coded chemicals. *Environ. mol. Mutag.,* **12,** 85–154

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Seiler, J.P. (1984) The mutagenicity of mono- and difunctional aromatic glycidyl compounds. *Mutat. Res.,* **135**, 159–167

United States National Toxicology Program (1986) *NTP Technical Report on the Toxicology and Carcinogenesis Studies of Diglycidyl Resorcinol Ether (Technical Grade) (CAS No. 101-90-6) in F344/N Rats and B6C3F$_1$ Mice (Gavage Study)* (NIH Publ. No. 87-2513; NTP TR 257), Research Triangle Park, NC, United States Department of Health and Human Services