

Group 2

Acrylamide



[CAS No.79-06-1]

Reproductive toxicant: Group 2

There are no human studies (epidemiological study or case report) that have clearly demonstrated the reproductive toxicity of acrylamide; however, there is sufficient evidence in animal studies indicating its adverse effects on reproduction such as germ-cell mutagenicity¹⁻⁴), developmental toxicity⁵⁻⁷) and testicular toxicity^{8,9}). Smith *et al*¹) reported that after subchronic oral dosing in the male rat, acrylamide induced significant elevations in both pre- and post-implantation loss in dominant lethal testing. Tyle *et al.*²) also reported the dominant lethal effects of acrylamide, reduced numbers of implantations and live pups, after oral administration. As for developmental effects, the incidence of variations (extra rib), dose-related decreases in preweaning weights, and effects on negative geotaxis and Rotarod performance were reported. Severe testicular damage such as vacuolation and swelling of the round spermatids, necrosis of the late elongated spermatids, abnormal meiosis, and a marked cellular exfoliation into the lumen were observed after a single oral dose⁸). Based on this evidence, acrylamide is classified as a Group 2 reproductive toxicant.

References

- 1) Smith M, Zenick H, Preston R, George E, Long E. Dominant lethal effects of subchronic acrylamide administration in the male Long-Evans rat. *Mutat Res* 1986; 173: 273–7.
- 2) Tyl RW, Friedman MA, Losco PE, et al. Rat two-generation reproduction and dominant lethal study of acrylamide in drinking water. *Reprod Toxicol* 2000; 14: 385–401.
- 3) Shelby MD, Cain KT, Cornett CV, Generoso WM. Acrylamide: induction of heritable translocation in male mice. *Environ Mutagen* 1987; 9: 363–8.
- 4) Ghanayem BI, Witt KL, El-Hadri L, et al. Comparison of germ cell mutagenicity in male CYP2E1-null and wild-type mice treated with acrylamide: evidence supporting a glycidamide-mediated effect. *Biol Reprod* 2005; 72: 157–63.
- 5) Field E, Price C, Sleet R, Marr M, Schwetz B, Morrissey R. Developmental toxicity evaluation of acrylamide in rats and mice. *Fundam Appl Toxicol* 1990; 14: 502–12.
- 6) Wise L, Gordon L, Soper K, Duchai D, Morrissey R. Developmental neurotoxicity evaluation of acrylamide in Sprague-Dawley rats. *Neurotoxicol Teratol* 1995; 17: 189–98.
- 7) Garey J, Ferguson SA, Paule MG. Developmental and behavioral effects of acrylamide in Fischer 344 rats. *Neurotoxicol Teratol* 2005; 27: 553–64.
- 8) Sakamoto J, Kurosaka Y, Hashimoto K. Histological changes of acrylamide-induced testicular lesions in mice. *Exp Mol Pathol* 1988; 48: 324–34.
- 9) Camacho L, Latendresse JR, Muskhelishvili L, et al. Effects of acrylamide exposure on serum hormones, gene expression, cell proliferation, and histopathology in male reproductive tissues of Fischer 344 rats. *Toxicol Lett* 2012; 211: 135–43.