

## 1 物質番号

通し番号	C-1028
整理番号	205
MITI番号	
CAS番号	123-31-9
物質名	ヒドロキノン
英名	Hydroquinone

## 2 発がん性分類

機関名	分類結果	評価年	評価書引用文献
IARC	3	1999	<ul style="list-style-type: none"> <li>●IARC (1977) IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Vol. 15, Some Fumigants, the Herbicides 2,4-D and 2,4,5-T, Chlorinated Dibenzodioxins and Miscellaneous Industrial Chemicals, Lyon, pp. 155-175</li> <li>●●Boylatld, E., Busby, E.R., Dukes, C.E., Grover, P.L. &amp; Manson,D.(1964) Further experiments on implantation oof materials into the urinary bladder of mice. Brit.J.Cancer, 18, 5757-581</li> <li>●●Roe, F.J.C. E Salaman,M.H.(1955) Further studies on incomplete carcinogenesis: triethylene melamine(T.E.M.), 1,2-benzanthracene and <math>\beta</math> -propiolactone as initiators of skin tumour formation in the mouse. Brit.J.Cancer,9,177-203</li> <li>●Hard, G.C., Whysner, J., English, J.C., Zang, E. &amp; Williams, G.M. (1997) Relationship of hydroquinone-associated rat renal tumors with spontaneous chronic progressive nephropathy.Toxicol. Pathol., 25, 132-143</li> <li>●Kari, F.W., Bucher, J., Eustis, S.L., Haseman, J.K. &amp; Huff, J.E. (1992) Toxicity and carcinogenicity of hydroquinone in F344/N rats and B6C3F1 mice. Food chem. Toxicol., 30, 737-747</li> <li>●Miyata, Y., Fukushima, S., Hirose, M., Masui, T. &amp; Ito, N. (1985) Short-term screening of promoters of bladder carcinogenesis in N-butyl-N-(4-hydroxybutyl)nitrosamine-initiated, unilaterally ureter-ligated rats. Jpn. J. Cancer Res. (Gann), 76, 828-834</li> <li>●Nielsen, H., Henriksen, L. &amp; Olsen, J.H. (1996) Malignant melanoma among lithographers. Scand. J. Work Environ. Health., 22, 108-111</li> <li>●Okazaki, S., Hoshiya, T., Takahashi, S., Futakuchi, M., Saito, K. &amp; Hirose, M. (1993) Modification of hepato-and renal carcinogenesis by catechol and its isomers in rats pretreated with N-ethyl-N-hydroxyethylnitrosamine. Teratog. Carcinog. Mutag., 13, 127-137</li> <li>●Pifer, J.W., Hearne, F.T., Swanson, F.A. &amp; O'Donoghue, J.L. (1995) Mortality study of employees engaged in the manufacture and use of hydroquinone. Int. Arch. occup. environ. Health, 67, 267-280</li> <li>●Shibata, M.-A., Hirose, M., Tanaka, H., Asakawa, E., Shirai, T. &amp; Ito, N. (1991) Induction of renal cell tumors in rats and mice, and enhancement of hepatocellular tumor development in mice after long-term hydroquinone treatment. Jpn. J. Cancer Res (Gann), 82, 1211-1219</li> <li>●Stenius, U., Warholm, M., Rannug, A., Walles, S., Lundberg, I. &amp; Högberg, J. (1989) The role of GSH depletion and toxicity in hydroquinone-induced development of enzyme-altered foci. Carcinogenesis, 10, 595-599</li> <li>●United States National Toxicology Program (1989) Toxicology and Carcinogenesis Studies of Hydroquinone (CAS No. 123-31-9) in F344/N Rats and B6C3F1 Mice (Technical Report Series No. 366; NIH Publ. No. 90-2821), Research Triangle Park, NC</li> <li>●Yamaguchi, S., Hirose, M., Fukushima, S., Hasegawa, R. &amp; Ito, N. (1989) Modification by catechol and resorcinol of upper digestive tract carcinogenesis in rats treated with methyl-n-amylnitrosamine. Cancer Res., 49, 6015-5018</li> </ul>
EPA	×	-	-
NTP	×	-	-

ACGIH	A3	2008	<ul style="list-style-type: none"> <li>●Boutwell R; Bosch D: The Tumor Promoting Action of Phenol and Related Compounds for Mouse Skin. <i>Cancer Res</i> 19:413-424 (1959).</li> <li>●Boyland E; Busby ER; Dukes CE; et al.: Further Experiments on Implantation of Materials into the Urinary Bladder of Mice. <i>Br J Cancer</i> 18:575-581(1964).</li> <li>●Carlson AJ; Brewer NR: Toxicity Studies on Hydroquinone. <i>Proc Soc Exp Biol</i> 84:684-688 (1953).</li> <li>●English JC; Perry LG; Vlaovic M; et al.: Measurement of Cell Proliferation in the Kidneys of Fischer 344 and Sprague-Dawley Rats After Gavage Administration of Hydroquinone. <i>Fund Appl Toxicol</i> 23:397-406(1994a).</li> <li>●Hard GC; Whysner J; English JC; et al.: Relationship of hydroquinone-associated rat renal tumors with spontaneous chronic progressive nephropathy. <i>Toxicol Pathol</i> 25:132-143 (1997).</li> <li>●Kari FW; Bucher J; Haseman JK; Huff JE: Letter to the Editor. <i>Fd Chem Toxic</i> 32:866-867 (1994).</li> <li>●Lau SS; Monks TJ; Everitt JI; et al.: Carcinogenicity of a Nephrotoxic Metabolite of the "Nongenotoxic" Carcinogen Hydroquinone. <i>Chem Res Toxicol</i> 14:25- 33 (2001).</li> <li>●McGregor D: Hydroquinone: An Evaluation of the Human Risks from its Carcinogenic and Mutagenic Properties. <i>Critical Reviews in Toxicology</i> 37:887-914 (2007).</li> <li>●Monks TJ; Lau SS: Toxicology of Quinone-Thioethers. <i>Crit Rev Toxicol</i> 22(5/6):243-270 (1992).</li> <li>●National Toxicology Program (NTP): NTP Technical Report on the Toxicology and Carcinogenesis Studies of Hydroquinone (CAS No 123-31-9) in F344/N rats and B6C3F1 Mice (Gavage Studies). National Toxicology Program TR 366; National Institutes of Health. Pub No 90-2821. National Toxicology Program, Research Triangle Park, NC (1989). [Published as Kari FW; Bucher J; Eustis SL; et al.: Toxicity and Carcinogenicity of Hydroquinone in F344/N Rats and B6C3F1 Mice. <i>Food Chem Toxicol</i> 30:737-747 (1992).</li> <li>●O' Donoghue JL; English JC: Letter to the Editor. <i>Fd Chem Toxic</i> 32:863-866 (1994).</li> <li>●Roe FJC; Salaman MH: Further Studies on Incomplete Carcinogenesis: Triethylene Melamine (TEM), 1,2-Benzanthracene and <math>\beta</math>-Propiolactone as Initiators of Skin Tumour Formation in the Mouse. <i>Br J Cancer</i> 9:177-203 (1955).</li> <li>●Shibata MA; Yamada M; Hirose M; et al.: Early Proliferative Responses of Forestomach and Glandular Stomach of Rats Treated with Five Different Phenolic Antioxidants. <i>Carcinogenesis</i> 11:425-429 (1990).</li> <li>●Shibata MA; Hirose M; Tanaka H; et al.: Induction of Renal Cell Tumors in Rats and Mice, and Enhancement of Hepatocellular Tumor Development in Mice After Long-Term Hydroquinone Treatment. <i>Jpn J Cancer Res</i> 82:1211-1219 (1991).</li> <li>●Van Duuren BL; Goldschmidt BM: Cocarcinogenic and Tumor-Promoting Agents in Tobacco Carcinogenesis. <i>J Natl Cancer Inst</i> 56:1237-1242 (1976).</li> <li>●Whysner J; Verna L; English JC; Williams GM: Analysis of studies related to tumorigenicity induced by hydroquinone. <i>Regulatory Toxicology and Pharmacology</i> 21:158-176 (1995).</li> <li>●Yamaguchi S; Hirose M; Fukushima S; et al.: Modification by Catechol and Resorcinol of Upper Digestive Tract Carcinogenesis in Rats Treated with Methyl-N-Amylnitrosamine. <i>Cancer Res</i> 49:6015-6018 (1989).</li> </ul>
産衛学会	×	-	-
EU	3	- *1	- *1

\*1 EU分類の根拠資料は公表されていない

3 発がん性に関する追加文献(動物試験、疫学調査)

追加文献の有無 不要

(1)動物試験

#1	試験概要	試験物質		試験の種類	ガイドライン	GLP適用状況	試験実施年	試験実施者	
	試験条件	動物種	系統	動物数/性別/群	投与経路	用量/濃度	単位	投与/暴露期間	
	試験結果概要	発がん影響							
		非発がん影響							
		結論							
	文献名								

(2)疫学調査

#1	調査の種類	調査方法	結果の概要	調査実施年	調査実施者
	文献名				