

## 1 物質番号

通し番号	C-1041
整理番号	DG-037
MITI番号	
CAS番号	106-42-3
物質名	p-キシレン
英名	p-Xylene

## 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	<p>●National Toxicology Program (1986) Toxicology and Carcinogenesis Studies of Xylenes (Misd) (60% m-Xylene, 14% p-Xylene, 9% o-Xylene, and 17% Ethylbenzene)(CAS No. 1330-20-7) in F344/ N Rats and B6C3F1 Mice (Gavage Studies) (NTP TR 327; NIH Publ. No. 87-2583), Research Triangle Park, NC, US Department of Health and Human Service.</p> <p>●Huff, J.E., Eastin, W., Roycroft, J., Eustis, S.L &amp; Hasman, J.K (1988) Carcinogenesis studies of benzene, methyl benzene, and dimethyl benzenes. Ann. N.Y. Acad Sci., 534, 427-440</p> <p>●Maltoni, C., Conti, B. &amp; Cotti, G. (1983) Benzene: a multipotential carcinogen. Results of long-term bioassays performed at the Bologna Institute of Oncology. Am. J ind. Med., 4, 589-630</p> <p>●Maltoni, C., Conti, B., Cotti, G. &amp; Belpogg, F. (1985) Experimental studies on benzene carcinogenicity at the Bologna Institute of Oncology: current results and ongoing research. Am. J ind. Med., 7, 415-4</p>
EPA	I	2003	<p>●NTP (National Toxicology Program). (1986) Technical Report on the Toxicology and Carcinogenesis of Xylenes (mixed) (60% m-xylene, 13.6% p-xylene, 17.0% ethylbenzene, and 9.1% o-xylene) in F344/N Rats and B6C3F1 mice (gavage studies). Research Triangle Park, NC. NTP TR 327, NIH Publ. No. 86-2583.</p> <p>●Maltoni, C; Conti, B; Cotti, G. (1983) Benzene: a multipotential carcinogen. Results of longterm bioassays performed at the Bologna Institute of Oncology. Am J Ind Med. 4:589-630.</p> <p>●Maltoni, C; Conti, B; Cotti, G; et al. (1985) Experimental studies on benzene carcinogenicity at the Bologna Institute of Oncology: current results and ongoing research. Am J Ind Med. 7:415-446.</p>
NTP	×	-	-
ACGIH	A4	1996	<p>●U.S. National Toxicology Program: Toxicology and Carcinogenesis Studies of Xylenes (Mixed) (60% m-Xylene, 14% p-Xylene, 9% o-Xylene, and 17% Ethyl Benzene) (CAS No. 1330-20-7) in F344/N Rats and B6C3F1 Mice (Gavage Studies). NTP TR 327. DHHS (NIH) Pub. No. 87-2583; NTIS Pub. No. PB-87-189-684. U.S. National Technical Information Service, Springfield, VA (1986).</p> <p>●Berenblum, I.: The Cocarcinogenic Action of Croton Oil. Cancer Res. 1:44 (1941).</p> <p>●Pound, A.W.: Induced Cell Proliferation and Initiation of Skin Tumor Formation in Mice by Ultraviolet. Pathology 2:269-275 (1970).</p> <p>●Tatrai, E.; Ungvary, G.; Cseh, I.R.; et al.: The Effect of Long-Term Inhalation of o-Xylene on the Liver. Ind. Environ. Xenobiotics, Proc. Intl. Conf., pp. 293-300 (1981); also published as Acta Med. Acad. Hung. 37:211-216 (1980).</p> <p>●Maltoni, C.; Conti, B.; Cotti, G.; Belpoggi, F.: Experimental Studies on Benzene Carcinogenicity at the Bologna Institute of Oncology: Current Results and Ongoing Research. Am. J. Ind. Med. 7:415-446(1985).</p> <p>●International Agency for Research on Cancer: IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, Vol. 47, Some Organic Solvents, Resin Monomers and Related Compounds, Pigments and Occupational Exposures in Paint Manufacture and Printing, pp. 125-156. IARC, Lyon, France (1989).</p>
産衛学会	×	-	-
EU	×	-	-

### 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 有

#### (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
	cohort	We followed cancer incidence among 3,922 male and 1,379 female workers monitored for exposure to styrene, toluene, or xylene. The follow-up after the first personal measurement comprised 66,500 person-years at risk over the period 1973±1992. We computed the indirectly standardized incidence ratios (SIR) with 95% confidence interval (CI) with regard to age-, gender-, and period-specific incidence rates of cancer in the Finnish general population.	xylene, no clear increase in cancer risk was found.	1998	
	文献名	Ahti Anttila, Eero Pukkala, Riitta Riala, Markku Sallmen, Kari Hemminki: "Cancer incidence among Finnish workers exposed to aromatic hydrocarbons" Int Arch Occup Environ Health (1998) 71: 187-193			
#2	調査の種類	調査方法	結果の概要	調査実施年	調査実施者
	case-control	The objective of this study was to evaluate the association between occupation and risk of liver cancer. A hospital-based case-control study was carried out during 1997-1999 in the Province of Brescia, a highly industrialized area in Northern Italy with a high incidence of this neoplasm. The cases were 144 male patients with incident liver cancer (96% hepatocellular carcinoma). Controls were 283 male patients, matched to cases on age (65 years), period and hospital of admission.	A slightly increased OR was noted in workers exposed to toluene and xylene (OR 1.4; 95% CI 0.7-3.0, 23 cases, 36 controls); the OR was 2.8 (95% CI 1.0-7.6, 11 cases, 12 controls) for 20 or more years of exposure and 2.0 (95% CI 0.9-4.1, 21 cases, 28 controls) for 30 or more years of time since first exposure. The increase in OR seemed to be independent from that of alcohol or viral infections. Our study showed that the role of occupational exposures in liver carcinogenesis is limited. However, prolonged exposure to organic solvents such as toluene and xylene may represent a risk factor for liver cancer.	2001	
	文献名	Stefano PORRU, Donatella PLACIDI, Angela CARTA, Umberto GELATTI, Maria Luisa RIBERO, Alessandro TAGGER Paolo BOFFETTA and Francesco DONATO: "PRIMARY LIVER CANCER AND OCCUPATION IN MEN: A CASE-CONTROL STUDY IN A HIGH-INCIDENCE AREA IN NORTHERN ITALY" International journal of cancer: 94, 878-883 (2001)			

	調査の種類	調査方法	結果の概要	調査実施年	調査実施者
#3	case-control	a population-based case-control study in 11 areas in Italy, in which all cases of hematolymphopoietic malignancies, incident in males and females aged 20-74 years in the period 1991-1993 were identified. A total of 2,737 cases of hematolymphopoietic malignancies were interviewed. The control group was formed from 1,779 subjects randomly selected through the demographic files of the municipalities in each of the areas under study, stratified by sex and 5-year age groups.	We found positive associations between CLL(chronic lymphatic leukemia) and exposures to benzene, toluene, and xylene, albeit with wide confidence intervals. When those with medium/high exposure to one of these agents were subdivided by duration of exposure there was a trend of increasing risk with increasing duration. For medium/high intensity exposure for more than 15 years, the ORs were: for benzene 4.7 (95% CI: 0.8-26.5);for xylene 3.3 (95% CI: 0.7-15.2); and for toluene 4.4 (95% CI: 1.1-18.8)	2008	
	文献名	Adele Seniori Costantini, Alessandra Benvenuti, Paolo Vineis, David Kriebel, Rosario Tumino, Valerio Ramazzotti, Stefania Rodella, Emanuele Stagnaro, Paolo Crosignani, Dino Amadori, Dario Mirabelli, Letizia Sommani, Isabella Belletti, Loredana Troschel, Luciano Romeo, Giuseppe Miceli, Giulio Andrea Tozzi, Igino Mendico, Simona Alberghini Maltoni, and Lucia Miligi: "Risk of Leukemia and Multiple Myeloma Associated With Exposure to Benzene and Other Organic Solvents:Evidence From the Italian Multicenter Case-Control Study" AMERICAN JOURNAL OF INDUSTRIAL MEDICINE 51:803-811 (2008)			
	調査の種類	調査方法	結果の概要	調査実施年	調査実施者
#4	case-control	All newly diagnosed cases of malignant lymphoma in men and women age 20 to 74 years in 1991-1993 were identified in 8 areas in Italy. The control group was formed by a random sample of the general population in the areas under study stratified by sex and 5-year age groups. Interviewed 1428 non-Hodgkin lymphoma cases, 304 Hodgkin disease cases, and 1530 controls.	In the medium/high level of exposure had an increased risk of non-Hodgkin lymphoma with exposure to toluene (odds ratio=1.8; confidence interval=1.1-2.8), xylene 1.7(1.0-2.6), and benzene 1.6(1.0-2.4)	2006	
	文献名	Miligi L, Costantini AS, Benvenuti A, Kriebel D, Bolejack V, Tumino R, Ramazzotti V, Rodella S, Stagnaro E, Crosignani P, Amadori D, Mirabelli D, Sommani L, Belletti I, Troschel L, Romeo L, Miceli G, Tozzi GA, Mendico I, Vineis P: "Occupational exposure to solvents and the risk of lymphomas" Epidemiology. 2006 Sep;17(5):552-61			
	調査の種類	調査方法	結果の概要	調査実施年	調査実施者
#5	case-control	2348 lymphoma cases and 2462 controls participated in a case-control study in six European countries.	Risk of follicular lymphoma significantly increased with three independent metrics of exposure to benzene, toluene and xylene (BTX) (combined $p=4 \times 10^{-7}$ ) and to styrene ( $p=1 \times 10^{-5}$ ), and chronic lymphocytic leukaemia (CLL) risk increased with exposure to solvents overall ( $p=4 \times 10^{-6}$ ), BTX ( $p=5 \times 10^{-5}$ ), gasoline ( $p=8 \times 10^{-5}$ ) and other solvents ( $p=2 \times 10^{-6}$ ). Risk of B-NHL for ever exposure to solvents was not elevated (OR=1.1, 95% CI 1.0 to 1.3), and that for CLL and follicular lymphoma was 1.3 (95% CI 1.1 to 1.6) and 1.3 (95% CI 1.0 to 1.7), respectively. Exposure to benzene accounted, at least partially, for the association observed with CLL risk. Hodgkin's lymphoma and T-cell lymphoma did not show an association with solvent exposure.	2010	
	文献名	Cocco P, t'Mannetje A, Fadda D, Melis M, Becker N, de Sanjosé S, Foretova L, Mareckova J, Staines A, Kleefeld S, Maynadié M, Nieters A, Brennan P, Boffetta P. : "Occupational exposure to solvents and the risk of lymphomas subtypes: results from the epilymph case-control study" Occup Environ Med. 2010 May;67(5):341-7			