

CHAPTER 8. REFERENCES

- Abplanalp W, DeJarnett N, Riggs DW, et al. 2017. Benzene exposure is associated with cardiovascular disease risk. *PLoS One* 12(9):e0183602. <https://doi.org/10.1371/journal.pone.0183602>.
- Abplanalp WT, Wickramasinghe NS, Sithu SD, et al. 2019. Benzene exposure induces insulin resistance in mice. *Toxicol Sci* 167(2):426-437. <https://doi.org/10.1093/toxsci/kfy252>.
- ACGIH. 2019. Benzene. Threshold limit values for chemical substances and physical agents and biological exposure indices. Cincinnati, OH: American Conference of Governmental Industrial Hygienists. 14, 107.
- Adami G, Larese F, Venier M, et al. 2006. Penetration of benzene, toluene and xylenes contained in gasolines through human abdominal skin in vitro. *Toxicol In Vitro* 20(8):1321-1330. <https://doi.org/10.1016/j.tiv.2006.05.008>.
- Adgate JL, Church TR, Ryan AD, et al. 2004. Outdoor, indoor and personal exposure to VOCs in children. *Environ Health Perspect* 112(14):1386-1392. <https://doi.org/10.1289/ehp.7107>.
- AIHA. 1989. Benzene. In: Odor thresholds for chemicals with established occupational health standards. Fairfax, VA: American Industrial Hygiene Association, 1, 9, 13, 41, 46.
- Aksoy M. 1980. Different types of malignancies due to occupational exposure to benzene: A review of recent observations in Turkey. *Environ Res* 23:181-190.
- Aksoy M. 1987. Chronic lymphoid leukaemia and hairy cell leukaemia due to chronic exposure to benzene: Report of three cases. *Br J Haematol* 66:209-211. <https://doi.org/10.1111/j.1365-2141.1987.tb01300.x>.
- Aksoy M, Erdem S. 1978. Followup study on the mortality and the development of leukemia in 44 pancytopenic patients with chronic benzene exposure. *Blood* 52:285-292. <https://doi.org/10.1182/BLOOD.V52.2.285.BLOODJOURNAL522285>.
- Aksoy M, Dincol K, Akgun T, et al. 1971. Haematological effects of chronic benzene poisoning in 217 workers. *Br J Ind Med* 28:296-302. <https://doi.org/10.1136/oem.28.3.296>.
- Aksoy M, Dincol K, Erdem S, et al. 1972. Details of blood changes in 32 patients with pancytopenia associated with long-term exposure to benzene. *Br J Ind Med* 29:56-64. <https://doi.org/10.1136/oem.29.1.56>.
- Aksoy M, Erdem S, Dincol G. 1974. Leukemia in shoe-workers exposed chronically to benzene. *Blood* 44:837-841. <https://doi.org/10.1182/BLOOD.V44.6.837.837>.
- Alexander DD, Wagner ME. 2010. Benzene exposure and non-Hodgkin lymphoma: a meta-analysis of epidemiologic studies. *J Occup Environ Med* 52(2):169-189. <https://doi.org/10.1097/JOM.0b013e3181cc9cf0>.
- Amin MM, Rafiei N, Poursafa P, et al. 2018. Association of benzene exposure with insulin resistance, SOD, and MDA as markers of oxidative stress in children and adolescents. *Environ Sci Pollut Res Int* 25(34):34046-34052. <https://doi.org/10.1007/s11356-018-3354-7>.
- Amodio-Cochieri R, Del PU, Cirillo T, et al. 2001. Evaluation of benzene exposure in children living in Campania (Italy) by urinary trans,trans-muconic acid assay. *J Toxicol Environ Health A* 63(2):79-87. <https://doi.org/10.1080/15287390151126388>.
- Andersen ME, Krishnan K. 1994. Relating in vitro to in vivo exposures with physiologically based tissue dosimetry and tissue response models. In: Salem H, ed. *Animal test alternatives: Refinement, reduction, replacement*. New York, NY: Marcel Dekker, Inc., 9-25.
- Anderson D, Richardson CR. 1981. Issues relevant to the assessment of chemically induced chromosome damage in vivo and their relationship to chemical mutagenesis. *Mutat Res* 90:261-272. [https://doi.org/10.1016/0165-1218\(81\)90006-9](https://doi.org/10.1016/0165-1218(81)90006-9).
- Andreoli C, Leopardi P, Crebelli R. 1997. Detection of DNA damage in human lymphocytes by alkaline single cell gel electrophoresis after exposure to benzene or benzene metabolites. *Mutat Res* 377(1):95-104. [https://doi.org/10.1016/S0027-5107\(97\)00065-1](https://doi.org/10.1016/S0027-5107(97)00065-1).

8. REFERENCES

- Andrews LS, Lee EW, Witmer CM, et al. 1977. Effects of toluene on metabolism, disposition, and hematopoietic toxicity of [3H] benzene. *Biochem Pharmacol* 26:293-300. [https://doi.org/10.1016/0006-2952\(77\)90180-0](https://doi.org/10.1016/0006-2952(77)90180-0).
- Andrews LS, Sasame HA, Gillette JR. 1979. 3H-Benzene metabolism in rabbit bone marrow. *Life Sci* 25:567-572.
- Angerer J, Scherer G, Schaller KH, et al. 1991. The determination of benzene in human blood as an indicator of environmental exposure to volatile aromatic compounds. *Fresenius J Anal Chem* 339(10):740-742.
- Aoyama K. 1986. Effects of benzene inhalation on lymphocyte subpopulations and immune response in mice. *Toxicol Appl Pharmacol* 85(1):92-101. [https://doi.org/10.1016/0041-008x\(86\)90390-x](https://doi.org/10.1016/0041-008x(86)90390-x).
- Arfellini G, Grilli S, Colacci A, et al. 1985. In vivo and in vitro binding of benzene to nucleic acids and proteins of various rat and mouse organs. *Cancer Lett* 28:159-168.
- Arinc E, Adali O, Iscan M, et al. 1991. Stimulatory effects of benzene on rabbit liver and kidney microsomal cytochrome P-450 dependent drug metabolizing enzymes. *Arch Toxicol* 65(3):186-190. <https://doi.org/10.1007/BF02307307>.
- Armenta-Reséndiz M, Ríos-Leal E, Rivera-García MT, et al. 2019. Structure-activity study of acute neurobehavioral effects of cyclohexane, benzene, m-xylene, and toluene in rats. *Toxicol Appl Pharmacol* 376:38-45. <https://doi.org/10.1016/j.taap.2019.05.016>.
- Arvin E, Jensen BK, Gundersen AT. 1989. Substrate interactions during aerobic biodegradation of benzene. *Appl Environ Microbiol* 55:3221-3225. <https://doi.org/10.1128/aem.55.12.3221-3225.1989>.
- Ashley DL, Bonin MA, Cardinali FL, et al. 1994. Blood concentrations of volatile organic compounds in a nonoccupationally exposed US population and in groups with suspected exposure. *Clin Chem* 40(7):1401-1404.
- Astier A. 1992. Simultaneous high-performance liquid chromatographic determination of urinary metabolites of benzene, nitrobenzene, toluene, xylene and styrene. *J Chromatogr* 573(2):318-322.
- ATSDR. 1989. Decision guide for identifying substance-specific data needs related to toxicological profiles; Notice. Agency for Toxic Substances and Disease Registry. *Fed Regist* 54(174):37618-37634.
- ATSDR. 2004. Interaction profile for: benzene, toluene, ethylbenzene, and xylenes (BTEX). Atlanta, GA: Agency for Toxic Substances and Disease Registry. <https://www.atsdr.cdc.gov/interactionprofiles/ip-btex/ip05.pdf>. April 11, 2024.
- ATSDR. 2016. Evaluating vapor intrusion pathways: Guidance for ATSDR's Division of Community Health Investigations. Agency for Toxic Substances and Disease Registry. <https://stacks.cdc.gov/view/cdc/79266>. April 17, 2024.
- ATSDR. 2019a. Health consultation: Evaluation of potential exposure to releases from historical military use areas, Port Heiden, Lake and Peninsula Borough, Alaska, EPA Facility ID: AK8570028698. Atlanta, GA: Agency for Toxic Substances and Disease Registry. https://www.atsdr.cdc.gov/HAC/pha/PortHeiden/Port_Heiden_Health_Consultation-508.pdf. January 31, 2024.
- ATSDR. 2019b. Health consultation: Public health evaluation of water data collected in the vicinity of the JKLM Natural Gas Well on the Reese Hollow 118 Pad, JKLM Natural Gas Well Coudersport, Coudersport, Potter County, Pennsylvania. Atlanta, GA: Agency for Toxic Substances and Disease Registry. https://www.atsdr.cdc.gov/HAC/pha/JKLMNaturalGas/JKLM_Energy_Natural_Gas_Well_Coudersport-508.pdf. January 31, 2024.
- ATSDR. 2020. Health consultation: Evaluation of environmental exposures at the Gambell formerly used defense site (FUDS) (aka St Lawrence Island), Native Village of Gambell, Gambell, Alaska, EPA facility ID: AKD981765894. Atlanta, GA: Agency for Toxic Substances and Disease Registry. https://www.atsdr.cdc.gov/hac/pha/Gambell/Gambell_FUDS_HC_092020-508.pdf. January 31, 2024.

8. REFERENCES

- ATSDR. 2021. Health consultation: Former Custom Cleaners NPL site (soil, soil gas, and indoor air evaluation), former Custom Cleaners, 3517 Southern Avenue, Memphis, Shelby County, Tennessee 38111, EPA facility ID: TNN000402275. Atlanta, GA: Agency for Toxic Substances and Disease Registry.
https://www.atsdr.cdc.gov/HAC/pha/FormerCustomCleaners/Former_Custom_Cleaners_HC_PC-508.pdf. January 31, 2024.
- ATSDR. 2022a. Benzene. Full SPL data. Substance priority list (SPL) resource page. Agency for Toxic Substances and Disease Registry. <https://www.atsdr.cdc.gov/SPL/resources/index.html>. January 31, 2024.
- ATSDR. 2022b. Health consultation: Evaluation of exposure to landfill gases in ambient air, Bridgeton Sanitary Landfill, Bridgeton, St. Louis County, Missouri. Atlanta, GA: Agency for Toxic Substances and Disease Registry. <https://health.mo.gov/living/environment/bridgeton/pdf/landfill-hc-508.pdf>. January 31, 2024.
- ATSDR. 2022c. Evaluation of volatile organic compounds (VOCs) in indoor air and radiation in soil, Alameda Naval Air Station, Alameda, California, CA2170023236. Atlanta, GA: Agency for Toxic Substances and Disease Registry. <https://www.atsdr.cdc.gov/HAC/pha/Alameda/NAS-Alameda-HC-508.pdf>. January 31, 2024.
- ATSDR. 2023a. Health consultation: Analysis of contaminants in drinking water and indoor air, Amphenol Products Company Plant, Hougland Tomato Cannery, Webb Wellfield, and adjacent sites in Northeast Franklin, Franklin, Johnson County, Indiana, EPA RCRA ID: IND044587848, EPA RCRA ID: INN000510423. Atlanta, GA: Agency for Toxic Substances and Disease Registry. <https://www.atsdr.cdc.gov/hac/pha/amphenol/Amphenol-Health-Consultation-508.pdf>. January 31, 2024.
- ATSDR. 2023b. Health consultation: Eldorado Chemical Co., Inc., Live Oak Bexar County, Texas, EPA facility ID: TXD057567216. Atlanta, GA: Agency for Toxic Substances and Disease Registry. <https://www.atsdr.cdc.gov/HAC/pha/EldoradoChemicalCo/Eldorado-Chemical-HC-508.pdf>. January 31, 2024.
- ATSDR. 2023c. Health consultation: Public comment version Spring Park Municipal Well Field NPL site, Spring Park, Hennepin County, Minnesota, EPA Facility ID: MNN000502963. Atlanta, GA: Agency for Toxic Substances and Disease Registry. <https://www.atsdr.cdc.gov/HAC/pha/SpringPark/SpringParkHC-Public-Comment-508.pdf>. January 31, 2024.
- ATSDR. 2023d. Public health assessment: Matlack, Inc. Site, New Jersey, EPA facility ID: NJD043584101. Atlanta, GA: Agency for Toxic Substances and Disease Registry. <https://www.atsdr.cdc.gov/HAC/pha/Matlack/Matlack-PHA-508.pdf>. January 31, 2024.
- ATSDR. 2023e. Evaluation of volatile organic compounds (VOCs) in public drinking water (public comment), Dorado Groundwater Contamination Site, Dorado Municipio, Puerto Rico. Chamblee, GA: Agency for Toxic Substances and Disease Registry. <https://www.atsdr.cdc.gov/HAC/pha/Dorado/DoradoNPL-PHA-508.pdf>. January 31, 2024.
- ATSDR. 2023f. Sanders2015 HLCs used in SHOWER Model v3 and PHAST. Atlanta, GA: Agency for Toxic Substances and Disease Registry. https://www.atsdr.cdc.gov/pha-guidance/toolbox/ATSDR_SHOWER_Model_v3_0_0.zip. January 31, 2024.
- Au WW, Anwar WA, Hanania E, et al. 1990. Antimutagenic effects of dimethyl sulfoxide on metabolism and genotoxicity of benzene in vivo. *Basic Life Sci* 52:389-393. https://doi.org/10.1007/978-1-4615-9561-8_38.
- Au WW, Ramanujam VM, Ward JB, et al. 1991. Chromosome aberrations in lymphocytes of mice after sub-acute low-level inhalation exposure to benzene. *Mutat Res* 260(2):219-224. [https://doi.org/10.1016/0165-1218\(91\)90011-A](https://doi.org/10.1016/0165-1218(91)90011-A).
- Aubrecht J, Rugo R, Schiestl RH. 1995. Carcinogens induce intrachromosomal recombination in human cells. *Carcinogenesis* 16(11):2841-2846. <https://doi.org/10.1093/CARCIN/16.11.2841>.

8. REFERENCES

- Austin CC, Wang D, Ecobichon DJ, et al. 2001. Characterization of volatile organic compounds in smoke at municipal structural fires. *J Toxicol Environ Health A* 63(6):437-458. <https://doi.org/10.1080/152873901300343470>.
- Avis SP, Hutton CJ. 1993. Acute benzene poisoning; A report of three fatalities. *J Forensic Sci* 38(3):599-602.
- Baarson K, Snyder CA, Green J, et al. 1982. The hematotoxic effects of inhaled benzene on peripheral blood, bone marrow, and spleen cells are increased by ingested ethanol. *Toxicol Appl Pharmacol* 64:393-404. [https://doi.org/10.1016/0041-008x\(82\)90235-6](https://doi.org/10.1016/0041-008x(82)90235-6).
- Baarson KA, Snyder CA, Albert RE. 1984. Repeated exposures of C57B1 mice to inhaled benzene at 10 ppm markedly depressed erythropoietic colony formation. *Toxicol Lett* 20:337-342. [https://doi.org/10.1016/0378-4274\(84\)90169-3](https://doi.org/10.1016/0378-4274(84)90169-3).
- Backer LC, Egeland GM, Ashley DL, et al. 1997. Exposure to regular gasoline and ethanol oxyfuel during refueling in Alaska. *Environ Health Perspect* 105(8):850-855. <https://doi.org/10.1289/EHP.97105850>.
- Bahadar H, Maqbool F, Mostafalou S, et al. 2015a. The molecular mechanisms of liver and islets of Langerhans toxicity by benzene and its metabolite hydroquinone in vivo and in vitro. *Toxicol Mech Methods* 25(8):628-636. <https://doi.org/10.3109/15376516.2015.1053650>.
- Bahadar H, Maqbool F, Mostafalou S, et al. 2015b. Assessment of benzene induced oxidative impairment in rat isolated pancreatic islets and effect on insulin secretion. *Environ Toxicol Pharmacol* 39(3):1161-1169. <https://doi.org/10.1016/j.etap.2015.04.010>.
- Bakoglu M, Karademir A, Ayberk S. 2004. An elevation of the occupational health risks to workers in a hazardous waste incinerator. *J Occup Health* 46(2):156-164.
- Bandow H, Washida N, Akimoto H. 1985. Ring-cleavage reactions of aromatic hydrocarbons studied by FT-IR spectroscopy. I. Photooxidation of toluene and benzene in the NOx-air system. *Bull Chem Soc Jpn* 58:2531-2540. <https://doi.org/10.1246/BCSJ.58.2531>.
- Banik S, Lahiri T. 2005. Decrease in brain serotonin level and short term memory loss in mice: a preliminary study. *Environ Toxicol Pharmacol* 19(2):367-370. <https://doi.org/10.1016/j.etap.2004.09.002>.
- Barale R, Giorgelli F, Migliore L, et al. 1985. Benzene induces micronuclei in circulating erythrocytes of chronically treated mice. *Mutat Res* 144:193-196. [https://doi.org/10.1016/0165-7992\(85\)90139-3](https://doi.org/10.1016/0165-7992(85)90139-3).
- Barnes DG, Dourson M. 1988. Reference dose (RfD); Description and use in health risk assessments. *Regul Toxicol Pharmacol* 8:471-486.
- Barrefors G, Petersson G. 1995. Assessment by gas chromatography and gas chromatography-mass spectrometry of volatile hydrocarbons from biomass burning. *J Chromatogr* 710:71-77.
- Barrett RH. 1985. Assays for unscheduled DNA synthesis in HeLa S3 cells. *Prog Mutat Res* 5:347-352.
- Bartczak A, Kline SA, Yu R, et al. 1994. Evaluation of assays for the identification and quantitation of muconic acid, a benzene metabolite in human urine. *J Toxicol Environ Health* 42:245-258. <https://doi.org/10.1080/15287399409531877>.
- Baslo A, Aksoy M. 1982. Neurological abnormalities in chronic benzene poisoning. A study of six patients with aplastic anemia and two with preleukemia. *Environ Res* 27:457-465.
- Bassig BA, Zhang L, Vermeulen R, et al. 2016. Comparison of hematological alterations and markers of B-cell activation in workers exposed to benzene, formaldehyde and trichloroethylene. *Carcinogenesis* 37(7):692-700. <https://doi.org/10.1093/carcin/bgw053>.
- Bechtold WE, Henderson RF. 1993. Biomarkers of human exposure to benzene. *J Toxicol Environ Health* 40:377-386. <https://doi.org/10.1080/15287399309531803>.
- Bechtold WE, Sun JD, Birnbaum LS, et al. 1992a. S-phenylcysteine formation in hemoglobin as a biological exposure index to benzene. *Arch Toxicol* 66(5):303-309. <https://doi.org/10.1007/BF01973623>.

8. REFERENCES

- Bechtold WE, Willis JK, Sun JD, et al. 1992b. Biological markers of exposure to benzene: S-phenylcysteine in albumin. *Carcinogenesis* 13(7):1217-1220. <https://doi.org/10.1093/CARCIN/13.7.1217>.
- Benedict RT, Scinicariello F, Abadin HG, et al. 2024. Hearing loss and urinary trans,trans-muconic acid (t,t-MA) in 6- to 19-year-old participants of NHANES 2017-March 2020. *Toxics* 12(3):191. <https://doi.org/10.3390/toxics12030191>.
- Bennett GF. 1987. Air quality aspects of hazardous waste landfills. *Haz Waste Haz Mat* 4:119-138.
- Berlin M, Gage JC, Gullberg B, et al. 1980. Breath concentration as an index to the health risk from benzene. *Scand J Work Environ Health* 6:104-111.
- Bernauer U, Vieth B, Ellrich R, et al. 1999. CYP2E1-dependent benzene toxicity: the role of extrahepatic benzene metabolism. *Arch Toxicol* 73:189-196. <https://doi.org/10.1007/s002040050605>.
- Bernauer U, Vieth B, Ellrich R, et al. 2000. CYP2E1 expression in bone marrow and its intra- and interspecies variability: approaches for a more reliable extrapolation from one species to another in the risk assessment of chemicals. *Arch Toxicol* 73(12):618-624. <https://doi.org/10.1007/s002040050016>.
- Bernillon P, Bois FY. 2000. Statistical issues in toxicokinetic modeling: a bayesian perspective. *Environ Health Perspect* 108(Suppl 5):883-893. <https://doi.org/10.1289/ehp.00108s5883>.
- Bhandari D, Zhu Y, Zhang C, et al. 2023. Smoke exposure associated with higher urinary benzene biomarker muconic acid (MUCA) in Golestan Cohort Study participants. *Biomarkers* 28(7):637-642. <https://doi.org/10.1080/1354750X.2023.2276030>.
- Bird MG, Wetmore BA, Letinski DJ, et al. 2010. Influence of toluene co-exposure on the metabolism and genotoxicity of benzene in mice using continuous and intermittent exposures. *Chem Biol Interact* 184(1-2):233-239. <https://doi.org/10.1016/j.cbi.2010.01.012>.
- Blank IH, McAuliffe DJ. 1985. Penetration of benzene through human skin. *J Invest Dermatol* 85:522-526.
- Bleasdale C, Kennedy G, MacGregor JO, et al. 1996. Chemistry of muconaldehydes of possible relevance to the toxicology of benzene. *Environ Health Perspect* 104(Suppl 6):1201-1209. <https://doi.org/10.1289/EHP.961041201>.
- Bloemen LJ, Youk A, Bradley TD, et al. 2004. Lymphohaematopoietic cancer risk among chemical workers exposed to benzene. *Occup Environ Med* 61(3):270-274. <https://doi.org/10.1136/oem.2003.007013>.
- Bock CW, George P, Greenberg A, et al. 1994. An ab initio computational molecular orbital study of the conformers of muconaldehyde, and the possible role of 2-formyl-2H-pyran in bringing about the conversion of a (Z,Z)-muconaldehyde structure into an (E,Z)-muconaldehyde structure. *Chem Res Toxicol* 7(4):534-543.
- Bodell WJ, Levay G, Pongracz K. 1993. Investigation of benzene-DNA adducts and their detection in human bone marrow. *Environ Health Perspect* 99:241-244. <https://doi.org/10.1289/EHP.9399241>.
- Bogadi-Šare A, Brumen V, Turk R, et al. 1997. Genotoxic effects in workers exposed to benzene: With special reference to exposure biomarkers and confounding factors. *Ind Health* 35:367-373.
- Bogen KT, Sheehan PJ. 2014. Dermal versus total uptake of benzene from mineral spirits solvent during parts washing. *Risk Anal* 34(7):1336-1358. <https://doi.org/10.1111/risa.12166>.
- Bois FY, Paxman DG. 1992. An analysis of exposure rate effects for benzene using a physiologically based pharmacokinetic model. *Regul Toxicol Pharmacol* 15(2):122-136.
- Bois FY, Smith MT, Spear RC. 1991a. Mechanisms of benzene carcinogenesis; Application of a physiological model of benzene pharmacokinetics and metabolism. *Toxicol Lett* 56(3):283-298. [https://doi.org/10.1016/0378-4274\(91\)90157-2](https://doi.org/10.1016/0378-4274(91)90157-2).
- Bois FY, Woodruff TJ, Spear RC. 1991b. Comparison of three physiologically based pharmacokinetic models of benzene disposition. *Toxicol Appl Pharmacol* 110(1):79-88. [https://doi.org/10.1016/0041-008X\(91\)90291-L](https://doi.org/10.1016/0041-008X(91)90291-L).

8. REFERENCES

- Bois FY, Jackson E, Pekari K. 1996. Population toxicokinetics of benzene. *Environ Health Perspect* 104(Suppl 6):1405-1411. <https://doi.org/10.1289/EHP.961041405>.
- Bond GG, McLaren EA, Baldwin CL, et al. 1986a. An update of mortality among chemical workers exposed to benzene. *Br J Ind Med* 43:685-691. <https://doi.org/10.1136/oem.43.10.685>.
- Bond AE, Thompson VL, Ortman GC, et al. 1986b. Self service station vehicle refueling exposure study. In: *Proceedings of the 1986 EPA/APCA symposium on measurements of toxic air pollutants*. Raleigh, NC: U.S. Environmental Protection Agency. Air Pollution Control Association, 458-466.
- Boogaard PJ. 2022. Human biomonitoring of low-level benzene exposures. *Crit Rev Toxicol* 52(10):799-810. <https://doi.org/10.1080/10408444.2023.2175642>.
- Boogaard PJ, van Sittert NJ. 1995. Biological monitoring of exposure to benzene: a comparison between S-phenylmercapturic acid, trans,trans-muconic acid, and phenol. *Occup Environ Med* 52:611-620. <https://doi.org/10.1136/oem.52.9.611>.
- Boogaard PJ, van Sittert NJ. 1996. Suitability of S-phenyl mercapturic acid and trans,trans-muconic acid as biomarkers for exposure to low concentrations of benzene. *Environ Health Perspect* 104(Suppl 6):1151-1157. <https://doi.org/10.1289/EHP.961041151>.
- Bowman BA, Lewis EV, Goldy DW, et al. 2023. Assessment of urinary 6-hydroxy-2,4-cyclohexadienyl mercapturic acid as a novel biomarker of benzene exposure. *J Anal Toxicol* 47(7):597-605. <https://doi.org/10.1093/jat/bkad056>.
- Bradley MO. 1985. Measurement of DNA single-strand breaks by alkaline elution in rat hepatocytes. *Prog Mutat Res* 5:353-357.
- Brief RS, Lynch J, Bernath T, et al. 1980. Benzene in the workplace. *Am Ind Hyg Assoc J* 41(9):616-623. <https://doi.org/10.1080/15298668091425392>.
- Brondeau MT, Ducos P, Gaudin R, et al. 1992. Evaluation of the interaction of benzene and toluene on the urinary excretion of t,t-muconic acid in rats. *Toxicol Lett* 61:311-316. [https://doi.org/10.1016/0378-4274\(92\)90158-G](https://doi.org/10.1016/0378-4274(92)90158-G).
- Brown EA, Shelley ML, Fisher JW. 1998. A pharmacokinetic study of occupational and environmental benzene exposure with regard to gender. *Risk Anal* 18(2):205-213.
- Brugnone F, Perbellini L, Romeo L, et al. 1998. Benzene in environmental air and human blood. *Int Arch Occup Environ Health* 71:554-559.
- Brunnemann KD, Kagan MR, Cox JE, et al. 1989. Determination of benzene, toluene and 1,3-butadiene in cigarette smoke by GC-MSD. *Exp Pathol* 37:108-113.
- Brunnemann KD, Kagan MR, Cox JE, et al. 1990. Analysis of 1,3-butadiene and other selected gas-phase components in cigarette mainstream and sidestream smoke by gas chromatography-mass selective detection. *Carcinogenesis* 11:1863-1868. <https://doi.org/10.1093/CARCIN/11.10.1863>.
- Bryce-Smith D, Gilbert A. 1976. The organic photochemistry of benzene. *Tetrahedron* 32:1309-1326.
- Budavari S, O'Neil MJ, Smith A, et al., eds. 2001. Benzene. In: *The Merck index: An encyclopedia of chemicals, drugs, and biologicals*. Whitehouse Station, NJ: Merck and Co., Inc., 182-183.
- Buratti M, Fustinoni S, Colombi A. 1996. Fast liquid chromatographic determination of urinary trans,trans-muconic acid. *J Chromatogr B Biomed Appl* 677(2):257-263. [https://doi.org/10.1016/0378-4347\(95\)00466-1](https://doi.org/10.1016/0378-4347(95)00466-1).
- Burk T, Zarus G. 2013. Community exposures to chemicals through vapor intrusion: a review of past ATSDR public health evaluations. *J Environ Health* 75(9):36-41.
- Byrd GD, Fowler KW, Hicks RD, et al. 1990. Isotope dilution gas chromatography-mass spectrometry in the determination of benzene, toluene, styrene and acrylonitrile in mainstream cigarette smoke. *J Chromatogr* 503:359-368.
- C&EN. 1995. Production soared in most chemical sectors. *Chem Eng News* 7(26):38-40.
- Cal EPA. 1987. Residential population exposure to ambient benzene in California. Sacramento, CA: California Environmental Protection Agency. PB87178836. ARB/TS87001.
- Cal EPA. 2018. Gasoline-related air pollutants in California - Trends in exposure and health risk, 1996 to 2014. California Environmental Protection Agency. <https://oehha.ca.gov/air/report/gasoline-related-air-pollutants-california-trends-exposure-and-health-risk-1996-2014>. January 31, 2024.

8. REFERENCES

- Cao Y, Wang T, Xi J, et al. 2023. Benchmark dose estimation for benzene-exposed workers in China: Based on quantitative and multi-endpoint genotoxicity assessments. *Environ Pollut* 330:121765. <https://doi.org/10.1016/j.envpol.2023.121765>.
- Carlos-Wallace FM, Zhang L, Smith MT, et al. 2016. Parental, in utero, and early-life exposure to benzene and the risk of childhood leukemia: A meta-analysis. *Am J Epidemiol* 183(1):1-14. <https://doi.org/10.1093/aje/kwv120>.
- Carpenter CP, Shaffer CB, Weil CS, et al. 1944. Studies on the inhalation of 1:3-butadiene; with a comparison of its narcotic effect with benzol, toluol, and styrene, and a note on the elimination of styrene by the human. *J Ind Hyg Toxicol* 26:69-78.
- Carrieri M, Tranfo G, Pigni D, et al. 2010. Correlation between environmental and biological monitoring of exposure to benzene in petrochemical industry operators. *Toxicol Lett* 192(1):17-21. <https://doi.org/10.1016/j.toxlet.2009.07.015>.
- Cassidy MK, Houston JB. 1984. In vivo capacity of hepatic and extra hepatic enzymes to conjugate phenol. *Drug Metab Dispos* 12:619-624.
- CDC. 1994. Continued use of drinking water wells contaminated with hazardous chemical substances Virgin Islands and Minnesota 1981-1993. *Morbid Mortal Weekly Rep* 43(5):89-92.
- CDC. 2005. 1999-2000 Data documentation, codebook, and frequencies: Volatile organic compounds (VOC) - Personal exposure badge (LAB21). National Health and Nutrition Examination Survey. Centers for Disease Control and Prevention. <https://wwwn.cdc.gov/Nchs/Nhanes/1999-2000/LAB21.htm>. January 31, 2024.
- CDC. 2022a. Blood benzene. Biomonitoring data tables for environmental chemicals. Centers for Disease Control and Prevention. https://www.cdc.gov/exposurereport/data_tables.html. January 31, 2024.
- CDC. 2022b. 2017-2018 Data documentation, codebook, and frequencies: Volatile organic compound (VOC) metabolites II - urine (surplus) (SSUVOC_J). National Health and Nutrition Examination Survey. Centers for Disease Control and Prevention. https://wwwn.cdc.gov/Nchs/Nhanes/2017-2018/P_UVOC2.htm. January 31, 2024.
- CDC. 2023. Tobacco product use among adults - United States, 2021. *Morbid Mortal Weekly Rep* 72(18):475-483. <https://www.cdc.gov/mmwr/volumes/72/wr/pdfs/mm7218a1-H.pdf>. October 28, 2024.
- CDPHE. 2020. Health consultation: Assessment of ambient air exposures to volatile organic compounds measured at an elementary school near an oil and gas development operation. Colorado Department of Public Health & Environment. <https://www.weld.gov/files/sharedassets/public/v/1/departments/commissioners/documents/climate-conversation/bella-health-consult-english-final.pdf>. January 31, 2024.
- Chaiklieng S, Suggaravetsiri P, Kaminski N, et al. 2021. Exposure to benzene and toluene of gasoline station workers in Khon Kaen, Thailand and adverse effects. *Hum Ecol Risk Assess* 27(7):1823-1837. <https://doi.org/10.1080/10807039.2021.1910010>.
- Chambers DM, Ocariz JM, McGuirk MF, et al. 2011. Impact of cigarette smoking on volatile organic compound (VOC) blood levels in the U.S. population: NHANES 2003-2004. *Environ Int* 37(8):1321-1328. <https://doi.org/10.1016/j.envint.2011.05.016>.
- Chang D, Sui H, Pan HZ, et al. 2005. Effects of chronic benzene poisoning on DNA and antioxidase of mice. *Zhongguo Lin Chuang Kang Fu* 9(3):240-242.
- Chatterjee A, Babu RJ, Ahaghotu E, et al. 2005. The effect of occlusive and unocclusive exposure to xylene and benzene on skin irritation and molecular responses in hairless rats. *Arch Toxicol* 79(5):294-301. <https://doi.org/10.1007/s00204-004-0629-1>.
- Chen H, Rupa DS, Tomar RR, et al. 1994. Chromosomal loss and breakage in mouse bone marrow and spleen cells exposed to benzene in vivo. *Cancer Res* 54:3533-3539.
- Chen L, Guo P, Zhang H, et al. 2019. Benzene-induced mouse hematotoxicity is regulated by a protein phosphatase 2A complex that stimulates transcription of cytochrome P4502E1. *J Biol Chem* 294(7):2486-2499. <https://doi.org/10.1074/jbc.RA118.006319>.

8. REFERENCES

- Chenna A, Hang B, Rydberg B, et al. 1995. The benzene metabolite p-benzoquinone forms adducts with DNA bases that are excised by a repair activity from human cells that differs from an ethenoadenine glycosylase. *Proc Natl Acad Sci U S A* 92(13):5890-5894. <https://doi.org/10.1073/PNAS.92.13.5890>.
- Chepiga TA, Yang CS, Snyder R. 1991. Benzene metabolism by two purified, reconstituted rat hepatic mixed function oxidase systems. *Adv Exp Med Biol* 283:261-265. https://doi.org/10.1007/978-1-4684-5877-0_28.
- Chertkov JL, Lutton JD, Jiang S, et al. 1992. Hematopoietic effects of benzene inhalation assessed by murine long-term bone marrow culture. *J Lab Clin Med* 119(4):412-419.
- Choi YH, Kim JH, Lee BE, et al. 2014. Urinary benzene metabolite and insulin resistance in elderly adults. *Sci Total Environ* 482-483:260-268. <https://doi.org/10.1016/j.scitotenv.2014.02.121>.
- Choy WN, MacGregor JT, Shelby MD, et al. 1985. Induction of micronuclei by benzene in B6C3F1 mice; Retrospective analysis of peripheral blood smears from the NTP carcinogenesis bioassay. *Mutat Res* 143:55-59. [https://doi.org/10.1016/0165-7992\(85\)90105-8](https://doi.org/10.1016/0165-7992(85)90105-8).
- Ciarrocca M, Tomei G, Fiaschetti M, et al. 2012. Assessment of occupational exposure to benzene, toluene and xylenes in urban and rural female workers. *Chemosphere* 87(7):813-819. <https://doi.org/10.1016/j.chemosphere.2012.01.008>.
- Ciranni R, Barale R, Marrazzini A, et al. 1988. Benzene and the genotoxicity of its metabolites. I. Transplacental activity in mouse fetuses and in their dams. *Mutat Res* 208:61-67. [https://doi.org/10.1016/0165-7992\(88\)90022-X](https://doi.org/10.1016/0165-7992(88)90022-X).
- Clavel J, Conso F, Limasset JC, et al. 1996. Hairy cell leukaemia and occupational exposure to benzene. *Occup Environ Med* 53(8):533-539. <https://doi.org/10.1136/oem.53.8.533>.
- Clewell HJ. 1995. The application of physiologically based pharmacokinetic modeling in human health risk assessment of hazardous substances. *Toxicol Lett* 79(1-3):207-217. [https://doi.org/10.1016/0378-4274\(95\)03372-r](https://doi.org/10.1016/0378-4274(95)03372-r).
- Cline PV, Viste DR. 1985. Migration and degradation patterns of volatile organic compounds. *Waste Manage Res* 3:351-360. <https://doi.org/10.1177/0734242X8500300143>.
- Coate WB, Hoberman AM, Durluo RS. 1984. Inhalation teratology study of benzene in rats. *Adv Mod Environ Toxicol* 6:187-198.
- Cody RP, Strawderman WW, Kipen HM. 1993. Hematologic effects of benzene: Job-specific trends during the first year of employment among a cohort of benzene-exposed rubber workers. *J Occup Med* 35(8):776-782.
- Cole CE, Tran HT, Schlosser PM. 2001. Physiologically based pharmacokinetic modeling of benzene metabolism in mice through extrapolation from in vitro to in vivo. *J Toxicol Environ Health A* 62(6):439-465. <https://doi.org/10.1080/00984100150501178>.
- Collins JJ, Conner P, Friedlander BR, et al. 1991. A study of the hematologic effects of chronic low-level exposure to benzene. *J Occup Med* 33(5):619-626.
- Collins JJ, Ireland BK, Easterday PA, et al. 1997. Evaluation of lymphopenia among workers with low-level benzene exposure and the utility of routine data collection. *J Occup Environ Med* 39(3):232-237.
- Collins CD, Bell JNB, Crews C. 2000. Benzene accumulation in horticultural crops. *Chemosphere* 40(1):109-114.
- Collins JJ, Anteau SE, Swaen GM, et al. 2015. Lymphatic and hematopoietic cancers among benzene-exposed workers. *J Occup Environ Med* 57(2):159-163. <https://doi.org/10.1097/jom.0000000000000324>.
- Cordiano R, Papa V, Cicero N, et al. 2022. Effects of benzene: Hematological and hypersensitivity manifestations in resident living in oil refinery areas. *Toxics* 10(11):678. <https://doi.org/10.3390/toxics10110678>.
- Cornish HH, Ryan RC. 1965. Metabolism of benzene in nonfasted, fasted, and aryl-hydroxylase inhibited rats. *Toxicol Appl Pharmacol* 7:767-771. [https://doi.org/10.1016/0041-008x\(65\)90001-3](https://doi.org/10.1016/0041-008x(65)90001-3).

8. REFERENCES

- Costantini AS, Quinn M, Consonni D, et al. 2003. Exposure to benzene and risk of leukemia among shoe factory workers. *Scand J Work Environ Health* 29(1):51-59.
- Cox LA. 1996. Reassessing benzene risks using internal doses and Monte-Carlo uncertainty analysis. *Environ Health Perspect* 104(Suppl 6):1413-1429. <https://doi.org/10.1289/EHP.961041413>.
- Cox LA, Schnatter AR, Boogaard PJ, et al. 2017. Non-parametric estimation of low-concentration benzene metabolism. *Chem Biol Interact* 278:242-255. <https://doi.org/10.1016/j.cbi.2017.08.007>.
- Cox LA, Ketelslegers HB, Lewis RJ. 2021. The shape of low-concentration dose-response functions for benzene: implications for human health risk assessment. *Crit Rev Toxicol* 51(2):95-116. <https://doi.org/10.1080/10408444.2020.1860903>.
- Crawford DW, Bonnevie NL, Wenning RJ. 1995. Sources of pollution and sediment contamination in Newark Bay, New Jersey. *Ecotoxicol Environ Saf* 30(1):85-100. <https://doi.org/10.1006/eesa.1995.1010>.
- Crebelli R, Bellincampi D, Conti G, et al. 1986. A comparative study on selected chemical carcinogens for chromosome malsegregation, mitotic crossing-over and forward mutation induction in *Aspergillus nidulans*. *Mutat Res* 172:139-149. [https://doi.org/10.1016/0165-1218\(86\)90070-4](https://doi.org/10.1016/0165-1218(86)90070-4).
- Creek MR, Mani C, Vogel JS, et al. 1997. Tissue distribution and macromolecular binding of extremely low doses of [¹⁴C]-benzene in B6C3F1 mice. *Carcinogenesis* 18(12):2421-2427. <https://doi.org/10.1093/CARCIN/18.12.2421>.
- Cronin HJ. 1924. Benzol poisoning in the rubber industry. *Boston Med Sci J* 191:1164-1166. <https://doi.org/10.1056/NEJM192412181912506>.
- Cronkite EP. 1986. Benzene hematotoxicity and leukemogenesis. *Blood Cells* 12:129-137.
- Cronkite EP, Inoue T, Carsten AL, et al. 1982. Effects of benzene inhalation on murine pluripotent stem cells. *J Toxicol Environ Health* 9:411-421. <https://doi.org/10.1080/15287398209530174>.
- Cronkite EP, Bullis JE, Inoue T, et al. 1984. Benzene inhalation produces leukemia in mice. *Toxicol Appl Pharmacol* 75:358-361. [https://doi.org/10.1016/0041-008x\(84\)90219-9](https://doi.org/10.1016/0041-008x(84)90219-9).
- Cronkite EP, Drew RT, Inoue T, et al. 1985. Benzene hematotoxicity and leukemogenesis. *Am J Ind Med* 7(5-6):447-456. <https://doi.org/10.1002/ajim.4700070509>.
- Cronkite EP, Drew RT, Inoue T, et al. 1989. Hematotoxicity and carcinogenicity of inhaled benzene. *Environ Health Perspect* 82:97-108. <https://doi.org/10.1289/ehp.898297>.
- Cui Y, Mo Z, Ji P, et al. 2022. Benzene exposure leads to lipodystrophy and alters endocrine activity in vivo and in vitro. *Front Endocrinol* 13:937281. <https://doi.org/10.3389/fendo.2022.937281>.
- Darrall KG, Figgins JA, Brown RD, et al. 1998. Determination of benzene and associated volatile compounds in mainstream cigarette smoke. *Analyst* 123(5):1095-1101. <https://doi.org/10.1039/A708664D>.
- Das M, Chaudhuri S, Law S. 2012. Benzene exposure - an experimental machinery for induction of myelodysplastic syndrome: stem cell and stem cell niche analysis in the bone marrow. *J Stem Cells* 7(1):43-59.
- Davis EM, Murray HE, Liehr JG, et al. 1981. Technical note: Basic microbial degradation rates and chemical byproducts of selected organic compounds. *Water Res* 15:1125-1127. [https://doi.org/10.1016/0043-1354\(81\)90082-8](https://doi.org/10.1016/0043-1354(81)90082-8).
- Davis JW, Klier NK, Carpenter CL. 1994. Natural biological attenuation of benzene in ground water beneath a manufacturing facility. *Ground Water* 32(2):215-226.
- De Flora S, Zanacchi P, Camoirano A, et al. 1984. Genotoxic activity and potency for 135 compounds in the Ames reversion test and in a bacterial DNA-repair test. *Mutat Res* 133:161-198. [https://doi.org/10.1016/0165-1110\(84\)90016-2](https://doi.org/10.1016/0165-1110(84)90016-2).
- De Palma G, Manno M. 2014. Metabolic polymorphisms and biomarkers of effect in the biomonitoring of occupational exposure to low-levels of benzene: state of the art. *Toxicol Lett* 231(2):194-204. <https://doi.org/10.1016/j.toxlet.2014.10.007>.
- Debarba LK, Mulka A, Lima JBM, et al. 2020. Acarbose protects from central and peripheral metabolic imbalance induced by benzene exposure. *Brain Behav Immun* 89:87-99. <https://doi.org/10.1016/j.bbi.2020.05.073>.

8. REFERENCES

- Dees C, Travis C. 1994. Hyperphosphorylation of p53 induced by benzene, toluene, and chloroform. *Cancer Lett* 84(2):117-123.
- Delfino JJ, Miles CJ. 1985. Aerobic and anaerobic degradation of organic contaminants in Florida groundwater. *Proc Soil Crop Sci Soc Fla* 44:9-14.
- Dempster AM, Snyder CA. 1991. Kinetics of granulocytic and erythroid progenitor cells are affected differently by short-term, low-level benzene exposure. *Arch Toxicol* 65(7):556-561. <https://doi.org/10.1007/BF01973716>.
- Dempster AM, Evans HL, Snyder CA. 1984. The temporal relationship between behavioral and hematological effects of inhaled benzene. *Toxicol Appl Pharmacol* 76:195-203. [https://doi.org/10.1016/0041-008x\(84\)90042-5](https://doi.org/10.1016/0041-008x(84)90042-5).
- Diaz M, Reiser A, Braier L, et al. 1980. Studies on benzene mutagenesis. I. The micronucleus test. *Experientia* 36(3):297-299. <https://doi.org/10.1007/BF01952286>.
- Dickinson GN, Miller DD, Bajracharya A, et al. 2022. Health risk implications of volatile organic compounds in wildfire smoke during the 2019 FIREX-AQ campaign and beyond. *Geohealth* 6(8):e2021GH000546. <https://doi.org/10.1029/2021gh000546>.
- Ding X, Li Y, Ding Y, et al. 1983. Chromosome changes in patients with chronic benzene poisoning. *Chin Med J* 96:681-685.
- DOE. 2018a. Table 2: Protective action criteria (PAC) rev. 29a based on applicable 60-minute AEGLs, ERPGs, or TEELs. The chemicals are listed in alphabetical order. June 2018. U.S. Department of Energy. https://edms3.energy.gov/pac/docs/Revision_29A_Table2.pdf. March 15, 2023.
- DOE. 2018b. Protective action criteria (PAC) with AEGLs, ERPGs, & TEELs: Rev. 29A, June 2018. U.S. Department of Energy. <https://edms3.energy.gov/pac/>. July 6, 2022.
- Dosemeci M, Yin SN, Linet M, et al. 1996. Indirect validation of benzene exposure assessment by association with benzene poisoning. *Environ Health Perspect* 104(Suppl 6):1343-1347. <https://doi.org/10.1289/ehp.961041343>.
- Douglas GR, Blakey DH, Liu-Lee VW, et al. 1985. Alkaline sucrose sedimentation, sister-chromatid exchange and micronucleus assays in CHO cells. *Prog Mutat Res* 5:359-366.
- Dow. 1992. Effects of benzene vapor in the pig and rat. I. Pertaining to hematology and immunology with cover letter dated 05/14/92. Dow Chemical Co. Submitted to the U.S. Environmental Protection Agency under TSCA Section 8E. OTS0539784. 8EHQ-0592-4554. 88920003196.
- Dowty BJ, Laseter JL, Storer J. 1976. The transplacental migration and accumulation in blood of volatile organic constituents. *Pediatr Res* 10(7):696-701. <https://doi.org/10.1203/00006450-197607000-00013>.
- Drew RT, Fouts JR. 1974. The lack of effects of pretreatment with phenobarbital and chlorpromazine on the acute toxicity of benzene in rats. *Toxicol Appl Pharmacol* 27:183-193. [https://doi.org/10.1016/0041-008x\(74\)90185-9](https://doi.org/10.1016/0041-008x(74)90185-9).
- Duarte-Davidson R, Courage C, Rushton L, et al. 2001. Benzene in the environment: an assessment of the potential risks to the health of the population. *Occup Environ Med* 58(1):2-13. <https://doi.org/10.1136/oem.58.1.2>.
- Ducos P, Gaudin R, Robert A, et al. 1990. Improvement in HPLC analysis of urinary trans,trans-muconic acid, a promising substitute for phenol in the assessment of benzene exposure. *Int Arch Occup Environ Health* 62-7:529-534.
- Ducos P, Gaudin R, Bel J, et al. 1992. trans,trans-Muconic acid, a reliable biological indicator for the detection of individual benzene exposure down to the ppm level. *Int Arch Occup Environ Health* 64(5):309-313.
- Dugheri S, Pizzella G, Mucci N, et al. 2022. Low-dose benzene exposure monitoring of oil refinery workers: Inhalation and biomarkers. *Atmosphere* 13(3):450. <https://doi.org/10.3390/atmos13030450>.
- Eastmond DA, Smith MT, Irons RD. 1987. An interaction of benzene metabolites reproduces the myelotoxicity observed with benzene exposure. *Toxicol Appl Pharmacol* 91:85-95. [https://doi.org/10.1016/0041-008X\(87\)90196-7](https://doi.org/10.1016/0041-008X(87)90196-7).

8. REFERENCES

- Eastmond DA, Rupa DS, Hasegawa LS. 1994. Detection of hyperdiploidy and chromosome breakage in interphase human lymphocytes following exposure to the benzene metabolite hydroquinone using multicolor fluorescence in situ hybridization with DNA probes. *Mutat Res* 322(1):9-20. [https://doi.org/10.1016/0165-1218\(94\)90028-0](https://doi.org/10.1016/0165-1218(94)90028-0).
- Eastmond DA, Schuler M, Frantz C, et al. 2001. Characterization and mechanisms of chromosomal alterations induced by benzene in mice and humans. Cambridge, MA: Health Effects Institute. Research Report 103.
- Edwards EA, Grbić-Galić D. 1992. Complete mineralization of benzene by aquifer microorganisms under strictly anaerobic conditions. *Appl Environ Microbiol* 58(8):2663-2666. <https://doi.org/10.1128/aem.58.8.2663-2666.1992>.
- Egeghy PP, Tornero-Velez R, Rappaport SM. 2000. Environmental and biological monitoring of benzene during self-service automobile refueling. *Environ Health Perspect* 108(12):1195-1202. <https://doi.org/10.1289/EHP.001081195>.
- Eisenreich SJ, Looney BB, Thornton JD. 1981. Airborne organic contaminants in the Great Lakes ecosystem. *Environ Sci Technol* 15:30-38.
- El-Masri HA, Mumtaz MM, Yushak ML. 2004. Application of physiologically-based pharmacokinetic modeling to investigate the toxicological interaction between chlorpyrifos and parathion in the rat. *Environ Toxicol Pharmacol* 16(1-2):57-71. <https://doi.org/10.1016/j.etap.2003.10.002>.
- EPA. 1977. List of pollutants and applicability of part 61. National emission standards for hazardous air pollutants. U.S. Environmental Protection Agency. Code of Federal Regulations. 40 CFR 61.01.
- EPA. 1978. Assessment of human exposures to atmospheric benzene. Research Triangle Park, NC: U.S. Environmental Protection Agency. EPA450378031. PB284203.
- EPA. 1979. Environmental monitoring benzene. Washington, DC: U.S. Environmental Protection Agency. EPA560679006.
- EPA. 1981. Hazardous wastes from specific sources. Identification and listing of hazardous waste. U.S. Environmental Protection Agency. Code of Federal Regulations. 40 CFR 261.32.
- EPA. 1982. Management of hazardous waste leachate. U.S. Environmental Protection Agency. PB91181578. SW-871. <https://ntrl.ntis.gov/NTRL/dashboard/searchResults/titleDetail/PB91181578.xhtml>. March 13, 2024.
- EPA. 1987. June-September, 6-9 AM, ambient air benzene concentrations in 39 U.S. cities, 1984-1986. Research Triangle Park, NC: U.S. Environmental Protection Agency. PB87191532. EPA600D87160. <https://ntrl.ntis.gov/NTRL/dashboard/searchResults/titleDetail/PB87191532.xhtml>. January 31, 2024.
- EPA. 1988. Recommendations for and documentation of biological values for use in risk assessment. Cincinnati, OH: U.S. Environmental Protection Agency. EPA600687008. PB88179874.
- EPA. 1992. Record of decision operable unit 2 (OU 2): Rhinehart Tire Fire Site, Winchester, Virginia. U.S. Environmental Protection Agency. <https://semspub.epa.gov/work/03/137918.pdf>. January 31, 2024.
- EPA. 1993. Motor vehicle-related air toxics study. U.S. Environmental Protection Agency. EPA420R93005. <https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=2000BB7X.txt>. January 31, 2024.
- EPA. 1994a. Land disposal restrictions phase II-Universal treatment standards and treatment standards for organic toxicity characteristic wastes and newly listed wastes. U.S. Environmental Protection Agency. *Fed Regist* 59(180):47982.
- EPA. 1994b. Methods for derivation of inhalation reference concentrations and application of inhalation dosimetry. Washington, DC: U.S. Environmental Protection Agency. EPA600890066F.
- EPA. 1995a. Federal standards for marine tank vessel loading operations and national emission standards for hazardous air pollutants for marine tank vessel loading operations. U.S. Environmental Protection Agency. *Fed Regist* 60(181):48388.

8. REFERENCES

- EPA. 1995b. Regulation of fuels and fuel additives: Standards for reformulated and conventional gasoline. U.S. Environmental Protection Agency. Fed Regist 60(150):40009-40017. <https://www.govinfo.gov/content/pkg/FR-1995-08-04/pdf/95-14429.pdf>. January 31, 2024.
- EPA. 1996. Method 8021B: Aromatic and halogenated volatiles by gas chromatography using photoionization and/or electrolytic conductivity detectors. U.S. Environmental Protection Agency. https://www.nemi.gov/methods/method_summary/5242/. January 31, 2024.
- EPA. 1998. Carcinogenic effects of benzene: An update. Washington, DC: U.S. Environmental Protection Agency. EPA600P97001F. PB99101420.
- EPA. 1999. Phase II Reformulated gasoline: The next major step toward cleaner air. U.S. Environmental Protection Agency. EPA420F99042. <https://nepis.epa.gov/Exe/ZyPDF.cgi/00000FG5.PDF?Dockey=00000FG5.PDF>. January 31, 2024.
- EPA. 2007. Control of hazardous air pollutants from mobile sources. U.S. Environmental Protection Agency. Fed Regist 72(37):8428-8570. <https://www.govinfo.gov/content/pkg/FR-2007-02-26/pdf/E7-2667.pdf>. January 31, 2024.
- EPA. 2009a. Provisional peer reviewed toxicity values for benzene (CASRN 71-43-2). Cincinnati, OH: U.S. Environmental Protection Agency. EPA690R09003F. <https://cfpub.epa.gov/ncea/pprtv/documents/Benzene.pdf>. January 21, 2024.
- EPA. 2009b. National primary drinking water regulations. U.S. Environmental Protection Agency. EPA816F090004. https://www.epa.gov/sites/default/files/2016-06/documents/npwdr_complete_table.pdf. September 7, 2017.
- EPA. 2011. Background indoor air concentrations of volatile organic compounds in North American residences (1990-2005): A compilation of statistics for assessing vapor intrusion. Washington, DC: U.S. Environmental Protection Agency. EPA530R10001. <https://www.epa.gov/vaporintrusion/background-indoor-air-concentrations-volatile-organic-compounds-north-american>. January 31, 2024.
- EPA. 2013. Method 524.4: Measurement of purgeable organic compounds in water by gas chromatography/mass spectrometry using nitrogen purge gas. U.S. Environmental Protection Agency. EPA815R13002. <https://www.regulations.gov/document/EPA-HQ-OW-2013-0300-0065>. January 31, 2024.
- EPA. 2014. National Air Toxics Program: The second integrated Urban Air Toxics Report to Congress. Research Triangle Park, NC: U.S. Environmental Protection Agency. EPA456R14001. <https://www.epa.gov/sites/default/files/2014-08/documents/082114-urban-air-toxics-report-congress.pdf>. January 31, 2024.
- EPA. 2016a. List of schools. Assessing outdoor air near schools. U.S. Environmental Protection Agency. <https://www3.epa.gov/air/sat/schools.html>. January 31, 2024.
- EPA. 2016b. Six-year review 3 compliance monitoring data (2006-2011). U.S. Environmental Protection Agency. <https://www.epa.gov/dwsixyearreview/six-year-review-3-compliance-monitoring-data-2006-2011>. January 31, 2024.
- EPA. 2016c. Vapor intrusion screening level calculator. U.S. Environmental Protection Agency. <https://www.epa.gov/vaporintrusion>. March 27, 2024.
- EPA. 2017. Improved data and EPA oversight are needed to assure compliance with the standards for benzene content in gasoline. Washington, DC: U.S. Environmental Protection Agency. Report No. 17-P-0249. https://www.epa.gov/sites/default/files/2017-06/documents/_epaog_20170608-17-p-0249.pdf. January 31, 2024.
- EPA. 2018a. 2018 Edition of the drinking water standards and health advisories. Washington, DC: U.S. Environmental Protection Agency. EPA822F18001. <https://www.epa.gov/system/files/documents/2022-01/dwtable2018.pdf>. June 15, 2022.
- EPA. 2018b. Compiled AEGL values. U.S. Environmental Protection Agency. https://www.epa.gov/sites/production/files/2018-08/documents/compiled_aegls_update_27jul2018.pdf. April 12, 2020.

8. REFERENCES

- EPA. 2018c. About acute exposure guideline levels (AEGs). U.S. Environmental Protection Agency. <https://www.epa.gov/aegl/about-acute-exposure-guideline-levels-aegls>. July 26, 2018.
- EPA. 2020a. National emission inventory (NEI) data. U.S. Environmental Protection Agency. <https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data>. October 20, 2022.
- EPA. 2020b. Andreas petroleum spill. U.S. Environmental Protection Agency. https://response.epa.gov/site/site_profile.aspx?site_id=14988. January 31, 2024.
- EPA. 2022a. 2020 Chemical data reporting results: Benzene. U.S. Environmental Protection Agency. <https://www.epa.gov/chemical-data-reporting/access-cdr-data#2020>. October 26, 2022.
- EPA. 2022b. Toxic chemical release inventory reporting forms and instructions: Revised 2021 version. U.S. Environmental Protection Agency. EPA740B22002. https://ordspub.epa.gov/ords/guideme_ext/guideme_ext/guideme/file/ry_2021_rfi.pdf. August 22, 2023.
- EPA. 2023a. Gasoline mobile source air toxics. U.S. Environmental Protection Agency. <https://www.epa.gov/gasoline-standards/gasoline-mobile-source-air-toxics>. January 31, 2024.
- EPA. 2023b. Annual summary data: Benzene. Air quality system: Concentration by monitor. U.S. Environmental Protection Agency. <https://www.epa.gov/aqs>. January 31, 2024.
- EPA. 2023c. East Palestine, Ohio train derailment. U.S. Environmental Protection Agency. <https://www.epa.gov/east-palestine-oh-train-derailment>. January 31, 2024.
- Erexson GL, Wilmer JL, Steinhagen WH, et al. 1986. Induction of cytogenetic damage in rodents after short-term inhalation of benzene. *Environ Mutagen* 8:29-40.
- Etzel RA, Ashley DL. 1994. Volatile organic compounds in the blood of persons in Kuwait during the oil fires. *Int Arch Occup Environ Health* 66:125-129.
- Eutermoser M, Rusch GM, Kuna RA, et al. 1986. A method for repeated evaluation of benzene uptake in rats and mice during a six hour inhalation period. *Am Ind Hyg Assoc J* 47(1):37-40. <https://doi.org/10.1080/15298668691389315>.
- Evans HL, Dempster AM, Snyder CA. 1981. Behavioral changes in mice following benzene inhalation. *Neurobehav Toxicol Teratol* 3(4):481-485.
- Eveleth WT, ed.,. 1990. Basic and intermediate chemicals. In: *Kline guide to the US chemical industry*. 5th ed. Fairfield, NJ: Kline & Company, Inc., 2-1 to 2-42.
- Exxon. 1986. Determination of maternal toxicity and fetal toxicity of benzene in rats following oral exposure. Submitted to the U.S. Environmental Protection Agency under TSCA Section 8E. OTS0536017. 88-920001029S. 8EHQ-0292-2383S.
- Fabiatti F, Ambrozzi A, Delise M, et al. 2004. Monitoring of the benzene and toluene contents in human milk. *Environ Int* 30(3):397-401.
- Fan XH. 1992. Effect of exposure to benzene on natural killer (NK) cell activity and interleukin-2 (IL-2) production of C57BL/6 mice. *J Nippon Med Sch* 59(5):393-399. <https://doi.org/10.1272/jnms1923.59.393>.
- Farmer PB, Kaur B, Roach J, et al. 2005. The use of S-phenylmercapturic acid as a biomarker in molecular epidemiology studies of benzene. *Chem Biol Interact* 153-154:97-102. <https://doi.org/10.1016/j.cbi.2005.03.013>.
- Farris GM, Everitt JI, Irons RD, et al. 1993. Carcinogenicity of inhaled benzene in CBA mice. *Fundam Appl Toxicol* 20(4):503-507. <https://doi.org/10.1006/faat.1993.1061>.
- Farris GM, Wong VA, Wong BA, et al. 1996. Benzene-induced micronuclei in erythrocytes: an inhalation concentration-response study in B6C3F1 mice. *Mutagenesis* 11(5):455-462. <https://doi.org/10.1093/MUTAGE/11.5.455>.
- Farris GM, Robinson SN, Gaido KW, et al. 1997a. Benzene-induced hematotoxicity and bone marrow compensation in B6C3F1 mice. *Fundam Appl Toxicol* 36(2):119-129. <https://doi.org/10.1006/faat.1997.2293>.
- Farris GM, Robinson SN, Wong BA, et al. 1997b. Effects of benzene on splenic, thymic, and femoral lymphocytes in mice. *Toxicology* 118:137-148. [https://doi.org/10.1016/s0300-483x\(96\)03606-2](https://doi.org/10.1016/s0300-483x(96)03606-2).

8. REFERENCES

- FDA. 1977a. Indirect food additives. Adhesives coatings and components. U.S. Food and Drug Administration. Fed Regist 42(50):14534-14554.
- FDA. 1977b. Modified hop extract. U.S. Food and Drug Administration. Code of Federal Regulations. 21 CFR 172.560. <https://www.ecfr.gov/current/title-21/chapter-I/subchapter-B/part-172/subpart-F/section-172.560>. January 31, 2024.
- FDA. 2015. Data on benzene in soft drinks and other beverages. U.S. Food and Drug Administration. <https://wayback.archive-it.org/7993/20161022184011/http://www.fda.gov/Food/FoodborneIllnessContaminants/ChemicalContaminants/ucm055815.htm>. January 31, 2024.
- FDA. 2023a. Reformulating drug products that contain carbomers manufactured with benzene; guidance for industry; availability. U.S. Food and Drug Administration. Fed Regist 88(248):89703-89705. <https://www.govinfo.gov/content/pkg/FR-2023-12-28/pdf/2023-28675.pdf>. January 31, 2024.
- FDA. 2023b. Recalls, market withdrawals, & safety alerts. U.S. Food and Drug Administration. <https://www.fda.gov/safety/recalls-market-withdrawals-safety-alerts>. January 31, 2024.
- FDA. 2023c. Frequently asked questions on benzene contamination in drugs. U.S. Food and Drug Administration. <https://www.fda.gov/drugs/drug-safety-and-availability/frequently-asked-questions-benzene-contamination-drugs>. January 31, 2024.
- FDA. 2023d. Subpart B - Requirements for specific standardized beverages. Bottled water. U.S. Food and Drug Administration. Code of Federal Regulations. 21 CFR 165.110. <https://www.govinfo.gov/content/pkg/CFR-2023-title21-vol2/pdf/CFR-2023-title21-vol2-sec165-110.pdf>. January 8, 2024.
- FDA. 2024. Benzene. Substances added to food (formerly EAFUS). U.S. Food and Drug Administration. <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/index.cfm?set=FoodSubstances&id=BENZENE>. January 21, 2024.
- Fenga C, Gangemi S, Costa C. 2016. Benzene exposure is associated with epigenetic changes (Review). *Mol Med Rep* 13(4):3401-3405. <https://doi.org/10.3892/mmr.2016.4955>.
- Fent KW, Eisenberg J, Snawder J, et al. 2014. Systemic exposure to PAHs and benzene in firefighters suppressing controlled structure fires. *Ann Occup Hyg* 58(7):830-845. <https://doi.org/10.1093/annhyg/meu036>.
- Fishbein L. 1992. Exposure from occupational versus other sources. *Scand J Work Environ Health* 18(Suppl 1):5-16.
- Fisher J, Mahle D, Bankston L, et al. 1997. Lactational transfer of volatile chemicals in breast milk. *Am Ind Hyg Assoc J* 58(6):425-431. <https://doi.org/10.1080/15428119791012667>.
- Fleming-Jones ME, Smith RE. 2003. Volatile organic compounds in foods: A five year study. *J Agric Food Chem* 51(27):8120-8127.
- Flury F. 1928. [F.Flury (Wurzburg): Pharmacological-toxicological aspects of intoxicants in modern industry]. *Naunyn Schmiedebergs Arch Exp Pathol Pharmacol* 138(1-4):65-82. <https://doi.org/10.1007/BF01961958>. (German)
- Folkins HO. 2012. Benzene. In: *Ullmann's Encyclopedia of industrial chemistry*. Weinheim, Germany: Wiley-VCH Verlag GmbH & Co. KGaA, online. https://doi.org/10.1002/14356007.a03_475.
- Forni A, Cappellini A, Pacifico E, et al. 1971. Chromosome changes and their evolution in subjects with past exposure to benzene. *Arch Environ Health* 23:385-391. <https://doi.org/10.1080/00039896.1971.10666024>.
- Fracasso ME, Doria D, Bartolucci GB, et al. 2010. Low air levels of benzene: correlation between biomarkers of exposure and genotoxic effects. *Toxicol Lett* 192(1):22-28. <https://doi.org/10.1016/j.toxlet.2009.04.028>.
- Franz TJ. 1984. Percutaneous absorption of benzene. In: MacFarland HN, Holdsworth CE, MacGregor JA, et al., eds. *Advances in modern environmental toxicology*. Vol. VI. Applied toxicology of petroleum hydrocarbons. Princeton, NJ: Princeton Scientific Publishers, Inc., 61-70.

8. REFERENCES

- Fraser MP, Cass GR, Simoneit BRT. 1998. Gas-phase and particle-phase organic compounds emitted from motor vehicle traffic in a Los Angeles roadway tunnel. *Environ Sci Technol* 32:2051-2060.
- French JE, Gatti DM, Morgan DL, et al. 2015. Diversity outbred mice identify population-based exposure thresholds and genetic factors that influence benzene-induced genotoxicity. *Environ Health Perspect* 123(3):237-245. <https://doi.org/10.1289/ehp.1408202>.
- Froom P, Dyerassi L, Cassel A, et al. 1994. Erythropoietin-independent colonies of red blood cells and leukocytosis in a worker exposed to low levels of benzene. *Scand J Work Environ Health* 20:306-308.
- Fruscella W. 2002. Benzene. In: Kirk-Othmer encyclopedia of chemical technology. Wiley, online. <https://doi.org/10.1002/0471238961.0205142606182119.a01.pub2>.
- Fu H, Demers PA, Costantini AS, et al. 1996. Cancer mortality among shoe manufacturing workers: an analysis of two cohorts. *Occup Environ Med* 53(6):394-398. <https://doi.org/10.1136/oem.53.6.394>.
- Fujie K, Ito Y, Maeda S. 1992. Acute cytogenetic effect of benzene on rat bone marrow cells in vivo and the effect of inducers or inhibitors of drug-metabolizing enzymes. *Mutat Res* 298(2):81-90. [https://doi.org/10.1016/0165-1218\(92\)90032-u](https://doi.org/10.1016/0165-1218(92)90032-u).
- Fustinoni S, Buratti M, Campo L, et al. 2005. Urinary t,t-muconic acid, S-phenylmercapturic acid and benzene as biomarkers of low benzene exposure. *Chem Biol Interact* 153-154:253-256. <https://doi.org/10.1016/j.cbi.2005.03.031>.
- Fustinoni S, Rossella F, Polledri E, et al. 2012. Global DNA methylation and low-level exposure to benzene. *Med Lav* 103(2):84-95.
- Gad-El-Karim MM, Ramanujam VMS, Legator MS. 1985. trans,trans-Muconic acid, an open chain urinary metabolite of benzene in mice. Quantification by high-pressure liquid chromatography. *Xenobiotica* 15:211-220. <https://doi.org/10.3109/00498258509045351>.
- Gad-El-Karim MM, Ramanujam VMS, Legator MS. 1986. Correlation between the induction of micronuclei in bone marrow by benzene exposure and the excretion of metabolites in urine of CD-1 mice. *Toxicol Appl Pharmacol* 85:464-477. [https://doi.org/10.1016/0041-008X\(86\)90354-6](https://doi.org/10.1016/0041-008X(86)90354-6).
- Gaffney JS, Levine SZ. 1979. Predicting gas phase organic molecule reaction rates using linear free-energy correlations. I. O(3P) and OH addition and abstraction reactions. *Int J Chem Kinet* 11(11):1197-1209. <https://doi.org/10.1002/kin.550111106>.
- Gajjar RM, Kasting GB. 2014. Absorption of ethanol, acetone, benzene and 1,2-dichloroethane through human skin in vitro: a test of diffusion model predictions. *Toxicol Appl Pharmacol* 281(1):109-117. <https://doi.org/10.1016/j.taap.2014.09.013>.
- Ganousis LG, Goon D, Zygiewska T, et al. 1992. Cell-specific metabolism in mouse bone marrow stroma: Studies of activation and detoxification of benzene metabolites. *Mol Pharmacol* 42(6):1118-1125.
- Garte S, Taioli E, Popov T, et al. 2008. Genetic susceptibility to benzene toxicity in humans. *J Toxicol Environ Health A* 71(22):1482-1489. <https://doi.org/10.1080/15287390802349974>.
- George BJ, Schultz BD, Palma T, et al. 2011. An evaluation of EPA's National-Scale Air Toxics Assessment (NATA): Comparison with benzene measurements in Detroit, Michigan. *Atmos Environ* 45:3301-3308. <https://doi.org/10.1016/j.atmosenv.2011.03.031>.
- Gerner-Smidt P, Friedrich U. 1978. The mutagenic effect of benzene, toluene and xylene studied by the SCE technique. *Mutat Res* 58:313-316. [https://doi.org/10.1016/0165-1218\(78\)90024-1](https://doi.org/10.1016/0165-1218(78)90024-1).
- Geyer H, Politzki G, Freitag D. 1984. Prediction of ecotoxicological behavior of chemicals: Relationship between n-octanol/water coefficient and bioaccumulation of organic chemicals by alga *Chlorella*. *Chemosphere* 13(2):269-284.
- Ghantous H, Danielsson BRG. 1986. Placental transfer and distribution of toluene, xylene and benzene, and their metabolites during gestation in mice. *Biol Res Pregnancy Perinatol* 7(3):98-105.
- Ghittori S, Fiorentino ML, Maestri L, et al. 1993. Urinary excretion of unmetabolized benzene as an indicator of benzene exposure. *J Toxicol Environ Health* 38(3):233-243. <https://doi.org/10.1080/15287399309531715>.

8. REFERENCES

- Gibson DT. 1977. Biodegradation of aromatic petroleum hydrocarbons. In: Wolfe DA, ed. Fate and effects of petroleum hydrocarbons in marine ecosystems and organisms. New York, NY: Pergamon, 36-46.
- Gibson DT. 1980. Microbial metabolism. In: Hutzinger O, ed. The handbook of environmental chemistry. New York, NY: Springer-Verlag, 161-192.
- Gill DP, Kempen RR, Nash JB, et al. 1979. Modifications of benzene myelotoxicity and metabolism by phenobarbital, SKF-525A and 3-methylcholanthrene. *Life Sci* 25:1633-1640.
- Gill DP, Jenkins VK, Kempen RR, et al. 1980. The importance of pluripotential stem cells in benzene toxicity. *Toxicology* 16:163-171. [https://doi.org/10.1016/0300-483x\(80\)90046-3](https://doi.org/10.1016/0300-483x(80)90046-3).
- Giver CR, Wong R, Moore DHII, et al. 2001. Persistence of aneuploid immature/primitive hemopoietic sub-populations in mice 8 months after benzene exposure in vivo. *Mutat Res* 491:127-138. [https://doi.org/10.1016/S1383-5718\(01\)00138-3](https://doi.org/10.1016/S1383-5718(01)00138-3).
- Glass LR, Connor TH, Thies JC, et al. 1986. Genotoxic evaluation of the offgassing products of particle boards. *Toxicol Lett* 31:75-83.
- Glass DC, Gray CN, Jolley DJ, et al. 2003. Leukemia risk associated with low-level benzene exposure. *Epidemiology* 14(5):569-577. <https://doi.org/10.1097/01.ede.0000082001.05563.e0>.
- Glass DC, Gray CN, Jolley DJ, et al. 2005. Health Watch exposure estimates: do they underestimate benzene exposure? *Chem Biol Interact* 153-154:23-32. <https://doi.org/10.1016/j.cbi.2005.03.006>.
- Glass DC, Gray CN, Jolley DJ, et al. 2006. The health watch case-control study of leukemia and benzene: the story so far. *Ann N Y Acad Sci* 1076:80-89. <https://doi.org/10.1196/annals.1371.024>.
- Glatt H, Padykula R, Berchtold GA, et al. 1989. Multiple activation pathways of benzene leading to products with varying genotoxic characteristics. *Environ Health Perspect* 82:81-89. <https://doi.org/10.1289/EHP.898281>.
- Glauert HP, Kennan WS, Sattler GL, et al. 1985. Assays to measure the induction of unscheduled DNA synthesis in cultured hepatocytes. *Prog Mutat Res* 5:371-373.
- Gollmer L, Graf H, Ullrich V. 1984. Characterization of the benzene monooxygenase system in rabbit bone marrow. *Biochem Pharmacol* 33(22):3597-3602. [https://doi.org/10.1016/0006-2952\(84\)90143-6](https://doi.org/10.1016/0006-2952(84)90143-6).
- Gonasun LM, Witmer C, Kocsis J, et al. 1973. Benzene metabolism in mouse liver microsomes. *Toxicol Appl Pharmacol* 26:398-406. [https://doi.org/10.1016/0041-008X\(73\)90276-7](https://doi.org/10.1016/0041-008X(73)90276-7).
- Goon D, Matsuura J, Ross D. 1993. Metabolism and cytotoxicity of trans,trans-muconaldehyde and its derivatives: potential markers of benzene ring cleavage reactions. *Chem Biol Interact* 88(1):37-53. [https://doi.org/10.1016/0009-2797\(93\)90083-b](https://doi.org/10.1016/0009-2797(93)90083-b).
- Gossett RW, Brown DA, Young DR. 1983. Predicting the bioaccumulation of organic compounds in marine organisms using octanol/water partition coefficients. *Marine Poll Bull* 14(10):387-392. [https://doi.org/10.1016/0025-326X\(83\)90604-5](https://doi.org/10.1016/0025-326X(83)90604-5).
- Graedel TE. 1978. Aromatic compounds: Benzene and derivatives. In: Chemical compounds in the atmosphere. New York, NY: Academic Press, 105-107.
- Grbić-Galić D, Vogel TM. 1987. Transformation of toluene and benzene by mixed methanogenic cultures. *Appl Environ Microbiol* 53(2):254-260. <https://doi.org/10.1128/aem.53.2.254-260.1987>.
- Greek BF. 1990. Prices and demand for aromatics reverse earlier gains. *Chem Eng News* 68:11-12.
- Green JD, Leong BKJ, Laskin S. 1978. Inhaled benzene fetotoxicity in rats. *Toxicol Appl Pharmacol* 46:9-18. [https://doi.org/10.1016/0041-008x\(78\)90132-1](https://doi.org/10.1016/0041-008x(78)90132-1).
- Green JD, Snyder CA, LoBue J, et al. 1981a. Acute and chronic dose/response effects of inhaled benzene on multipotential hematopoietic stem (CFU-S) and granulocyte/macrophage progenitor (GM- CFU-C) cells in CD-1 mice. *Toxicol Appl Pharmacol* 58:492-503. [https://doi.org/10.1016/0041-008x\(81\)90102-2](https://doi.org/10.1016/0041-008x(81)90102-2).
- Green JD, Snyder CA, LoBue J, et al. 1981b. Acute and chronic dose/response effect of benzene inhalation on the peripheral blood, bone marrow, and spleen cell of CD-1 male mice. *Toxicol Appl Pharmacol* 59:204-214. [https://doi.org/10.1016/0041-008x\(81\)90191-5](https://doi.org/10.1016/0041-008x(81)90191-5).

8. REFERENCES

- Greenburg L. 1926. Benzol poisoning as an industrial hazard. *Public Health Rep* 41(27):1357-1375. <https://doi.org/10.2307/4577927>.
- Grotz VL, Ji S, Kline SA, et al. 1994. Metabolism of benzene and trans,trans-muconaldehyde in the isolated perfused rat liver. *Toxicol Lett* 70(3):281-290. [https://doi.org/10.1016/0378-4274\(94\)90122-8](https://doi.org/10.1016/0378-4274(94)90122-8).
- Gulati DK, Witt K, Anderson B, et al. 1989. Chromosome aberration and sister chromatid exchange tests in Chinese hamster ovary cells in vitro III: Results with 27 chemicals. *Environ Mol Mutagen* 13:133-193.
- Guo X, Zhang L, Wang J, et al. 2022. Plasma metabolomics study reveals the critical metabolic signatures for benzene-induced hematotoxicity. *JCI Insight* 7(2):e154999. <https://doi.org/10.1172/jci.insight.154999>.
- Gut I, Terelius Y, Frantik E, et al. 1993. Exposure to various benzene derivatives differently induces cytochromes P450 2B1 and P450 2E1 in rat liver. *Arch Toxicol* 67(4):237-243. <https://doi.org/10.1007/BF01974342>.
- Gut I, Nedelcheva V, Soucek P, et al. 1996a. Cytochromes P450 in benzene metabolism and involvement of their metabolites and reactive oxygen species in toxicity. *Environ Health Perspect* 104(Suppl 6):1211-1218. <https://doi.org/10.1289/EHP.961041211>.
- Gut I, Nedelcheva V, Soucek P, et al. 1996b. The role of CYP2E1 and 2B1 in metabolic activation of benzene derivatives. *Arch Toxicol* 71:45-56. <https://doi.org/10.1007/s002040050357>.
- Haider K, Jagnow G, Kohnen R, et al. 1981. Degradation of chlorinated benzene, phenols and cyclohexane derivatives by benzene-and phenol-utilizing soil bacteria under aerobic conditions. In: Overcash MR, ed. *Decomposition of toxic and nontoxic organic compounds in soils*. Ann Arbor, MI: Ann Arbor Science, 207-223.
- Hajimiragha H, Ewers U, Brockhaus A, et al. 1989. Levels of benzene and other volatile aromatic compounds in the blood of non-smokers and smokers. *Int Arch Occup Environ Health* 61:513-518.
- Hallberg LM, El ZR, Grossman L, et al. 1996. Measurement of DNA repair deficiency in workers exposed to benzene. *Environ Health Perspect* 104:529-534. <https://doi.org/10.1289/EHP.96104S3529>.
- Hamilton A. 1922. The growing menace of benzene (benzol) poisoning in American industry. *J Am Med Assoc* 78:627-630.
- Hanke J, Dutkiewicz T, Piotrowski J. 1961. [The absorption of benzene through the skin in men]. *Med Pr* 12:413-426. (Polish)
- Hanzlick R. 1995. National association of medical examiners pediatric toxicology (PedTox) registry report 3: Case submission summary and data for acetaminophen, benzene, carboxyhemoglobin, dextromethorphan, ethanol, phenobarbital, and pseudoephedrine. *Am J Forensic Med Pathol* 16(4):270- 277.
- Harayama S, Timmis KN. 1992. Aerobic biodegradation of aromatic hydrocarbons by bacteria. In: Sigel H, Sigel A, eds. *Metal ions in biological systems, Vol. 28: Degradation of environmental pollutants by microorganisms and their metalloenzymes*. New York, NY: Marcel Dekker, Inc, 99-156.
- Harper BL, Sadagopa RVM, Gad-El-Karim MM, et al. 1984. The influence of simple aromatics on benzene clastogenicity. *Mutat Res* 128:105-114. [https://doi.org/10.1016/0027-5107\(84\)90097-6](https://doi.org/10.1016/0027-5107(84)90097-6).
- Harrath AH, Alrezaki A, Jalouli M, et al. 2022. Benzene exposure causes structural and functional damage in rat ovaries: occurrence of apoptosis and autophagy. *Environ Sci Pollut Res Int* 29(50):76275-76285. <https://doi.org/10.1007/s11356-022-21289-5>.
- Hattemer-Frey HA, Travis CC, Land ML. 1990. Benzene; Environmental partitioning and human exposure. *Environ Res* 53:221-232.
- Hayashi M, Norppa H, Sofuni T, et al. 1992. Flow cytometric micronucleus test with mouse peripheral erythrocytes. *Mutagenesis* 7(4):257-264. <https://doi.org/10.1093/MUTAGE/7.4.257>.
- Hayes RB, Yin SN, Dosemeci M, et al. 1996. Mortality among benzene-exposed workers in China. *Environ Health Perspect* 104(Suppl 6):1349-1352. <https://doi.org/10.1289/EHP.961041349>.

8. REFERENCES

- Hayes RB, Yin SN, Dosemeci M, et al. 1997. Benzene and the dose-related incidence of hematologic neoplasms in China. *J Natl Cancer Inst* 89(14):1065-1071.
- Hayes RB, Songnian Y, Dosemeci M, et al. 2001. Benzene and lymphohematopoietic malignancies in humans. *Am J Ind Med* 40(2):117-126. <https://doi.org/10.1002/ajim.1078>.
- Healy LN, Pluta LJ, James RA, et al. 2001. Induction and time-dependent accumulation of micronuclei in peripheral blood of transgenic p53 +/- mice, TgAC (v-HA-ras) and parental wild-type (C57BL/6 and FVB/N) mice exposed to benzene by inhalation. *Mutagenesis* 16(2):163-168. <https://doi.org/10.1093/MUTAGE/16.2.163>.
- Heavner DL, Morgan WT, Ogden MW. 1995. Determination of volatile organic compounds and ETS apportionment in 49 homes. *Environ Int* 21(1):3-21.
- Heijne WH, Jonker D, Stierum RH, et al. 2005. Toxicogenomic analysis of gene expression changes in rat liver after a 28-day oral benzene exposure. *Mutat Res* 575(1-2):85-101. <https://doi.org/10.1016/j.mrfmmm.2005.02.003>.
- Hellmér L, Bolcsfoldi G. 1992a. An evaluation of the E. coli K-12 uvrB/recA DNA repair host-mediated assay. II. In vivo results for 36 compounds tested in the mouse. *Mutat Res* 272(2):161-173. [https://doi.org/10.1016/0165-1161\(92\)90044-M](https://doi.org/10.1016/0165-1161(92)90044-M).
- Hellmér L, Bolcsfoldi G. 1992b. An evaluation of the E. coli K-12 uvrB/recA DNA repair host-mediated assay. I. In vitro sensitivity of the bacteria to 61 compounds. *Mutat Res* 272(2):145-160. [https://doi.org/10.1016/0165-1161\(92\)90043-L](https://doi.org/10.1016/0165-1161(92)90043-L).
- Henderson RF, Sabourin PJ, Bechtold WE, et al. 1989. The effect of dose, dose rate, route of administration, and species on tissue and blood levels of benzene metabolites. *Environ Health Perspect* 82:9-17. <https://doi.org/10.1289/EHP.89829>.
- Henderson RF, Sabourin PJ, Medinsky MA, et al. 1992. Benzene dosimetry in experimental animals: Relevance for risk assessment. In: D'Amato R, Slaga TJ, Farland WH, et al., eds. *Relevance of animal studies to the evaluation of human cancer risk*. New York, NY: Wiley-Liss Inc., 93-105.
- Hendrickson HP, Sahafayen M, Bell MA, et al. 1994. Relationship of flavonoid oxidation potential and effect on rat hepatic microsomal metabolism of benzene and phenol. *J Pharm Biomed Anal* 12(3):335- 341.
- Henschler R, Glatt HR. 1995. Induction of cytochrome p4501a1 in haemopoietic stem cells by hydroxylated metabolites of benzene. *Toxicol In Vitro* 9(4):453-457. [https://doi.org/10.1016/0887-2333\(95\)00037-9](https://doi.org/10.1016/0887-2333(95)00037-9).
- Hite M, Pecharo M, Smith I, et al. 1980. The effect of benzene in the micronucleus test. *Mutat Res* 77:149-155. [https://doi.org/10.1016/0165-1218\(80\)90132-9](https://doi.org/10.1016/0165-1218(80)90132-9).
- Hoechst. 1977. Initial submission: Mutagenicity evaluation of benzene in *Salmonella typhimurium*, *Saccharomyces cerevisiae*, and mice (final report) with attachment. Hoechst Celanese Corporation. Submitted to the U.S. Environmental Protection Agency under TSCA Section 8E. OTS0539838. 88-920002878. 8EHQ-0592-4236.
- Hoffmann MJ, Ji S, Hedli CC, et al. 1999. Metabolism of [14C]phenol in the isolated perfused mouse liver. *Toxicol Sci* 49(1):40-47. <https://doi.org/10.1093/toxsci/49.1.40>.
- Hoffmann K, Krause C, Seifert B, et al. 2000. The German Environmental Survey 1990/92 (GERES II) Sources of Personal exposure to volatile organic compounds. *J Expo Anal Environ Epidemiol* 10:115- 125.
- Holeckova B, Piesova E, Sivikova K, et al. 2008. FISH detection of chromosome 1 aberration in human interphase and metaphase lymphocytes after exposure to benzene. *Ann Agric Environ Med* 15(1):99-103.
- Holmberg B, Lundberg P. 1985. Benzene: Standards, occurrence, and exposure. *Am J Ind Med* 7(5-6):375- 383. <https://doi.org/10.1002/ajim.4700070504>.
- Holmes TH, Winn LM. 2022. DNA damage, DNA repair gene expression, and topoisomerase II α activity in CD-1 mice following in utero benzene exposure. *Toxicol Lett* 368:47-55. <https://doi.org/10.1016/j.toxlet.2022.08.002>.

8. REFERENCES

- Hopper DJ. 1978. Microbial degradation of aromatic hydrocarbons. In: Watkinson RJ, ed. *Developments in biodegradation of hydrocarbons*. London, England: Applied Science Publishers LTD, 85-112.
- Hostynek JJ, Lamel SA, Maibach HI. 2012. Benzene absorption in animals and man: an overview. *Rev Environ Health* 27(2-3):85-101. <https://doi.org/10.1515/reveh-2012-0008>.
- Hsieh GC, Sharma RP, Parker RDR. 1988. Subclinical effects of groundwater contaminants. I. Alteration of humoral and cellular immunity by benzene in CD-1 mice. *Arch Environ Contam Toxicol* 17:151-158. <https://doi.org/10.1007/BF01056019>.
- Hsieh GC, Parker RDR, Sharma RP, et al. 1990. Subclinical effects of groundwater contaminants III Effects of repeated oral exposure to combinations of benzene and toluene on immunologic responses in mice. *Arch Toxicol* 64(4):320-328. <https://doi.org/10.1007/BF01972993>.
- Hsieh GC, Sharma RP, Parker RD. 1991. Hypothalamic-pituitary-adrenocortical axis activity and immune function after oral exposure to benzene and toluene. *Immunopharmacology* 21(1):23-31. [https://doi.org/10.1016/0162-3109\(91\)90004-i](https://doi.org/10.1016/0162-3109(91)90004-i).
- Huang JS, Zhao MD, Shi JM, et al. 2013. Expression of multidrug resistance 1 and multidrug resistance-related protein 1 in C57BL/6 mice treated with benzene. *Genet Mol Res* 12(4):5842-5850. <https://doi.org/10.4238/2013.November.22.11>.
- Huff JE, Haseman JK, DeMarini DM, et al. 1989. Multiple-site carcinogenicity of benzene in Fischer 344 rats and B6C3F1 mice. *Environ Health Perspect* 82:125-163. <https://doi.org/10.1289/ehp.8982125>.
- Hui X, Wester RC, Barbadillo S, et al. 2009a. In vitro percutaneous absorption of benzene in human skin. *Cutan Ocul Toxicol* 28(2):65-70. <https://doi.org/10.1080/15569520902826609>.
- Hui X, Wester RC, Barbadillo S, et al. 2009b. In vitro percutaneous absorption of benzene in human skin (erratum to: *Cutan Ocul Toxicol* 28(2):65-70). *Cutan Ocul Toxicol* 28:191. <https://doi.org/10.1080/15569520902826609>.
- Hunting KL, Longbottom H, Kalavar SS, et al. 1995. Haematopoietic cancer mortality among vehicle mechanics. *Occup Environ Med* 52:673-678. <https://doi.org/10.1136/oem.52.10.673>.
- Hustert K, Mansour H, Korte F. 1981. The "EPA Test": A method for the determination the photo-chemical degradation of organic compounds in aquatic systems. *Chemosphere* 10(9):995-998.
- IARC. 1982. Benzene. In: IARC monographs on the evaluation of the carcinogenic risk of chemicals to humans. Volume 29: Some industrial chemicals and dyestuffs. Lyon, France: World Health Organization, International Agency for Research on Cancer, 93-148.
- IARC. 1987. [Benzene]. In: IARC monographs on the evaluation of carcinogenic risks to humans. Overall evaluations of carcinogenicity: An updating of IARC monographs Volumes 1 to 42. Lyons, France: International Agency for Research on Cancer, 38-74.
- IARC. 2012. Benzene. In: Chemical agents and related occupations. IARC monographs on the evaluation of carcinogenic risks to humans. Vol. 100F. International Agency for Research on Cancer, 249-294. <http://monographs.iarc.fr/ENG/Monographs/vol100F/mono100F-24.pdf>. January 20, 2015.
- IARC. 2018. Benzene. IARC monographs on the evaluation of carcinogenic risks to humans. Volume 120. Lyon, France: International Agency for Research on Cancer. <https://publications.iarc.fr/576>. June 28, 2023.
- Ibrahim KS, Amer NM, El-dossuky EA, et al. 2014. Hematological effect of benzene exposure with emphasis of muconic acid as a biomarker. *Toxicol Ind Health* 30(5):467-474. <https://doi.org/10.1177/0748233712458141>.
- ICH. 2021. Impurities: Guideline for residual solvents. ICH harmonised guideline. International Council For Harmonisation. https://database.ich.org/sites/default/files/ICH_Q3C-R8_Guideline_Step4_2021_0422_1.pdf. January 31, 2024.
- Ikeda M, Ohtsuji H. 1971. Phenobarbital-induced protection against toxicity of toluene and benzene in the rat. *Toxicol Appl Pharmacol* 20:30-43. [https://doi.org/10.1016/0041-008X\(71\)90086-X](https://doi.org/10.1016/0041-008X(71)90086-X).

8. REFERENCES

- Ikeda M, Ohtsuji H, Imamura T. 1972. In vivo suppression of benzene and styrene oxidation by co-administered toluene in rats and effects of phenobarbital. *Xenobiotica* 2:101-106. <https://doi.org/10.3109/00498257209111041>.
- Infante PF. 2006. Benzene exposure and multiple myeloma: a detailed meta-analysis of benzene cohort studies. *Ann N Y Acad Sci* 1076:90-109. <https://doi.org/10.1196/annals.1371.081>.
- Infante PF, Rinsky RA, Wagoner JK, et al. 1977. Leukemia in benzene workers. *Lancet* 2:76-78.
- Ingelman-Sundberg M, Johansson I, Penttila KE, et al. 1988. Centrilobular expression of ethanol-inducible cytochrome P-450 (IIE1) in rat liver. *Biochem Biophys Res Commun* 157(1):55-60. [https://doi.org/10.1016/S0006-291X\(88\)80010-X](https://doi.org/10.1016/S0006-291X(88)80010-X).
- Inoue T, Hirabayashi Y. 2010. Hematopoietic neoplastic diseases develop in C3H/He and C57BL/6 mice after benzene exposure: strain differences in bone marrow tissue responses observed using microarrays. *Chem Biol Interact* 184(1-2):240-245. <https://doi.org/10.1016/j.cbi.2009.12.005>.
- Inoue O, Seiji K, Kasahara M, et al. 1986. Quantitative relation of urinary phenol levels to breathzone benzene concentrations: a factory survey. *Br J Ind Med* 43:692-697. <https://doi.org/10.1136/oem.43.10.692>.
- Inoue O, Seiji K, Watanabe T, et al. 1988. Mutual metabolic suppression between benzene and toluene in man. *Int Arch Occup Environ Health* 60:15-20.
- Inoue O, Seiji K, Nakatsuka H, et al. 1989. Urinary t,t-muconic acid as an indicator of exposure to benzene. *Br J Ind Med* 46:122-127. <https://doi.org/10.1136/oem.46.2.122>.
- Inoue O, Kanno E, Kakizaki M, et al. 2000. Urinary phenylmercapturic acid as a marker of occupational exposure to benzene. *Ind Health* 38(2):195-204.
- Ireland B, Collins JJ, Buckley CF, et al. 1997. Cancer mortality among workers with benzene exposure. *Epidemiology* 8(3):318-320. <https://doi.org/10.1097/00001648-199705000-00016>.
- IRIS. 2003. Benzene; CASRN 71-43-2. Integrated Risk Information System. Chemical assessment summary. U.S. Environmental Protection Agency. https://iris.epa.gov/static/pdfs/0276_summary.pdf. January 21, 2024.
- Irons RD. 2000. Molecular models of benzene leukemogenesis. *J Toxicol Environ Health A* 61((5-6)):391-397. <https://doi.org/10.1080/00984100050166415>.
- Irons RD, Dent JG, Baker TS, et al. 1980. Benzene is metabolized and covalently bound in bone marrow in situ. *Chem Biol Interact* 30:241-245.
- Irons RD, Gross SA, Le A, et al. 2010. Integrating WHO 2001-2008 criteria for the diagnosis of Myelodysplastic Syndrome (MDS): a case-case analysis of benzene exposure. *Chem Biol Interact* 184(1-2):30-38. <https://doi.org/10.1016/j.cbi.2009.11.016>.
- IRPTC. 1985. Treatment and disposal methods for waste chemicals. International register of potentially toxic chemicals. Geneva, Switzerland: United Nations Environment Programme. Data Profile Series No. 5.
- Isbell MA, Stolzberg RJ, Duffy LK. 2005. Indoor climate in interior Alaska: simultaneous measurement of ventilation, benzene and toluene in residential indoor air of two homes. *Sci Total Environ* 345(1-3):31-40. <https://doi.org/10.1016/j.scitotenv.2004.11.016>.
- Jablónická A, Vargova M, Karellova J. 1987. Cytogenetic analysis of peripheral blood lymphocytes in workers exposed to benzene. *J Hyg Epidemiol Microbiol Immunol* 31(2):127-132.
- Janitz AE, Campbell JE, Magzamen S, et al. 2017. Benzene and childhood acute leukemia in Oklahoma. *Environ Res* 158:167-173. <https://doi.org/10.1016/j.envres.2017.06.015>.
- Jerina D, Daly J, Witkop B, et al. 1968. Role of arene oxide-oxepin system in the metabolism of aromatic substances I In vitro conversion of benzene oxide to a premercapturic acid and a dihydrodiol. *Arch Biochem Biophys* 128:176-183. [https://doi.org/10.1016/0003-9861\(68\)90020-9](https://doi.org/10.1016/0003-9861(68)90020-9).
- Jo WK, Kim SH. 2001. Worker exposure to aromatic volatile organic compounds in dry cleaning stores. *AIHAJ* 62(4):466-471. <https://doi.org/10.1080/15298660108984648>.
- Johansson I, Ingelman-Sundberg M. 1988. Benzene metabolism by ethanol-, acetone-, and benzene-inducible cytochrome P-450(IIE1) in rat and rabbit liver microsomes. *Cancer Res* 48:5387-5390.

8. REFERENCES

- Johnson MM, Williams RW, Fan Z, et al. 2010. Participant-based monitoring of indoor and outdoor nitrogen dioxide, volatile organic compounds, and polycyclic aromatic hydrocarbons among MICA-air households. *Atmos Environ* 44(38):4927-4936. <https://doi.org/10.1016/j.atmosenv.2010.08.027>.
- Kaden DA, Hites RA, Thilly WG. 1979. Mutagenicity of soot and associated polycyclic aromatic hydrocarbons to *Salmonella typhimurium*. *Cancer Res* 39:4152-4159.
- Kaina B, Izzotti A, Xu J, et al. 2018. Inherent and toxicant-provoked reduction in DNA repair capacity: A key mechanism for personalized risk assessment, cancer prevention and intervention, and response to therapy. *Int J Hyg Environ Health* 221(7):993-1006. <https://doi.org/10.1016/j.ijheh.2018.07.003>.
- Kale PG, Baum JW. 1983. Genetic effects of benzene in *Drosophila melanogaster* males. *Environ Mutagen* 5:223-226.
- Kalf GF, Rushmore T, Snyder R. 1982. Benzene inhibits RNA synthesis in mitochondria from liver and bone marrow. *Chem Biol Interact* 42:353-370.
- Kanada M, Miyagawa M, Sato M, et al. 1994. Neurochemical profile of effects of 28 neurotoxic chemicals on the central nervous system in rats. (1) Effects of oral administration on brain contents of biogenic amines and metabolites. *Ind Health* 32:145-164. <https://doi.org/10.2486/indhealth.32.145>.
- Kane EV, Newton R. 2010. Benzene and the risk of non-Hodgkin lymphoma: a review and meta-analysis of the literature. *Cancer Epidemiol* 34(1):7-12. <https://doi.org/10.1016/j.canep.2009.12.011>.
- Karacic V, Skender L, Prpic-Majic D. 1987. Occupational exposure to benzene in the shoe industry. *Am J Ind Med* 12(5):531-536. <https://doi.org/10.1002/ajim.4700120507>.
- Karaulov AV, Mikhaylova IV, Smolyagin AI, et al. 2017. The immunotoxicological pattern of subchronic and chronic benzene exposure in rats. *Toxicol Lett* 275:1-5. <https://doi.org/10.1016/j.toxlet.2017.04.006>.
- Karickhoff SW. 1981. Semi-empirical estimation of sorption of hydrophobic pollutants on natural sediments and soils. *Chemosphere* 10:833-846.
- Karlson U, Frankenberger WT. 1989. Microbial degradation of benzene and toluene in groundwater. *Bull Environ Contam Toxicol* 43:505-510. <https://doi.org/10.1007/BF01701927>.
- Kashtan YS, Nicholson M, Finnegan C, et al. 2023. Gas and propane combustion from stoves emits benzene and increases indoor air pollution. *Environ Sci Technol* 57:9653-9663. <https://doi.org/10.1021/acs.est.2c09289>.
- Kašuba V, Rozgaj R, Sentija K. 2000. Cytogenic changes in subjects occupationally exposed to benzene. *Chemosphere* 40(3):307-310.
- Katukam V, Kulakarni M, Syed R, et al. 2012. Effect of benzene exposure on fertility of male workers employed in bulk drug industries. *Genet Test Mol Biomarkers* 16(6):592-597. <https://doi.org/10.1089/gtmb.2011.0241>.
- Kawasaki Y, Hirabayashi Y, Kaneko T, et al. 2009. Benzene-induced hematopoietic neoplasms including myeloid leukemia in Trp53-deficient C57BL/6 and C3H/He mice. *Toxicol Sci* 110(2):293-306. <https://doi.org/10.1093/toxsci/kfp107>.
- Keener WK, Arp DJ. 1994. Transformations of aromatic compounds by *Nitrosomonas europaea*. *Appl Environ Microbiol* 60(6):1914-1920. <https://doi.org/10.1128/aem.60.6.1914-1920.1994>.
- Keller KA, Snyder CA. 1986. Mice exposed in utero to low concentrations of benzene exhibit enduring changes in their colony forming hematopoietic cells. *Toxicology* 42:171-181. [https://doi.org/10.1016/0300-483X\(86\)90007-7](https://doi.org/10.1016/0300-483X(86)90007-7).
- Keller KA, Snyder CA. 1988. Mice exposed in utero to 20 ppm benzene exhibit altered numbers of recognizable hematopoietic cells up to seven weeks after exposure. *Fundam Appl Toxicol* 10:224-232. [https://doi.org/10.1016/0272-0590\(88\)90306-5](https://doi.org/10.1016/0272-0590(88)90306-5).
- Kelly TJ, Callahan PJ, Pleil J, et al. 1993. Method development and field measurements for polar volatile organic compounds in ambient air. *Environ Sci Technol* 27(6):1146-1152.

8. REFERENCES

- Kelsey KT, Ross D, Traver RD, et al. 1997. Ethnic variation in the prevalence of a common HAD(P)H quinone oxidoreductase polymorphism and its implications for anticancer chemotherapy. *Br J Cancer* 76:852-854. <https://doi.org/10.1038/bjc.1997.474>.
- Kenaga EE. 1980. Predicted bioconcentration factors and soil sorption coefficients of pesticides and other chemicals. *Ecotoxicol Environ Saf* 4(1):26-38. [https://doi.org/10.1016/0147-6513\(80\)90005-6](https://doi.org/10.1016/0147-6513(80)90005-6).
- Kennedy LG, Hutchins SR. 1992. Applied geologic, microbiological, and engineering constraints of in-situ BTEX bioremediation. *Remediation* 3:83-110.
- Kenyon EM, Seeley ME, Janszen D, et al. 1995. Dose-, route-, and sex-dependent urinary excretion of phenol metabolites of B6C3F1 mice. *J Toxicol Environ Health* 44:219-233. <https://doi.org/10.1080/15287399509531956>.
- Kenyon EM, Seaton MJ, Himmelstein MW, et al. 1998. Influence of gender and acetone pretreatment on benzene metabolism in mice exposed by nose-only inhalation. *J Toxicol Environ Health A* 55(6):421-443. <https://doi.org/10.1080/009841098158340>.
- Khalade A, Jaakkola MS, Pukkala E, et al. 2010. Exposure to benzene at work and the risk of leukemia: a systematic review and meta-analysis. *Environ Health* 9:31. <https://doi.org/10.1186/1476-069x-9-31>.
- Kim S, Vermeulen R, Waidyanatha S, et al. 2006a. Modeling human metabolism of benzene following occupational and environmental exposures. *Cancer Epidemiol Biomarkers Prev* 15(11):2246-2252. <https://doi.org/10.1158/1055-9965.Epi-06-0262>.
- Kim S, Vermeulen R, Waidyanatha S, et al. 2006b. Using urinary biomarkers to elucidate dose-related patterns of human benzene metabolism. *Carcinogenesis* 27(4):772-781. <https://doi.org/10.1093/carcin/bgi297>.
- Kim S, Lan Q, Waidyanatha S, et al. 2007a. Genetic polymorphisms and benzene metabolism in humans exposed to a wide range of air concentrations. *Pharmacogenet Genomics* 17(10):789-801. <https://doi.org/10.1097/FPC.0b013e3280128f77>.
- Kim SR, Halden RU, Buckley TJ. 2007b. Volatile organic compounds in human milk: methods and measurements. *Environ Sci Technol* 41(5):1662-1667. <https://doi.org/10.1021/es062362y>.
- Kim EA, Lee WJ, Son M, et al. 2010. Occupational lymphohematopoietic cancer in Korea. *J Korean Med Sci* 25(Suppl):S99-104. <https://doi.org/10.3346/jkms.2010.25.S.S99>.
- Kim DY, Kim HS, Lim DS, et al. 2022. Benzene exposure assessment of printing workers treating petroleum-based cleaner in South Korea. *Ind Health* 61(4):283-290. <https://doi.org/10.2486/indhealth.2022-0103>.
- Kinney PL, Chillrud SN, Ramstrom S, et al. 2002. Exposures to multiple air toxics in New York City. *Environ Health Perspect* 110(Suppl 4):539-546. <https://doi.org/10.1289/EHP.02110S4539>.
- Kipen HM, Cody RP, Goldstein BD. 1989. Use of longitudinal analysis of peripheral blood counts to validate historical reconstructions of benzene exposure. *Environ Health Perspect* 82:199-206. <https://doi.org/10.1289/EHP.8982199>.
- Kirkeleit J, Ulvestad E, Riise T, et al. 2006. Acute suppression of serum IgM and IgA in tank workers exposed to benzene. *Scand J Immunol* 64(6):690-698. <https://doi.org/10.1111/j.1365-3083.2006.01858.x>.
- Kissling M, Speck B. 1972. Further studies on experimental benzene induced aplastic anemia. *Blut* 25:97-103. <https://doi.org/10.1007/BF01633873>.
- Kissling M, Speck B. 1973. Chromosome aberrations in experimental benzene intoxication. *Helv Med Acta* 36:59-66.
- Kitamoto S, Matsuyama R, Uematsu Y, et al. 2015. Genotoxicity evaluation of benzene, di(2-ethylhexyl) phthalate, and trisodium ethylenediamine tetraacetic acid monohydrate using a combined rat comet/micronucleus assays. *Mutat Res Genet Toxicol Environ Mutagen* 786-788:137-143. <https://doi.org/10.1016/j.mrgentox.2015.05.002>.

8. REFERENCES

- Knutsen JS, Kerger BD, Finley B, et al. 2013a. A calibrated human PBPK model for benzene inhalation with urinary bladder and bone marrow compartments. *Risk Anal* 33(7):1237-1251. <https://doi.org/10.1111/j.1539-6924.2012.01927.x>.
- Knutsen JS, Kerger BD, Finley B, et al. 2013b. Supplemental material: A calibrated human PBPK model for benzene inhalation with urinary bladder and bone marrow compartments. *Risk Anal* 33(7) <https://doi.org/10.1111/j.1539-6924.2012.01927.x>.
- Kok PW, Ong CN. 1994. Blood and urinary benzene determined by headspace gas chromatography with photoionization detection; Application in biological monitoring of low-level nonoccupational exposure. *Int Arch Occup Environ Health* 66(3):195-201.
- Kolachana P, Subrahmanyam VV, Meyer KB, et al. 1993. Benzene and its phenolic metabolites produce oxidative DNA damage in HL60 cells in vitro and in the bone marrow in vivo. *Cancer Res* 53(5):1023- 1026.
- Koop DR, Laethem CL. 1992. Inhibition of rabbit microsomal cytochrome P-450 2E1-dependent p-nitrophenol hydroxylation by substituted benzene derivatives. *Drug Metab Dispos* 20(5):775-777.
- Koop DR, Laethem CL, Schnier GG. 1989. Identification of ethanol-inducible P450 isozyme 3a (P45011E1) as a benzene and phenol hydroxylase. *Toxicol Appl Pharmacol* 98:278-288. [https://doi.org/10.1016/0041-008X\(89\)90233-0](https://doi.org/10.1016/0041-008X(89)90233-0).
- Korte F, Klein W. 1982. Degradation of benzene in the environment. *Ecotoxicol Environ Saf* 6(4):311-327. [https://doi.org/10.1016/0147-6513\(82\)90046-x](https://doi.org/10.1016/0147-6513(82)90046-x).
- Koshko L, Debarba LK, Sacla M, et al. 2021. In utero maternal benzene exposure predisposes to the metabolic imbalance in the offspring. *Toxicol Sci* 180(2):252-261. <https://doi.org/10.1093/toxsci/kfab010>.
- Koshko L, Scofield S, Debarba L, et al. 2023. Prenatal benzene exposure in mice alters offspring hypothalamic development predisposing to metabolic disease in later life. *Chemosphere* 330:138738. <https://doi.org/10.1016/j.chemosphere.2023.138738>.
- Kouniali A, Cicolella A, Gonzalez-Flesca N, et al. 2003. Environmental benzene exposure assessment for parent-child pairs in Rouen, France. *Sci Total Environ* 308:73-82.
- Kumar Pal V, Lee S, Naidu M, et al. 2022. Occurrence of and dermal exposure to benzene, toluene and styrene found in hand sanitizers from the United States. *Environ Int* 167:107449. <https://doi.org/10.1016/j.envint.2022.107449>.
- Kuna RA, Kapp RW. 1981. Embryotoxic/teratogenic potential of benzene vapor in rats. *Toxicol Appl Pharmacol* 57:1-7. [https://doi.org/10.1016/0041-008x\(81\)90018-1](https://doi.org/10.1016/0041-008x(81)90018-1).
- Kuna RA, Nicolich MJ, Schroeder RE, et al. 1992. A female rat fertility study with inhaled benzene. *J Am Coll Toxicol* 11(3):275-282. <https://doi.org/10.3109/10915819209141861>.
- Lagorio S, Ferrante D, Ranucci A, et al. 2013. Exposure to benzene and childhood leukaemia: a pilot case-control study. *BMJ Open* 3(2):e002275. <https://doi.org/10.1136/bmjopen-2012-002275>.
- Laitinen J, Kangas J, Pekari K, et al. 1994. Short time exposure to benzene and gasoline at garages. *Chemosphere* 28:197-205.
- Lakhanisky TH, Hendricks B. 1985. Induction of DNA single-strand breaks in CHO cells in culture. *Prog Mutat Res* 5:367-370.
- Lamm SH, Engel A, Byrd DM. 2005. Non-Hodgkin lymphoma and benzene exposure: a systematic literature review. *Chem Biol Interact* 153-154:231-237. <https://doi.org/10.1016/j.cbi.2005.03.027>.
- Lamm SH, Engel A, Joshi KP, et al. 2009. Chronic myelogenous leukemia and benzene exposure: a systematic review and meta-analysis of the case-control literature. *Chem Biol Interact* 182(2-3):93-97. <https://doi.org/10.1016/j.cbi.2009.08.010>.
- Lan Q, Zhang L, Li G, et al. 2004a. Hematotoxicity in workers exposed to low levels of benzene. *Science* 306:1774-1776. <https://doi.org/10.1126/science.1102443>.
- Lan Q, Zhang L, Li G, et al. 2004b. Supplemental material: Hematotoxicity in workers exposed to low levels of benzene. *Science* 306

8. REFERENCES

- Lan Q, Zhang L, Shen M, et al. 2005. Polymorphisms in cytokine and cellular adhesion molecule genes and susceptibility to hematotoxicity among workers exposed to benzene. *Cancer Res* 65(20):9574-9581. <https://doi.org/10.1158/0008-5472.Can-05-1419>.
- Lange A, Smolik R, Zatonski W, et al. 1973a. Leukocyte agglutinins in workers exposed to benzene, toluene and xylene. *Int Arch Arbeitsmed* 31:45-40.
- Lange A, Smolik R, Zatonski W, et al. 1973b. Serum immunoglobulin levels in workers exposed to benzene, toluene and xylene. *Int Arch Arbeitsmed* 31:37-44.
- Latriano L, Goldstein BD, Witz G. 1986. Formation of muconaldehyde, an open-ring metabolite of benzene, in mouse liver microsomes: an additional pathway for toxic metabolites. *Proc Natl Acad Sci U S A* 83:8356-8360. <https://doi.org/10.1073/PNAS.83.21.8356>.
- Lee EW, Garner CD, Johnson JT. 1988. A proposed role played by benzene itself in the induction of acute cytopenia: inhibition of DNA synthesis. *Res Commun Chem Pathol Pharmacol* 60:27-46.
- Lee EW, Johnson JT, Garner CD. 1989. Inhibitory effect of benzene metabolites on nuclear DNA synthesis in bone marrow cells. *J Toxicol Environ Health* 26:277-291. <https://doi.org/10.1080/15287398909531254>.
- Lee B, New A, Kok P, et al. 1993. Urinary trans,trans-muconic acid determined by liquid chromatography: application in biological monitoring of benzene exposure. *Clin Chem* 39:1788-1792.
- Lee E, Im H, Oh E, et al. 2005. DNA damage in T and B lymphocytes, bone marrow, spleens, and livers of rats exposed to benzene. *Inhal Toxicol* 17(7-8):401-408. <https://doi.org/10.1080/08958370590929529>.
- Lee EH, Eum KD, Cho SI, et al. 2007. Acquired dyschromatopsia among petrochemical industry workers exposed to benzene. *Neurotoxicology* 28(2):356-363. <https://doi.org/10.1016/j.neuro.2006.05.005>.
- Lee MS, LeBouf RF, Son YS, et al. 2017. Nicotine, aerosol particles, carbonyls and volatile organic compounds in tobacco- and menthol-flavored e-cigarettes. *Environ Health* 16(1):42. <https://doi.org/10.1186/s12940-017-0249-x>.
- Lemire S, Ashley D, Olaya P, et al. 2004. Environmental exposure of commuters in Mexico City to volatile organic compounds as assessed by blood concentrations, 1998. *Salud Pub Mexico* 46(1):32-38.
- Lévay G, Bodell WJ. 1992. Potentiation of DNA adduct formation in HL-60 cells by combinations of benzene metabolites. *Proc Natl Acad Sci U S A* 89(15):7105-7109. <https://doi.org/10.1073/PNAS.89.15.7105>.
- Lévay G, Pathak DN, Bodell WJ. 1996. Detection of DNA adducts in the white blood cells of B6C3F1 mice treated with benzene. *Carcinogenesis* 17(1):151-153. <https://doi.org/10.1093/CARCIN/17.1.151>.
- Levy A. 1973. The photochemical smog reactivity of organic solvents. *Adv Chem Ser* 124:70-94. <https://doi.org/10.1021/ba-1973-0124.ch006>.
- Li W, Schnatter AR. 2018. Benzene risk assessment: does new evidence on myelodysplastic syndrome justify a new approach? *Crit Rev Toxicol* 48(6):417-432. <https://doi.org/10.1080/10408444.2018.1437389>.
- Li G, Yin S, Watanabe T, et al. 1986. Benzene-specific increase in leukocyte alkaline phosphatase activity in rats exposed to vapors of various organic solvents. *J Toxicol Environ Health* 19:581-589. <https://doi.org/10.1080/15287398609530954>.
- Li Y, Kuppusamy P, Zweier JL, et al. 1995. ESR evidence for the generation of reactive oxygen species from the copper-mediated oxidation of the benzene metabolite, hydroquinone: role in DNA damage. *Chem Biol Interact* 94(2):101-120.
- Li B, Li YQ, Yang LJ, et al. 2009a. Decreased T-cell receptor excision DNA circles in peripheral blood mononuclear cells among benzene-exposed workers. *Int J Immunogenet* 36(2):107-111. <https://doi.org/10.1111/j.1744-313X.2009.00832.x>.

8. REFERENCES

- Li YS, Li YF, Li QN, et al. 2009b. The acute pulmonary toxicity in mice induced by multiwall carbon nanotubes, benzene, and their combination. *Environ Toxicol* 25(4):409-417. <https://doi.org/10.1002/tox.20512>.
- Li H, Li D, He Z, et al. 2018. The effects of Nrf2 knockout on regulation of benzene-induced mouse hematotoxicity. *Toxicol Appl Pharmacol* 358:56-67. <https://doi.org/10.1016/j.taap.2018.09.002>.
- Li A, Sun Y, Wang T, et al. 2020. Effects of micronucleus frequencies and mitochondrial DNA copy numbers among benzene-exposed workers in China. *Environ Mol Mutagen* 61(3):355-360. <https://doi.org/10.1002/em.22354>.
- Lin T, Little JC, Nazaroff WW. 1994. Transport and sorption of volatile organic compounds and water vapor within dry soil grains. *Environ Sci Technol* 28:322-330.
- Lindstrom AB, Highsmith VR, Buckley TJ, et al. 1994. Gasoline-contaminated ground water as a source of residential benzene exposure: a case study. *J Expo Anal Environ Epidemiol* 4(2):183-195.
- Lindstrom AB, Yeowell-O'Connell K, Waidyanatha S, et al. 1997. Measurement of benzene oxide in the blood of rats following administration of benzene. *Carcinogenesis* 18(8):1637-1641. <https://doi.org/10.1093/CARCIN/18.8.1637>.
- Lindstrom AB, Yeowell-O'Connell K, Waidyanatha S, et al. 1999. Investigation of benzene oxide in bone marrow and other tissues of F344 rats following metabolism of benzene in vitro and in vivo. *Chem Biol Interact* 122(1):45-58.
- Linnet MS, Yin S, Travis LB, et al. 1996. Clinical features of hematopoietic malignancies and related disorders among benzene-exposed workers in China. *Environ Health Perspect* 104(Suppl 6):1353-1364. <https://doi.org/10.2307/3433190>.
- Lipscomb JC, Teuschler LK, Swartout JC, et al. 2003a. Variance of microsomal protein and cytochrome P450 2E1 and 3A forms in adult human liver. *Toxicol Mech Methods* 13(1):45-51. <https://doi.org/10.1080/15376510309821>.
- Lipscomb JC, Teuschler LK, Swartout J, et al. 2003b. The impact of cytochrome P450 2E1-dependent metabolic variance on a risk-relevant pharmacokinetic outcome in humans. *Risk Anal* 23(6):1221-1238.
- Liu L, Zhang Q, Feng J, et al. 1996. The study of DNA oxidative damage in benzene-exposed workers. *Mutat Res* 370:45-50. [https://doi.org/10.1016/S0165-1218\(96\)00048-1](https://doi.org/10.1016/S0165-1218(96)00048-1).
- Lodén M. 1986. The in vitro permeability of human skin to benzene, ethylene glycol, formaldehyde, and n-hexane. *Acta Pharmacol Toxicol* 58:382-389. <https://doi.org/10.1111/j.1600-0773.1986.tb00126.x>.
- Loh MM, Houseman EA, Gray GM, et al. 2006. Measured concentrations of VOCs in several non-residential microenvironments in the United States. *Environ Sci Technol* 40(22):6903-6911. <https://doi.org/10.1021/es060197g>.
- Longacre SL, Kocsis JJ, Snyder R. 1981a. Influence of strain differences in mice on the metabolism and toxicity of benzene. *Toxicol Appl Pharmacol* 60:398-409. [https://doi.org/10.1016/0041-008X\(81\)90324-0](https://doi.org/10.1016/0041-008X(81)90324-0).
- Longacre SL, Kocsis JJ, Witmer CM, et al. 1981b. Toxicological and biochemical effects of repeated administration of benzene in mice. *J Toxicol Environ Health* 7:223-237. <https://doi.org/10.1080/15287398109529974>.
- Lovern MR, Maris ME, Schlosser PM. 1999. Use of a mathematical model of rodent in vitro benzene metabolism to predict human in vitro metabolism data. *Carcinogenesis* 20(8):1511-1520. <https://doi.org/10.1093/CARCIN/20.8.1511>.
- Lovreglio P, D'Errico MN, Fustinoni S, et al. 2011. Biomarkers of internal dose for the assessment of environmental exposure to benzene. *J Environ Monit* 13(10):2921-2928. <https://doi.org/10.1039/c1em10512d>.
- Lovreglio P, Maffei F, Carrieri M, et al. 2014. Evaluation of chromosome aberration and micronucleus frequencies in blood lymphocytes of workers exposed to low concentrations of benzene. *Mutat Res Genet Toxicol Environ Mutagen* 770:55-60. <https://doi.org/10.1016/j.mrgentox.2014.04.022>.

8. REFERENCES

- Low LK, Meeks JR, Norris KJ, et al. 1989. Pharmacokinetics and metabolism of benzene in Zymbal gland and other key target tissues after oral administration in rats. *Environ Health Perspect* 82:215-222. <https://doi.org/10.1289/EHP.8982215>.
- Lowry WT, Juarez L, Petty CS, et al. 1985. Studies of toxic gas production during actual structural fires in the Dallas area. *J Forensic Sci* 30:59-72.
- Luke CA, Tice RR, Drew RT. 1988a. The effect of exposure regimen and duration on benzene-induced bone-marrow damage in mice. I. Sex comparison in DBA/2 mice. *Mutat Res* 203:251-271. [https://doi.org/10.1016/0165-1161\(88\)90017-9](https://doi.org/10.1016/0165-1161(88)90017-9).
- Luke CA, Tice RR, Drew RT. 1988b. The effect of exposure regimen and duration on benzene-induced bone marrow damage in mice. II. Strain comparisons involving B6C3F1, C57BL/6 and DBA/2 male mice. *Mutat Res* 203:273-295. [https://doi.org/10.1016/0165-1161\(88\)90018-0](https://doi.org/10.1016/0165-1161(88)90018-0).
- Lutz WK, Schlatter CH. 1977. Mechanism of the carcinogenic action of benzene; Irreversible binding to rat liver DNA. *Chem Biol Interact* 18:241-245.
- Lyman WJ. 1982. Atmospheric residence time. In: Lyman WJ, Reehl WF, Rosenblatt DH, eds. *Handbook of chemical property estimation methods: Environmental behavior of organic compounds*. New York, NY: McGraw-Hill, 10.11-10.33.
- Mackay D, Leinonen PJ. 1975. Rate of evaporation of low-solubility contaminants from water bodies to atmosphere. *Environ Sci Technol* 9:1178-1180.
- MacLeod M, Mackay D. 1999. An assessment of the environmental fate and exposure of benzene and the chlorobenzenes in Canada. *Chemosphere* 38(8):1777-1796.
- Maibach HI, Anjo DM. 1981. Percutaneous penetration of benzene and benzene contained in solvents in the rubber industry. *Arch Environ Health* 36:256-260. <https://doi.org/10.1080/00039896.1981.10667633>.
- Maine DEP. 2014. Typical concentrations of petroleum compounds in Maine residential indoor air. Maine Department of Environmental Protection. https://www.maine.gov/dep/spills/petroleum/documents/typical_compounds4-2012rev2014.pdf. January 31, 2024.
- Majumdar D, Dutta C, Sen S. 2016. Inhalation exposure or body burden? Better way of estimating risk-- An application of PBPK model. *Environ Toxicol Pharmacol* 41:54-61. <https://doi.org/10.1016/j.etap.2015.11.004>.
- Malachowsky KJ, Phelps TJ, Teboli AB, et al. 1994. Aerobic mineralization of trichloroethylene, vinyl chloride, and aromatic compounds by *Rhodococcus* species. *Appl Environ Microbiol* 60(2):542-548. <https://doi.org/10.1128/aem.60.2.542-548.1994>.
- Malovichko MV, Abplanalp WT, McFall SA, et al. 2021. Subclinical markers of cardiovascular toxicity of benzene inhalation in mice. *Toxicol Appl Pharmacol* 431:115742. <https://doi.org/10.1016/j.taap.2021.115742>.
- Maltoni C, Cotti G, Valgimigli L, et al. 1982. Hepatocarcinomas in Sprague-Dawley rats following exposure to benzene by inhalation: First experimental demonstration. *Med Lav* 73(4):446-450.
- Maltoni C, Conti B, Cotti G. 1983. Benzene: A multipotential carcinogen. Results of long-term bioassays performed at the Bologna Institute of Oncology. *Am J Ind Med* 4(5):589-630. <https://doi.org/10.1002/ajim.4700040503>.
- 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(5-6):415-446. <https://doi.org/10.1002/ajim.4700070508>.
- Maltoni C, Ciliberti A, Cotti G, et al. 1989. Benzene, an experimental multipotential carcinogen: Results of the long-term bioassays performed at the Bologna Institute of Oncology. *Environ Health Perspect* 82:109-124. <https://doi.org/10.1289/ehp.8982109>.
- Mani C, Freeman S, Nelson DO, et al. 1999. Species and strain comparisons in the macromolecular binding of extremely low doses of [¹⁴C]benzene in rodents, using accelerator mass spectrometry. *Toxicol Appl Pharmacol* 159(2):83-90. <https://doi.org/10.1006/TAAP.1999.8707>.

8. REFERENCES

- Manning CC, Schlosser PM, Tran HT. 2010. A multicompartment liver-based pharmacokinetic model for benzene and its metabolites in mice. *Bull Math Biol* 72(3):507-540. <https://doi.org/10.1007/s11538-009-9459-x>.
- Mathews JM, Etheridge AS, Matthews HB. 1998. Dose-dependent metabolism of benzene in hamsters, rats and mice. *Toxicol Sci* 44(1):14-21. <https://doi.org/10.1006/TOXS.1998.2474>.
- Mattie DR, Bates GDJR, Jepson GW, et al. 1994. Determination of skin:air partition coefficients for volatile chemicals Experimental method and applications. *Fundam Appl Toxicol* 22(1):51-57.
- Maxwell A, Adzibolusu N, Hu A, et al. 2023. Intrinsic sexual dimorphism in the placenta determines the differential response to benzene exposure. *iScience* 26(4):106287. <https://doi.org/10.1016/j.isci.2023.106287>.
- Mazzullo M, Bartoli S, Bonora B, et al. 1989. Benzene adducts with rat nucleic acids and proteins; Dose-response relationship after treatment in vivo. *Environ Health Perspect* 82:259-266. <https://doi.org/10.1289/EHP.8982259>.
- McAllister PM, Chiang CY. 1994. A practical approach to evaluating natural attenuation of contaminants in ground water. *Ground Water Monit Remed* 14:161-173.
- McDougal JN, Jepson GW, Clewell HJ, et al. 1990. Dermal absorption of organic chemical vapors in rats and humans. *Fundam Appl Toxicol* 14:299-308.
- McHale CM, Zhang L, Smith MT. 2012. Current understanding of the mechanism of benzene-induced leukemia in humans: implications for risk assessment. *Carcinogenesis* 33(2):240-252. <https://doi.org/10.1093/carcin/bgr297>.
- McMahon TF, Birnbaum LS. 1991. Age-related changes in disposition and metabolism of benzene in male C57BL/6N mice. *Drug Metab Dispos* 19(6):1052-1057.
- McNally K, Sams C, Loizou GD, et al. 2017. Evidence for non-linear metabolism at low benzene exposures? A reanalysis of data. *Chem Biol Interact* 278:256-268. <https://doi.org/10.1016/j.cbi.2017.09.002>.
- Meadows M. 2006. Benzene in beverages. *FDA Consum* 40(5):9-10.
- Medeiros Vinci R, Jacxsens L, Van Loco J, et al. 2012. Assessment of human exposure to benzene through foods from the Belgian market. *Chemosphere* 88(8):1001-1007. <https://doi.org/10.1016/j.chemosphere.2012.03.044>.
- Medinsky MA. 1995. The application of physiologically based pharmacokinetic-pharmacodynamic (PBPK-PD) modeling to understanding the mechanism of action of hazardous substances. *Toxicol Lett* 79:185-191. [https://doi.org/10.1016/0378-4274\(95\)03369-V](https://doi.org/10.1016/0378-4274(95)03369-V).
- Medinsky MA, Sabourin PJ, Lucier G, et al. 1989a. A physiological model for simulation of benzene metabolism by rats and mice. *Toxicol Appl Pharmacol* 99:193-206. [https://doi.org/10.1016/0041-008X\(89\)90002-1](https://doi.org/10.1016/0041-008X(89)90002-1).
- Medinsky MA, Sabourin PJ, Henderson RF, et al. 1989b. Differences in the pathways for metabolism of benzene in rats and mice simulated by a physiological model. *Environ Health Perspect* 82:43-49. <https://doi.org/10.1289/EHP.898243>.
- Medinsky MA, Sabourin PJ, Lucier G, et al. 1989c. A toxicokinetic model for simulation of benzene metabolism. *Exp Pathol* 37:150-154.
- Melikian AA, Prahalad AK, Hoffmann D. 1993. Urinary trans,trans-muconic acid as an indicator of exposure to benzene in cigarette smokers. *Cancer Epidemiol Biomarkers Prev* 2(1):47-51.
- Melikian AA, Prahalad AK, Secker-Waker RH. 1994. Comparison of the levels of the urinary benzene metabolite trans,trans-muconic acid in smokers and nonsmokers, and the effects of pregnancy. *Cancer Epidemiol* 3:239-244.
- Meyne J, Legator MS. 1980. Sex-related differences in cytogenetic effects of benzene in the bone marrow of Swiss mice. *Environ Mutagen* 2:43-50.
- Midzenski MA, McDiarmid MA, Rothman N, et al. 1992. Acute high dose exposure to benzene in shipyard workers. *Am J Ind Med* 22(4):553-565. <https://doi.org/10.1002/ajim.4700220410>.
- Miller MM, Wasik SP, Huang G, et al. 1985. Relationships between octanol-water partition coefficients and aqueous solubility. *Environ Sci Technol* 19:522-529.

8. REFERENCES

- Mitchell C, Crayne CB, Cron RQ. 2019. Patterns of B cell repletion following rituximab therapy in a pediatric rheumatology cohort. *ACR Open Rheumatol* 1(8):527-532. <https://doi.org/10.1002/acr2.11074>.
- Modjtahedi BS, Maibach HI. 2008. In vivo percutaneous absorption of benzene in man: forearm and palm. *Food Chem Toxicol* 46(3):1171-1174. <https://doi.org/10.1016/j.fct.2007.11.014>.
- Mohamed MF, Kang D, Aneja VP. 2002. Volatile organic compounds in some urban locations in United States. *Chemosphere* 47:863-882.
- Mohammed OS, Kambouche F, Amirthalingam P. 2020. Chemical pneumonitis due to accidental inhalation of benzene: A case report. *Respir Med Case Rep* 29:100981. <https://doi.org/10.1016/j.rmcr.2019.100981>.
- Morata TC, Hungerford M, Konrad-Martin D. 2021. Potential risks to hearing functions of service members from exposure to jet fuels. *Am J Audiol* 30(3S):922-927. https://doi.org/10.1044/2021_AJA-20-00226.
- Morbach H, Eichhorn EM, Liese JG, et al. 2010. Reference values for B cell subpopulations from infancy to adulthood. *Clin Exp Immunol* 162(2):271-279. <https://doi.org/10.1111/j.1365-2249.2010.04206.x>.
- Morello-Frosch RA, Woodruff TJ, Axelrad DA, et al. 2000. Air toxics and health risks in California: The public health implications of outdoor concentrations. *Risk Anal* 20(2):273-291.
- Morikawa M, Imanaka T. 1993. Isolation of a new mixotrophic bacterium which can fix CO₂ and assimilate aliphatic and aromatic hydrocarbons anaerobically. *J Ferment Bioeng* 76(4):280-283.
- Morimoto K. 1976. Analysis of combined effects of benzene with radiation on chromosomes in cultured human leukocytes. *Jpn J Ind Health* 18:23-34.
- Morimoto K. 1983. Induction of sister chromatid exchanges and cell division delays in human lymphocytes by microsomal activation of benzene. *Cancer Res* 43:1330-1334.
- Moro AM, Brucker N, Charão MF, et al. 2017. Biomonitoring of gasoline station attendants exposed to benzene: Effect of gender. *Mutat Res Genet Toxicol Environ Mutagen* 813:1-9. <https://doi.org/10.1016/j.mrgentox.2016.11.002>.
- Mozzoni P, Poli D, Pinelli S, et al. 2023. Benzene exposure and microRNAs expression: in vitro, in vivo and human findings. *Int J Environ Res Public Health* 20(3):1920. <https://doi.org/10.3390/ijerph20031920>.
- Mukhopadhyay MK, Nath D. 2014. Physiologically based toxicokinetic modeling of secondary acute myelolytic leukemia. *Environ Toxicol Pharmacol* 37(1):378-389. <https://doi.org/10.1016/j.etap.2013.11.029>.
- Mullin AH, Nataraj D, Ren JJ, et al. 1998. Inhaled benzene increases the frequency and length of lacI deletion mutations in lung tissue of mice. *Carcinogenesis* 19(10):1723-1733. <https://doi.org/10.1093/CARCIN/19.10.1723>.
- Mumtaz MM, Ray M, Crowell SR, et al. 2012a. Translational research to develop a human PBPK models tool kit-volatile organic compounds (VOCs). *J Toxicol Environ Health A* 75(1):6-24. <https://doi.org/10.1080/15287394.2012.625546>.
- Mumtaz M, Fisher J, Blount B, et al. 2012b. Application of physiologically based pharmacokinetic models in chemical risk assessment. *J Toxicol* 2012:904603. <https://doi.org/10.1155/2012/904603>.
- Murray FJ, John JA, Rampy LW, et al. 1979. Embryotoxicity of inhaled benzene in mice and rabbits. *Am Ind Hyg Assoc J* 40(11):993-998. <https://doi.org/10.1080/15298667991430604>.
- Mushrush GW, Mose DG, Sullivan KT. 1994. Soil vapor and groundwater analysis from a recent oil spill. *Bull Environ Contam Toxicol* 52:31-38. <https://doi.org/10.1007/BF00197354>.
- Naft BN. 1992. Removing benzene from wastewater. *Environ Protect* 3(2):47-54.
- Nakai JS, Chu I, Li-Muller A, et al. 1997. Effect of environmental conditions on the penetration of benzene through human skin. *J Toxicol Environ Health* 51(5):447-462. <https://doi.org/10.1080/00984109708984036>.
- Nakajima T, Okuyama S, Yonekura I, et al. 1985. Effects of ethanol and phenobarbital administration on the metabolism and toxicity of benzene. *Chem Biol Interact* 55:23-38.

8. REFERENCES

- NAS/NRC. 2006. Human biomonitoring for environmental chemicals. Washington, DC: The National Academies Press, National Research Council. <https://doi.org/10.17226/11700>.
- NCI. 2022. Benzene. Cancer-causing substances. National Cancer Institute. <https://www.cancer.gov/about-cancer/causes-prevention/risk/substances/benzene>. June 5, 2024.
- Nebert DW, Roe AL, Vandale SE, et al. 2002. NAD(P)H: quinone oxidoreductase (NQO1) polymorphism, exposure to benzene, and predisposition to disease A huGE review. *Genet Med* 4(2):62- 70.
- Nedelcheva V, Gut I, Soucek P, et al. 1999. Metabolism of benzene in human liver microsomes Individual variations in relation to CYP2E1 expression. *Arch Toxicol* 73(1):33-40. <https://doi.org/10.1007/s002040050583>.
- NESCAUM. 1989. Evaluation of the health effects from exposure to gasoline and gasoline vapors. Final Report. Northeast States for Coordinated Air Use Management. 3.1-3.16, 15.11-15.33.
- Neun DJ, Penn A, Snyder CA. 1992. Evidence for strain-specific differences in benzene toxicity as a function of host target cell susceptibility. *Arch Toxicol* 66(1):11-17. <https://doi.org/10.1007/BF02307264>.
- NFPA. 1994. [Benzene]. In: Fire protection guide to hazardous materials. 11th ed. Quincy, MA: National Fire Protection Association, 49-25, 325-316.
- NIH. 1940. Toxicity and potential dangers of aliphatic and aromatic hydrocarbons: A critical review of the literature. Washington, DC: National Institute of Health. 66-97, 125-135. Public Health Bulletin No. 255.
- Nilsson RI, Nordlinder RG, Tagesson C, et al. 1996. Genotoxic effects in workers exposed to low levels of benzene from gasoline. *Am J Ind Med* 30(3):317-324. [https://doi.org/10.1002/\(SICI\)1097-0274\(199609\)30:3<317::AID-AJIM10>3.0.CO;2-Z](https://doi.org/10.1002/(SICI)1097-0274(199609)30:3<317::AID-AJIM10>3.0.CO;2-Z).
- NIOSH. 1974. Criteria for a recommended standard. Occupational exposure to benzene. Washington, DC: National Institute for Occupational Safety and Health. NIOSH 74-137. PB246700.
- NIOSH. 1990. National occupational exposure survey 1981-1983. Cincinnati, OH: National Institute for Occupational Safety and Health.
- NIOSH. 1992. Table 1. NIOSH recommended safety and health standards for hazardous agents in the workplace. NIOSH recommendations for occupational safety and health: Compendium of policy documents and statements. National Institute for Occupational Safety and Health. PB92162536.
- NIOSH. 2019. Benzene. NIOSH pocket guide to chemical hazards. National Institute for Occupational Safety and Health. <https://www.cdc.gov/niosh/npg/npgd0049.html>. January 22, 2024.
- NLM. 2023. Compound summary: Benzene. PubChem. U.S. National Library of Medicine. <https://pubchem.ncbi.nlm.nih.gov/compound/Benzene>. January 31, 2024.
- Nojima K, Fukaya K, Fukui S, et al. 1975. Studies on photochemistry of aromatic hydrocarbons. II. The formation of nitrophenols and nitrobenzene by the photochemical reaction of benzene in the presence of nitrogen monoxide. *Chemosphere* 2:77-82.
- Nomiyama K, Nomiyama H. 1974a. Respiratory retention, uptake and excretion of organic solvents in man: Benzene, toluene, n-hexane, trichloroethylene, acetone, ethyl acetate and ethyl alcohol. *Int Arch Arbeitsmed* 32:75-83.
- Nomiyama K, Nomiyama H. 1974b. Respiratory elimination of organic solvents in man: Benzene, toluene, n-hexane, trichloroethylene, acetone, ethyl acetate and ethyl alcohol. *Int Arch Arbeitsmed* 32:85-91.
- Norpoth K, Stuker W, Krewet E, et al. 1988. Biomonitoring of benzene exposure by trace analyses of phenylguanine. *Int Arch Occup Environ Health* 60:163-168.
- Nourozi MA, Neghab M, Bazzaz JT, et al. 2018. Association between polymorphism of GSTP1, GSTT1, GSTM1 and CYP2E1 genes and susceptibility to benzene-induced hematotoxicity. *Arch Toxicol* 92(6):1983-1990. <https://doi.org/10.1007/s00204-017-2104-9>.
- NTP. 1986. Toxicology and carcinogenesis studies of benzene (CAS No. 71-43-2) in F344/N rats and B6C3F1 mice (gavage studies). Research Triangle Park, NC: National Toxicology Program. NTP TR 289. NIH publication no. 86-2545.

8. REFERENCES

- NTP. 1994. Benzene. In: Seventh annual report on carcinogens: Summary 1994. National Toxicology Program, 34-37.
- NTP. 2007. NTP report on the toxicology and carcinogenesis study of benzene (CAS No. 71-43-2) in genetically modified haploinsufficient p16 Ink4a/p19 Arf mice (gavage study). National Toxicology Program. NTP GMM 8. NIH Publication No. 08-4425.
http://ntp.niehs.nih.gov/ntp/htdocs/gmm_rpts/gmm8.pdf. January 28, 2015.
- NTP. 2013. Draft OHAT approach for systematic review and evidence integration for literature-based health assessments – February 2013. National Toxicology Program, Office of Health Assessment and Translation.
https://ntp.niehs.nih.gov/ntp/ohat/evaluationprocess/draftohatapproach_february2013.pdf. October 4, 2023.
- NTP. 2015. OHAT risk of bias rating tool for human and animal studies. National Toxicology Program, Office of Health Assessment and Translation.
https://ntp.niehs.nih.gov/ntp/ohat/pubs/riskofbiastool_508.pdf. March 19, 2019.
- NTP. 2021. Benzene. CAS no. 71-43-2. In: Report on carcinogens. 15th ed. National Toxicology Program, <https://ntp.niehs.nih.gov/sites/default/files/ntp/roc/content/profiles/benzene.pdf>. January 22, 2024.
- NYSDOH. 2005. Study of volatile organic chemicals in air of fuel oil heated homes. New York State Department of Health. http://www.health.state.ny.us/nysdoh/indoor/fuel_oil.html. March 04, 2005.
- Oberly TJ, Bewsey BJ, Probst GS. 1984. An evaluation of the L5178Y TK+/- mouse lymphoma forward mutation assay using 42 chemicals. *Mutat Res* 125:291-306.
- Ödkvist LM, Arlinger SD, Edling C, et al. 1987. Audiological and vestibulo-oculomotor findings in workers exposed to solvents and jet fuel. *Scand Audiol* 16(2):75-81.
<https://doi.org/10.3109/01050398709042159>.
- Ogata M, Fujisawa K, Ogino Y, et al. 1984. Partition coefficients as a measure of bioconcentration potential of crude oil compounds in fish and shellfish. *Bull Environ Contam Toxicol* 33:561-567.
<https://doi.org/10.1007/BF01625584>.
- Orzechowski A, Schwarz LR, Schwegler U, et al. 1995. Benzene metabolism in rodent hepatocytes; Role of sulphate conjugation. *Xenobiotica* 25(10):1093-1102.
<https://doi.org/10.3109/00498259509061909>.
- OSHA. 1977. Emergency temporary standard for occupational exposure to benzene [and revision]. Occupational Safety and Health Administration. Fed Regist 42:22516-22529, 27460-57464.
- OSHA. 1987. Occupational exposure to benzene. Occupational Safety and Health Administration. Fed Regist 52(176):34460-34578.
- OSHA. 2003. Benzene. Occupational Safety and Health Administration. Code of Federal Regulations. 29 CFR 1910.1028.
- OSHA. 2021. Benzene. OSHA occupational chemical database. Occupational Safety and Health Administration. <https://www.osha.gov/chemicaldata/491>. January 31, 2024.
- OSHA. 2022a. Occupational safety and health standards. Subpart Z - Toxic and hazardous substances. Air contaminants. Table Z-1. Occupational Safety and Health Administration. Code of Federal Regulations. 29 CFR 1910.1000. <https://www.govinfo.gov/content/pkg/CFR-2022-title29-vol6/pdf/CFR-2022-title29-vol6-sec1910-1000.pdf>. January 22, 2024.
- OSHA. 2022b. Occupational safety and health standards. Subpart Z - Toxic and hazardous substances. Benzene. Occupational Safety and Health Administration. Code of Federal Regulations. 29 CFR 1910.1028. <https://www.govinfo.gov/content/pkg/CFR-2022-title29-vol6/pdf/CFR-2022-title29-vol6-sec1910-1028.pdf>. January 21, 2024.
- OSHA. 2022c. Occupational safety and health standards for shipyard employment. Subpart Z - Toxic and hazardous substances. Benzene. Occupational Safety and Health Administration. Code of Federal Regulations. 29 CFR 1915.1028. <https://www.govinfo.gov/content/pkg/CFR-2022-title29-vol7/pdf/CFR-2022-title29-vol7-sec1915-1028.pdf>. January 21, 2024.

8. REFERENCES

- OSHA. 2022d. Safety and health regulations for construction. Subpart Z - Toxic and hazardous substances. Benzene. Occupational Safety and Health Administration. Code of Federal Regulations. 29 CFR 1926.1128. <https://www.govinfo.gov/content/pkg/CFR-2022-title29-vol8/pdf/CFR-2022-title29-vol8-sec1926-1128.pdf>. January 21, 2024.
- Ott MG, Townsend JC, Fishbeck WA, et al. 1978. Mortality among individuals occupationally exposed to benzene. *Arch Environ Health* 33:3-10. <https://doi.org/10.1080/00039896.1978.10667299>.
- Paci E, Buiatti E, Costantini AS, et al. 1989. Aplastic anemia, leukemia and other cancer mortality in a cohort of shoe workers exposed to benzene. *Scand J Work Environ Health* 15:313-318.
- Painter RB, Howard R. 1982. The HeLa DNA-synthesis inhibition test as a rapid screen for mutagenic carcinogens. *Mutat Res* 92:427-437. [https://doi.org/10.1016/0027-5107\(82\)90241-X](https://doi.org/10.1016/0027-5107(82)90241-X).
- Pandey AK, Gurbani D, Bajpayee M, et al. 2009a. In silico studies with human DNA topoisomerase-II alpha to unravel the mechanism of in vitro genotoxicity of benzene and its metabolites. (Erratum in: *Mutat Res* 671:100). *Mutat Res* 661:57-70. <https://doi.org/10.1016/j.mrfmmm.2008.11.006>.
- Pandey AK, Gurbani D, Bajpayee M, et al. 2009b. In silico studies with human DNA topoisomerase-II alpha to unravel the mechanism of in vitro genotoxicity of benzene and its metabolites. (Erratum to: *Mutat Res* 661:57-70). *Mutat Res* 671:100. <https://doi.org/10.1016/j.mrfmmm.2009.09.008>.
- Park H, Seo J, Kim J, et al. 2022. [Relationship between urinary t, t-muconic acid and insulin resistance in the elderly]. *Korean J Occup Environ Med* 23(4):387-396. (Korean)
- Parke DV. 1989. Introduction: Session on metabolism. *Environ Health Perspect* 82:7-8. <https://doi.org/10.1289/EHP.89827>.
- Parke DV, Williams RT. 1953. Studies in detoxication 49 The metabolism of benzene containing [¹⁴C] benzene. *Biochem J* 54:231-238. <https://doi.org/10.1042/BJ0540231>.
- Pate CT, Atkinson R, Pitts JN. 1976. The gas phase reaction of O₃ with a series of aromatic hydrocarbons. *J Environ Sci Health A* 11:1-10.
- Paterson S, Mackay D. 1989. Correlation of tissue, blood and air partition coefficients of volatile organic chemicals. *Br J Ind Med* 46:321-314. <https://doi.org/10.1136/oem.46.5.321>.
- Pathak DN, Levay G, Bodell WJ. 1995. DNA adduct formation in the bone marrow of B6C3F1 mice treated with benzene. *Carcinogenesis* 16(8):1803-1808. <https://doi.org/10.1093/CARCIN/16.8.1803>.
- Pawar SS, Mungikar AM. 1975. Changes in the activities of hepatic drug metabolizing enzymes and lipid peroxidation caused by benzene and toluene. *Indian J Biochem Biophys* 12:133-134.
- Paxton MB, Chinchilli VM, Brett SM, et al. 1994a. Leukemia risk associated with benzene exposure in the pliofilm cohort: I. mortality update and exposure distribution. *Risk Anal* 14(2):147-154.
- Paxton MB, Chinchilli VM, Brett SM, et al. 1994b. Leukemia risk associated with benzene exposure in the pliofilm cohort. II. Risk estimates. *Risk Anal* 14(2):155-161.
- Pech K, Pérez-Herrera N, Vértiz-Hernández Á A, et al. 2023a. Health risk assessment in children occupationally and para-occupationally exposed to benzene using a reverse-translation PBPK model. *Int J Environ Res Public Health* 20(3):2275. <https://doi.org/10.3390/ijerph20032275>.
- Pech K, Pérez-Herrera N, Vértiz-Hernández Á A, et al. 2023b. Supplemental material: Health risk assessment in children occupationally and para-occupationally exposed to benzene using a reverse-translation PBPK model. *Int J Environ Res Public Health* 20(3):2275. <https://doi.org/10.3390/ijerph20032275>.
- Pekari K, Vainiotalo S, Heikkila P, et al. 1992. Biological monitoring of occupational exposure to low levels of benzene. *Scand J Work Environ Health* 18(5):317-322.
- Pellack-Walker P, Blumer JL. 1986. DNA damage in L5178YS cells following exposure to benzene metabolites. *Mol Pharmacol* 30:42-47.
- Pellizzari ED, Lioy P, Quackenboss J, et al. 1995. Population-based exposure measurements in EPA Region 5: A phase I field study in support of the national human exposure assessment survey. *J Expo Anal Environ Epidemiol* 15(3):327-358.

8. REFERENCES

- Peng D, Jiaying W, Chunhui H, et al. 2012. Study on the cytogenetic changes induced by benzene and hydroquinone in human lymphocytes. *Hum Exp Toxicol* 31(4):322-335. <https://doi.org/10.1177/0960327111433900>.
- Petty SE, Nicas M, Boiarski AA. 2011. A quantitative method for estimating dermal benzene absorption from benzene-containing hydrocarbon liquids. *Int J Occup Environ Health* 17(4):287-300. <https://doi.org/10.1179/107735211799041788>.
- Philip P, Jensen MK. 1970. Benzene induced chromosome abnormalities in rat bone marrow cells. *Acta Pathol Microbiol Scand A* 78(4):489-490. <https://doi.org/10.1111/j.1699-0463.1970.tb02529.x>.
- Picciano D. 1979. Cytogenetic study of workers exposed to benzene. *Environ Res* 19:33-38.
- Pitarque M, Carbonell E, Lapena N, et al. 1996. No increase in micronuclei frequency in cultured blood lymphocytes from a group of filling station attendants. *Mutat Res* 367(3):161-167. [https://doi.org/10.1016/0165-1218\(95\)00091-7](https://doi.org/10.1016/0165-1218(95)00091-7).
- Pitarque M, Carbonell E, Lapena E, et al. 1997. SCE analysis in peripheral blood lymphocytes of a group of filling station attendants. *Mutat Res* 390:153-159. [https://doi.org/10.1016/S0165-1218\(97\)00011-6](https://doi.org/10.1016/S0165-1218(97)00011-6).
- Plappert U, Barthel E, Raddatz K, et al. 1994a. Early effects of benzene exposure in mice. Haematological versus genotoxic effects. *Arch Toxicol* 68:284-290. <https://doi.org/10.1007/s002040050070>.
- Plappert U, Barthel E, Seidel HJ, et al. 1994b. Reduction of benzene toxicity by toluene. *Environ Mol Mutagen* 24:283-292. <https://doi.org/10.1002/em.2850240405>.
- Popp W, Vahrenholz C, Yaman S, et al. 1992. Investigations of the frequency of DNA strand breakage and cross-linking and of sister chromatid exchange frequency in the lymphocytes of female workers exposed to benzene and toluene. *Carcinogenesis* 13(1):57-61. <https://doi.org/10.1007/BF00379074>.
- Popp W, Rauscher D, Muller G, et al. 1994. Concentrations of benzene in blood and S-phenylmercapturic and t,t-muconic acid in urine in car mechanics. *Int Arch Occup Environ Health* 66(1):1-6.
- Post GB, Snyder R, Kalf GF. 1985. Inhibition of RNA synthesis and interleukin-2 production in lymphocytes in vitro by benzene and its metabolites, hydroquinone and p-benzoquinone. *Toxicol Lett* 29:161-167. [https://doi.org/10.1016/0378-4274\(85\)90037-2](https://doi.org/10.1016/0378-4274(85)90037-2).
- Poulin P, Krishnan K. 1995. A biologically-based algorithm for predicting human tissue:blood partition coefficients of organic chemicals. *Hum Exp Toxicol* 14:273-280.
- Powley MW, Carlson GP. 1999. Species comparison of hepatic and pulmonary metabolism of benzene. *Toxicology* 139:207-217. [https://doi.org/10.1016/S0300-483X\(99\)00134-1](https://doi.org/10.1016/S0300-483X(99)00134-1).
- Powley MW, Carlson GP. 2000. Cytochromes P450 involved with benzene metabolism in hepatic and pulmonary microsomes. *J Biochem Mol Toxicol* 14(6):303-309.
- Powley MW, Carlson GP. 2001. Hepatic and pulmonary microsomal benzene metabolism in CYP2E1 knockout mice. *Toxicology* 169(3):187-194. [https://doi.org/10.1016/S0300-483X\(01\)00519-4](https://doi.org/10.1016/S0300-483X(01)00519-4).
- Powley MW, Carlson GP. 2002. Benzene metabolism by the isolated perfused lung. *Inhal Toxicol* 14(6):569-584.
- Price PS, Rey TD, Fontaine DD, et al. 2012. A reanalysis of the evidence for increased efficiency in benzene metabolism at airborne exposure levels below 3 p.p.m. *Carcinogenesis* 33(11):2094-2099. <https://doi.org/10.1093/carcin/bgs257>.
- Probst GS, Hill LE. 1985. Tests for the induction of DNA-repair synthesis in primary cultures of adult rat hepatocytes. *Prog Mutat Res* 5:381-386.
- Proctor CR, Lee J, Yu D, et al. 2020a. Wildfire caused widespread drinking water distribution network contamination. *AWWA Water Science* 2(4):e1183. <https://doi.org/10.1002/aws2.1183>.
- Proctor CR, Lee J, Yu D, et al. 2020b. Supplemental material: Wildfire caused widespread drinking water distribution network contamination. *AWWA Water Science* 2(4) <https://doi.org/10.1002/aws2.1183>.
- Purcell KJ, Cason GH, Gargas ML, et al. 1990. In vivo metabolic interactions of benzene and toluene. *Toxicol Lett* 52(2):141-152. [https://doi.org/10.1016/0378-4274\(90\)90148-F](https://doi.org/10.1016/0378-4274(90)90148-F).

8. REFERENCES

- Qian S, Han Y, Shi Y, et al. 2019. Benzene induces haematotoxicity by promoting deacetylation and autophagy. *J Cell Mol Med* 23(2):1022-1033. <https://doi.org/10.1111/jcmm.14003>.
- Qu Q, Shore R, Li G, et al. 2002. Hematological changes among Chinese workers with a broad range of benzene exposures. *Am J Ind Med* 42(4):275-285. <https://doi.org/10.1002/ajim.10121>.
- Qu Q, Shore R, Li G, et al. 2003a. Validation and evaluation of biomarkers in workers exposed to benzene in China. Boston, MA: Health Effects Institute. Research number 115.
- Qu Q, Shore R, Li G, et al. 2003b. Appendix A: Analyses of the combined data for year 1 and year 2. Validation and evaluation of biomarkers in workers exposed to benzene in China. Boston, MA: Health Effects Institute. Research number 115. <http://pubs.healtheffects.org/getfile.php?u=34>. January 18, 2007.
- Qu Q, Shore R, Li G, et al. 2005. Biomarkers of benzene: urinary metabolites in relation to individual genotype and personal exposure. *Chem Biol Interact* 153-154:85-95. <https://doi.org/10.1016/j.cbi.2005.03.012>.
- Raabe GK, Wong O. 1996. Leukemia mortality by cell type in petroleum workers with potential exposure to benzene. *Environ Health Perspect* 104(Suppl 6):1381-1392. <https://doi.org/10.1289/EHP.961041381>.
- Rafati A, Erfanizadeh M, Noorafshan A, et al. 2015. Effect of benzene on the cerebellar structure and behavioral characteristics in rats. *Asian Pac J Trop Biomed* 5(7):568-573. <https://doi.org/10.1016/j.apjtb.2015.05.002>.
- Rajganesh B, Selvaraj PT, Manning FS, et al. 1995. Biotreatment of produced water for removal of sulfides, organics, and toxicity. *Appl Biochem Biotech* 51/52:735-746. <https://doi.org/10.1007/BF02933474>.
- Rana I, Dahlberg S, Steinmaus C, et al. 2021. Benzene exposure and non-Hodgkin lymphoma: a systematic review and meta-analysis of human studies. *Lancet Planet Health* 5(9):e633-e643. [https://doi.org/10.1016/s2542-5196\(21\)00149-2](https://doi.org/10.1016/s2542-5196(21)00149-2).
- Ranaldi R, Bassani B, Villani P, et al. 1998. Measurement and characterization of micronuclei in cultured primary lung cells of mice following inhalation exposure to benzene. *Mutagenesis* 13(5):453- 460. <https://doi.org/10.1093/MUTAGE/13.5.453>.
- Rappaport SM, McDonald TA, Yeowell-O'Connell K. 1996. The use of protein adducts to investigate the disposition of reactive metabolites of benzene. *Environ Health Perspect* 104:1235-1237. <https://doi.org/10.1289/EHP.961041235>.
- Rappaport SM, Waidyanatha S, Qu Q, et al. 2002a. Albumin adducts of benzene oxide and 1,4-benzoquinone as measures of human benzene metabolism. *Cancer Res* 62(5):1330-1337.
- Rappaport SM, Yeowell-O'Connor K, Smith MT, et al. 2002b. Non-linear production of benzene oxide-albumin adducts with human exposure to benzene. *J Chromatogr B Analyt Technol Biomed Life Sci* 778:367-374.
- Rappaport SM, Kim S, Lan Q, et al. 2009. Evidence that humans metabolize benzene via two pathways. *Environ Health Perspect* 117(6):946-952. <https://doi.org/10.1289/ehp.0800510>.
- Rappaport SM, Kim S, Lan Q, et al. 2010. Human benzene metabolism following occupational and environmental exposures. *Chem Biol Interact* 184(1-2):189-195. <https://doi.org/10.1016/j.cbi.2009.12.017>.
- Reddy CM, Arey JS, Seewald JS, et al. 2012. Composition and fate of gas and oil released to the water column during the Deepwater Horizon oil spill. *Proc Natl Acad Sci U S A* 109(50):20229-20234. <https://doi.org/10.1073/pnas.1101242108>.
- Ren JC, Liu H, Zhang GH, et al. 2020. Interaction effects of environmental response gene polymorphisms and benzene exposure on telomere length in shoe-making workers. *Chemosphere* 255:126841. <https://doi.org/10.1016/j.chemosphere.2020.126841>.
- RePORTER. 2024. Benzene. Research portfolio online reporting tools. National Institutes of Health. <https://reporter.nih.gov/>. January 31, 2024.

8. REFERENCES

- Rich AL, Orimoloye HT. 2016. Elevated atmospheric levels of benzene and benzene-related compounds from unconventional shale extraction and processing: Human health concern for residential communities. *Environ Health Insights* 10:75-82. <https://doi.org/10.4137/ehi.S33314>.
- Richardson DB. 2008. Temporal variation in the association between benzene and leukemia mortality. *Environ Health Perspect* 116(3):370-374. <https://doi.org/10.1289/ehp.10841>.
- Rickert DE, Baker TS, Bus JS, et al. 1979. Benzene disposition in the rat after exposure by inhalation. *Toxicol Appl Pharmacol* 49:417-423. [https://doi.org/10.1016/0041-008X\(79\)90441-1](https://doi.org/10.1016/0041-008X(79)90441-1).
- Rinsky RA, Young RJ, Smith AB. 1981. Leukemia in benzene workers. *Am J Ind Med* 2(3):217-245. <https://doi.org/10.1002/ajim.4700020305>.
- Rinsky RA, Smith AB, Hornung R, et al. 1987. Benzene and leukemia: An epidemiological risk assessment. *N Eng J Med* 316:1044-1050.
- Rinsky RA, Hornung RW, Silver SR, et al. 2002. Benzene exposure and hematopoietic mortality: A long-term epidemiologic risk assessment. *Am J Ind Med* 42(6):474-480. <https://doi.org/10.1002/ajim.10138>.
- Ritchie G, Still K, Rossi J, et al. 2003. Biological and health effects of exposure to kerosene-based jet fuels and performance additives. *J Toxicol Environ Health B Crit Rev* 6(4):357-451. <https://doi.org/10.1080/10937400306473>.
- Rithidech K, Au WW, Ramanujam VMS, et al. 1987. Induction of chromosome aberrations in lymphocytes of mice after subchronic exposure to benzene. *Mutat Res* 188:135-140. [https://doi.org/10.1016/0165-1218\(87\)90102-9](https://doi.org/10.1016/0165-1218(87)90102-9).
- Rithidech K, Au WW, Ramanujam VMS, et al. 1988. Persistence of micronuclei in peripheral blood normochromatic erythrocytes of subchronically benzene-treated male mice. *Environ Mol Mutagen* 12:319-329.
- Robertson ML, Eastmond DA, Smith MT. 1991. Two benzene metabolites, catechol and hydroquinone, produce a synergistic induction of micronuclei and toxicity in cultured human lymphocytes. *Mutat Res* 249(1):201-210. [https://doi.org/10.1016/0027-5107\(91\)90147-G](https://doi.org/10.1016/0027-5107(91)90147-G).
- Robinson SN, Shah R, Wong BA, et al. 1997. Immunotoxicological effects of benzene inhalation in male Sprague-Dawley rats. *Toxicology* 119(3):227-237. [https://doi.org/10.1016/s0300-483x\(97\)03621-4](https://doi.org/10.1016/s0300-483x(97)03621-4).
- Rooney AA, Boyles AL, Wolfe MS, et al. 2014. Systematic review and evidence integration for literature-based environmental health science assessments. *Environ Health Perspect* 122(7):711-718. <https://doi.org/10.1289/ehp.1307972>.
- Rosenthal GJ, Snyder CA. 1985. Modulation of the immune response to *Listeria monocytogenes* by benzene inhalation. *Toxicol Appl Pharmacol* 80:502-510. [https://doi.org/10.1016/0041-008x\(85\)90395-3](https://doi.org/10.1016/0041-008x(85)90395-3).
- Rosenthal GJ, Snyder CA. 1987. Inhaled benzene reduces aspects of cell-mediated tumor surveillance in mice. *Toxicol Appl Pharmacol* 88:35-43. [https://doi.org/10.1016/0041-008x\(87\)90267-5](https://doi.org/10.1016/0041-008x(87)90267-5).
- Ross D. 1996. Metabolic basis of benzene toxicity. *Eur J Haematol Suppl* 60:111-118. <https://doi.org/10.1111/j.1600-0609.1996.tb01656.x>.
- Ross D. 2000. The role of metabolism and specific metabolites in benzene-induced toxicity; Evidence and issues. *J Toxicol Environ Health A* 61((5-6)):357-372. <https://doi.org/10.1080/00984100050166361>.
- Ross D, Siegel D, Schattenberg DG, et al. 1996. Cell-specific activation and detoxification of benzene metabolites in mouse and human bone marrow: identification of target cells and a potential role for modulation of apoptosis in benzene toxicity. *Environ Health Perspect* 104(Suppl 6):1177-1182. <https://doi.org/10.1289/ehp.961041177>.
- Rothman N, Haas R, Hayes RB, et al. 1995. Benzene induces gene-duplicating but not gene-inactivating mutations at the glycophorin A locus in exposed humans. *Proc Natl Acad Sci U S A* 92:4069-4073. <https://doi.org/10.1073/PNAS.92.9.4069>.

8. REFERENCES

- Rothman N, Li G, Dosemeci M, et al. 1996a. Hematotoxicity among Chinese workers heavily exposed to benzene. *Am J Ind Med* 29(3):236-246. [https://doi.org/10.1002/\(SICI\)1097-0274\(199603\)29:3<236::AID-AJIM3>3.0.CO;2-O](https://doi.org/10.1002/(SICI)1097-0274(199603)29:3<236::AID-AJIM3>3.0.CO;2-O).
- Rothman N, Smith MT, Hayes RB, et al. 1996b. An epidemiological study of early biologic effects of benzene in Chinese workers. *Environ Health Perspect* 104(Suppl 6):1365-1370. <https://doi.org/10.1289/ehp.961041365>.
- Rothman N, Smith MT, Hayes RB, et al. 1997. Benzene poisoning, a risk factor for hematological malignancy, is associated with the NQO1 609C-T mutation and rapid fractional excretion of chlozoxazone. *Cancer Res* 57(14):2839-2842.
- Rothman N, Bechtold WE, Yin SN, et al. 1998. Urinary excretion of phenol, catechol, hydroquinone, and muconic acid by workers occupationally exposed to benzene. *Occup Environ Med* 55(10):705-711. <https://doi.org/10.1136/oem.55.10.705>.
- Rowe BL, Toccalino PL, Moran MJ, et al. 2007. Occurrence and potential human-health relevance of volatile organic compounds in drinking water from domestic wells in the United States. *Environ Health Perspect* 115(11):1539-1546. <https://doi.org/10.1289/ehp.10253>.
- Rozen MG, Snyder CA, Albert RE. 1984. Depression in B- and T-lymphocyte mitogen-induced blastogenesis in mice exposed to low concentrations of benzene. *Toxicol Lett* 20:343-349. [https://doi.org/10.1016/0378-4274\(84\)90170-x](https://doi.org/10.1016/0378-4274(84)90170-x).
- Ruckart PZ, Bove FJ, Maslia M. 2014. Evaluation of contaminated drinking water and preterm birth, small for gestational age, and birth weight at Marine Corps Base Camp Lejeune, North Carolina: a cross-sectional study. *Environ Health* 13:99. <https://doi.org/10.1186/1476-069x-13-99>.
- Ruiz MA, Augusto LGS, Vassallo J, et al. 1994. Bone marrow morphology in patients with neutropenia due to chronic exposure to organic solvents (benzene): Early lesions. *Pathol Res Pract* 190(2):151-154. [https://doi.org/10.1016/S0344-0338\(11\)80705-3](https://doi.org/10.1016/S0344-0338(11)80705-3).
- Ruiz P, Ray M, Fisher J, et al. 2011. Development of a human physiologically based pharmacokinetic (PBPK) Toolkit for environmental pollutants. *Int J Mol Sci* 12(11):7469-7480. <https://doi.org/10.3390/ijms12117469>.
- Ruiz P, Emond C, McLanahan ED, et al. 2020. Exploring mechanistic toxicity of mixtures using PBPK modeling and computational systems biology. *Toxicol Sci* 174(1):38-50. <https://doi.org/10.1093/toxsci/kfz243>.
- Rushmore T, Snyder R, Kalf G. 1984. Covalent binding of benzene and its metabolites to DNA in rabbit bone marrow mitochondria in vitro. *Chem Biol Interact* 49:133-154.
- Rushton L, Schnatter AR, Tang G, et al. 2014. Acute myeloid and chronic lymphoid leukaemias and exposure to low-level benzene among petroleum workers. *Br J Cancer* 110(3):783-787. <https://doi.org/10.1038/bjc.2013.780>.
- Sabourin PJ, Chen BT, Lucier G, et al. 1987. Effect of dose on the absorption and excretion of [14C]benzene administered orally or by inhalation in rats and mice. *Toxicol Appl Pharmacol* 87:325-336. [https://doi.org/10.1016/0041-008X\(87\)90294-8](https://doi.org/10.1016/0041-008X(87)90294-8).
- Sabourin PJ, Bechtold WE, Birnbaum LS, et al. 1988. Differences in the metabolism and disposition of inhaled [3H]benzene by F344/N rats and B6C3F1 mice. *Toxicol Appl Pharmacol* 94:128-140. [https://doi.org/10.1016/0041-008X\(88\)90343-2](https://doi.org/10.1016/0041-008X(88)90343-2).
- Sabourin PJ, Bechtold WE, Griffith WC, et al. 1989a. Effect of exposure concentration, exposure rate, and route of administration on metabolism of benzene by F344 rats and B6C3F1 mice. *Toxicol Appl Pharmacol* 99:421-444. [https://doi.org/10.1016/0041-008X\(89\)90151-8](https://doi.org/10.1016/0041-008X(89)90151-8).
- Sabourin PJ, Sun JD, Birnbaum LS, et al. 1989b. Effect of repeated benzene inhalation exposures on subsequent metabolism of benzene. *Exp Pathol* 37:155-157.
- Sabourin PJ, Sun JD, MacGregor JT, et al. 1990. Effect of repeated benzene inhalation exposures on benzene metabolism, binding to hemoglobin, and induction of micronuclei. *Toxicol Appl Pharmacol* 103:452-462. [https://doi.org/10.1016/0041-008X\(90\)90318-O](https://doi.org/10.1016/0041-008X(90)90318-O).

8. REFERENCES

- Sabourin PJ, Muggenburg BA, Couch RC, et al. 1992. Metabolism of [14C]benzene by cynomolgus monkeys and chimpanzees. *Toxicol Appl Pharmacol* 114(2):277-284. [https://doi.org/10.1016/0041-008X\(92\)90078-7](https://doi.org/10.1016/0041-008X(92)90078-7).
- Saito FU, Kocsis JJ, Snyder R. 1973. Effect of benzene on hepatic drug metabolism and ultrastructure. *Toxicol Appl Pharmacol* 26:209-217. [https://doi.org/10.1016/0041-008X\(73\)90254-8](https://doi.org/10.1016/0041-008X(73)90254-8).
- Salanitro JP. 1993. The role of bioattenuation in the management of aromatic hydrocarbon plumes in aquifers. *Ground Water Monit Remed* 13:150-161.
- Salviano Dos Santos VP, Medeiros Salgado A, Guedes Torres A, et al. 2015. Benzene as a chemical hazard in processed foods. *Int J Food Sci* 2015:545640. <https://doi.org/10.1155/2015/545640>.
- Sammett D, Lee EW, Kocsis JJ, et al. 1979. Partial hepatectomy reduces both the metabolism and toxicity of benzene. *J Toxicol Environ Health* 5:785-792. <https://doi.org/10.1080/15287397909529789>.
- Sasahara T, Kato H, Saito A, et al. 2007. Development of a ppb-level sensor based on catalytic combustion for total volatile organic compounds in indoor air. *Sens Actuators B Chem* 126(2):536-543. <https://doi.org/10.1016/j.snb.2007.04.001>.
- Sasiadek M. 1992. Nonrandom distribution of breakpoints in the karyotypes of workers occupationally exposed to benzene. *Environ Health Perspect* 97:255-257. <https://doi.org/10.1289/EHP.9297255>.
- Sasiadek M, Jagielski J. 1990. Genotoxic effects observed in workers occupationally exposed to organic solvents. *Pol J Occup Med* 3(1):103-108.
- Sasiadek M, Jagielski J, Smolik R. 1989. Localization of breakpoints in the karyotype of workers professionally exposed to benzene. *Mutat Res* 224:235-240. [https://doi.org/10.1016/0165-1218\(89\)90161-4](https://doi.org/10.1016/0165-1218(89)90161-4).
- Sato A, Nakajima T. 1979. Dose-dependent metabolic integration between benzene and toluene in vivo and in vitro. *Toxicol Appl Pharmacol* 48:249-256. [https://doi.org/10.1016/0041-008X\(79\)90030-9](https://doi.org/10.1016/0041-008X(79)90030-9).
- Sato A, Nakajima T, Fujiwara Y, et al. 1975. Kinetic studies on sex differences in susceptibility to chronic benzene intoxication - with special reference to body fat content. *Br J Ind Med* 32:321-328. <https://doi.org/10.1136/oem.32.4.321>.
- Sawahata T, Neal RA. 1983. Biotransformation of phenol to hydroquinone and catechol by rat liver microsomes. *Mol Pharmacol* 23:453-460.
- Saxton J, Narkus-Kramer M. 1975. EPA findings of solid waste from industrial chemicals. *Chem Eng* 82:107-112.
- Schad H, Schafer F, Weber L, et al. 1992. Determination of benzene metabolites in urine of mice by solid-phase extraction and high-performance liquid chromatography. *J Chromatog* 593:147-151.
- Schafer F, Schad H, Weber L. 1993. Determination of phenylmercapturic acid in urine of benzene-exposed BDF-1 mice. *J Chromatog* 620:239-242.
- Schauer JJ, Kleeman MJ, Cass GR, et al. 2001. Measurement of emissions from air pollution sources. 3. C1-C29 organic compounds from fireplace combustion of wood. *Environ Sci Technol* 35(9):1716-1728. <https://doi.org/10.1021/es001331e>.
- Scheunert I, Topp E, Schmitzer J, et al. 1985. Formation and fate of bound residues on [14C]benzene and [14C]chlorobenzenes in soil and plants. *Ecotoxicol Environ Saf* 9(2):159-170. [https://doi.org/10.1016/0147-6513\(85\)90018-1](https://doi.org/10.1016/0147-6513(85)90018-1).
- Schiestl RH, Aubrecht J, Khogali F. 1997. Carcinogens induce reversion of the mouse pink-eyed unstable mutation. *Proc Natl Acad Sci U S A* 94(9):4576-4581. <https://doi.org/10.1073/PNAS.94.9.4576>.
- Schlösser PM, Bond JA, Medinsky MA. 1993. Benzene and phenol metabolism by mouse and rat liver microsomes. *Carcinogenesis* 14:2477-2486. <https://doi.org/10.1093/CARCIN/14.12.2477>.
- Schnatter AR, Nicolich MJ, Bird MG. 1996. Determination of leukemogenic benzene exposure concentrations: Refined analyses of the Pliofilm cohort. *Risk Anal* 16(6):833-840.
- Schnatter AR, Kerzic PJ, Zhou Y, et al. 2010. Peripheral blood effects in benzene-exposed workers. *Chem Biol Interact* 184(1-2):174-181. <https://doi.org/10.1016/j.cbi.2009.12.020>.

8. REFERENCES

- Schnatter AR, Glass DC, Tang G, et al. 2012. Myelodysplastic syndrome and benzene exposure among petroleum workers: an international pooled analysis. *J Natl Cancer Inst* 104(22):1724-1737. <https://doi.org/10.1093/jnci/djs411>.
- Schnier GG, Laethem CL, Koop DR. 1989. Identification and induction of cytochromes P450, P450IIE1 and P450IA1 in rabbit bone marrow. *J Pharmacol Exp Ther* 251:790-796.
- Schreiber JS. 1993. Predicted infant exposure to tetrachloroethylene in human breastmilk. *Risk Anal* 13:515-424.
- Schrenk D, Bock KW. 1990. Metabolism of benzene in rat hepatocytes: Influence of inducers on phenol glucuronidation. *Drug Metab Dispos* 18(5):720-725.
- Schrenk D, Ingelman-Sundberg M, Bock KW. 1992. Influence of P-4502E1 induction on benzene metabolism in rat hepatocytes and on biliary metabolite excretion. *Drug Metab Dispos* 20(2):137-141.
- Schrenk HH, Yant WP, Pearce SJ, et al. 1941. Absorption, distribution and elimination of benzene by body tissues and fluids of dogs exposed to benzene vapor. *J Ind Hyg Toxicol* 23:20-34.
- Seaton MJ, Schlosser PM, Bond JA, et al. 1994. Benzene metabolism by human liver microsomes in relation to cytochrome P450 2E1 activity. *Carcinogenesis* 15:1799-1806. <https://doi.org/10.1093/CARCIN/15.9.1799>.
- Seaton MJ, Schlosser P, Medinsky MA. 1995. In vitro conjugation of benzene metabolites by human liver: Potential influence of interindividual variability on benzene toxicity. *Carcinogenesis* 16(7):1519-1527. <https://doi.org/10.1093/CARCIN/16.7.1519>.
- Seidel HJ, Beyvers G, Pape M, et al. 1989. The influence of benzene on the erythroid cell system in mice. *Exp Hematol* 17(7):760-764.
- Seidenberg JM, Anderson DG, Becker RA. 1986. Validation of an in vivo developmental toxicity screen in the mouse. *Teratog Carcinog Mutagen* 6:361-374. <https://doi.org/10.1002/tcm.1770060503>.
- Seiji K, Jin C, Watanabe T, et al. 1990. Sister chromatid exchanges in peripheral lymphocytes of workers exposed to benzene, trichloroethylene, or tetrachloroethylene, with reference to smoking habits. *Int Arch Occup Environ Health* 62:171-176.
- Seixas GM, Andon BM, Hollingshead PG, et al. 1982. The aza-arenes as mutagens for *Salmonella typhimurium*. *Mutat Res* 102:201-212. [https://doi.org/10.1016/0165-1218\(82\)90130-6](https://doi.org/10.1016/0165-1218(82)90130-6).
- Sexton K, Adgate JL, Fredrickson AL, et al. 2006. Using biologic markers in blood to assess exposure to multiple environmental chemicals for inner-city children 3-6 years of age. *Environ Health Perspect* 114(3):453-459. <https://doi.org/10.1289/ehp.8324>.
- Sharma RK, Jacobsen-Kram D, Lemmon M, et al. 1985. Sister-chromatid exchange and cell replication kinetics in fetal and maternal cells after treatment with chemical teratogens. *Mutat Res* 158:217-231. [https://doi.org/10.1016/0165-1218\(85\)90088-6](https://doi.org/10.1016/0165-1218(85)90088-6).
- Sheets PL, Carlson GP. 2004. Kinetic factors involved in the metabolism of benzene in mouse lung and liver. *J Toxicol Environ Health A* 67(5):421-430. <https://doi.org/10.1080/15287390490273488>.
- Sheets PL, Yost GS, Carlson GP. 2004. Benzene metabolism in human lung cell lines BEAS-2B and A549 and cells overexpressing CYP2F1. *J Biochem Mol Toxicol* 18(2):92-99.
- Shelby MD, Witt KL. 1995. Comparison of results from mouse bone marrow chromosome aberration and micronucleus test. *Environ Mol Mutagen* 25:302-313.
- Shelby MD, Erexson GL, Hook GJ, et al. 1993. Evaluation of a three-exposure mouse bone marrow micronucleus protocol; Results with 49 chemicals. *Environ Mol Mutagen* 21(2):160-179.
- Shell. 1980. A dominant-lethal inhalation study with benzene in rats. Shell Oil Co. Submitted to the U.S. Environmental Protection Agency under TSCA Section 8E. OTS0539136. 88-920002041. 8EHQ-0492-3399.
- Shell. 1992. Immunosuppression of B6C3F1 female mice following subchronic exposure to benzene from drinking water. Submitted to the U.S Environmental Protection Agency under TSCA Section 8E. OTS0536214. 88920002020. 8EHQ-0492-3378.
- Sherwood RJ. 1972. Benzene: The interpretation of monitoring results. *Ann Occup Hyg* 15(2):409-421. <https://doi.org/10.1093/annhyg/15.2-4.409>.

8. REFERENCES

- Sherwood RJ. 1988. Pharmacokinetics of benzene in a human after exposure at about the permissible limit. *Ann N Y Acad Sci* 534:635-647. <https://doi.org/10.1111/j.1749-6632.1988.tb30154.x>.
- Sherwood RJ, Sinclair GC. 1999. New PBPK model applied to old occupational exposure to benzene. *Am Ind Hyg Assoc J* 60(2):259-265. <https://doi.org/10.1080/00028899908984445>.
- Shi B, Su S, Wen C, et al. 2022. The prediction of occupational health risks of benzene in the printing industry through multiple occupational health risk assessment models. *Front Public Health* 10:1038608. <https://doi.org/10.3389/fpubh.2022.1038608>.
- Sinclair GC, Gray CN, Sherwood RJ. 1999. Structure and validation of a pharmacokinetic model for benzene. *Am Ind Hyg Assoc J* 60(2):249-258. <https://doi.org/10.1080/00028899908984444>.
- Singh GB, Salas LJ, Cantrell BK, et al. 1985. Distribution of aromatic hydrocarbons in ambient air. *Atmos Environ* 19:1911-1919.
- Siou G, Conan L, el Haitem M. 1981. Evaluation of the clastogenic action of benzene by oral administration with 2 cytogenetic techniques in mouse and Chinese hamster. *Mutat Res* 90:273-278. [https://doi.org/10.1016/0165-1218\(81\)90007-0](https://doi.org/10.1016/0165-1218(81)90007-0).
- Siviková K, Holecková B, Dianovský J. 2005. Chromosome damage induced by benzene after the use of conventional and FISH chromosome painting. *Neoplasma* 52(1):79-84.
- Skowronski GA, Turkall RM, Abdel-Rahman MS. 1988. Soil adsorption alters bioavailability of benzene in dermally exposed male rats. *Am Ind Hyg Assoc J* 49(10):506-511. <https://doi.org/10.1080/15298668891380132>.
- Smith MT. 1996a. Overview of benzene-induced aplastic anaemia. *Eur J Haematol Suppl* 60:107-110. <https://doi.org/10.1111/j.1600-0609.1996.tb01655.x>.
- Smith MT. 1996b. The mechanism of benzene-induced leukemia: A hypothesis and speculations on the causes of leukemia. *Environ Health Perspect* 104:1219-1225. <https://doi.org/10.1289/EHP.961041219>.
- Smith MT. 1999. Benzene, NQO1, and genetic susceptibility to cancer. *Proc Natl Acad Sci U S A* 96(14):7624-7626. <https://doi.org/10.1073/pnas.96.14.7624>.
- Smith MT. 2010. Advances in understanding benzene health effects and susceptibility. *Annu Rev Public Health* 31:133-148. <https://doi.org/10.1146/annurev.publhealth.012809.103646>.
- Smith MT, Zhang L. 1998. Biomarkers of leukemia risk: Benzene as a model. *Environ Health Perspect* 106(Suppl 4):937-946. <https://doi.org/10.1289/ehp.98106s4937>.
- Smith MT, Zhang L, Wang Y, et al. 1998. Increased translocations and aneusomy in chromosomes 8 and 21 among workers exposed to benzene. *Cancer Res* 58(10):2176-2181.
- Smyth HF, Carpenter CP, Weil CS, et al. 1962. Range-finding toxicity data: List VI. *Am Ind Hyg Assoc J* 23:95-107. <https://doi.org/10.1080/00028896209343211>.
- Snyder R. 2000a. Overview of the toxicology of benzene. *J Toxicol Environ Health A* 61((5-6)):339-346. <https://doi.org/10.1080/00984100050166334>.
- Snyder R. 2000b. Recent developments in the understanding of benzene toxicity and leukemogenesis. *Drug Chem Toxicol* 23(1):13-25.
- Snyder R. 2002. Benzene and leukemia. *Crit Rev Toxicol* 32(3):155-210.
- Snyder R, Kalf GF. 1994. A perspective on benzene leukemogenesis. *Crit Rev Toxicol* 24(3):177-209.
- Snyder R, Hedli CC. 1996. An overview of benzene metabolism. *Environ Health Perspect* 104(Suppl 6):1165-1171. <https://doi.org/10.1289/EHP.961041165>.
- Snyder CA, Goldstein BD, Sellakumar A. 1978. Hematototoxicity of inhaled benzene to Sprague-Dawley rats and AKR mice at 300 ppm. *J Toxicol Environ Health* 4:605-618. <https://doi.org/10.1080/15287397809529683>.
- Snyder CA, Goldstein BD, Sellakumar AR, et al. 1980. The inhalation toxicology of benzene; Incidence of hematopoietic neoplasms and hematotoxicity in AKR/J and C57BL/6J mice. *Toxicol Appl Pharmacol* 54:323-331. [https://doi.org/10.1016/0041-008x\(80\)90202-1](https://doi.org/10.1016/0041-008x(80)90202-1).
- Snyder CA, Green JD, LoBue J, et al. 1981. Protracted benzene exposure causes a proliferation of myeloblasts and/or promyelocytes in CD-1 mice. *Bull Environ Contam Toxicol* 27:17-22.

8. REFERENCES

- Snyder CA, Goldstein BD, Sellakumar A, et al. 1982. Toxicity of chronic benzene inhalation; CD-1 mice exposed to 300 ppm. *Bull Environ Contam Toxicol* 29(4):385-391. <https://doi.org/10.1007/BF01605600>.
- Snyder CA, Goldstein BD, Sellakumar AR. 1984. Evidence for hematotoxicity and tumorigenesis in rats exposed to 100 ppm benzene. *Am J Ind Med* 5(6):429-434. <https://doi.org/10.1002/ajim.4700050603>.
- Snyder CA, Sellakumar AR, James DJ, et al. 1988. The carcinogenicity of discontinuous inhaled benzene exposures in CD-1 and C57BL/6 mice. *Arch Toxicol* 62:331-335. <https://doi.org/10.1007/BF00293618>.
- Snyder R, Chopiga T, Yang CS, et al. 1993a. Benzene metabolism by reconstituted cytochromes P450, 2B1, and 2E1 and its modulation by cytochrome b5, microsomal epoxide hydrolase, and glutathione transferases; Evidence for an important role of microsomal epoxide hydrolase in the formation of hydroquinone. *Toxicol Appl Pharmacol* 122(2):172-181. <https://doi.org/10.1006/TAAP.1993.1185>.
- Snyder R, Witz G, Goldstein BD. 1993b. The toxicology of benzene. *Environ Health Perspect* 100:293-306. <https://doi.org/10.1289/EHP.93100293>.
- Solomon GM, Hurley S, Carpenter C, et al. 2021. Fire and water: Assessing drinking water contamination after a major wildfire. *ACS ES T Water* 1(8):1878-1886. <https://doi.org/10.1021/acsestwater.1c00129>.
- Sommers CH, Schiestl RH. 2006. Effect of benzene and its closed ring metabolites on intrachromosomal recombination in *Saccharomyces cerevisiae*. *Mutat Res* 593(1-2):1-8. <https://doi.org/10.1016/j.mrfmmm.2005.06.026>.
- Songnian Y, Quilan L, Yuxiang L. 1982. Significance of leukocyte alkaline phosphates in the diagnosis of chronic benzene poisoning. *Regul Toxicol Pharmacol* 2:209-212. [https://doi.org/10.1016/0273-2300\(82\)90014-9](https://doi.org/10.1016/0273-2300(82)90014-9).
- Sonoda T, Nagata Y, Mori M, et al. 2001. Meta-analysis of multiple myeloma and benzene exposure. *J Epidemiol* 11(6):249-254.
- Srbova J, Teisinger J, Skramovsky S. 1950. Absorption and elimination of inhaled benzene in man. *Arch Ind Hyg Occup Med* 2:1-8.
- Staples CA, Werner AF, Hoogheem TJ. 1985. Assessment of priority pollutant concentrations in the United States using STORET database. *Environ Toxicol Chem* 4:131-142.
- Stoner RD, Drew RT, Bernstein DM. 1981. Benzene-inhalation effects upon tetanus antitoxin responses and leukemogenesis in mice. In: Mahlum DD, Gray RH, Felix WD, eds. *Coal conversion and the environment*. Oak Ridge, TN: U.S. Department of Energy, 445-461.
- Stucker I, Mandereau L, Aubert-Berleur MP, et al. 1994. Occupational paternal exposure to benzene and risk of spontaneous abortion. *Occup Environ Med* 51(7):475-478. <https://doi.org/10.1136/oem.51.7.475>.
- Styles JA, Richardson CR. 1984. Cytogenetic effects of benzene: Dosimetric studies on rats exposed to benzene vapour. *Mutat Res* 135:203-209. [https://doi.org/10.1016/0165-1218\(84\)90123-X](https://doi.org/10.1016/0165-1218(84)90123-X).
- Sul D, Lee D, Im H, et al. 2002. Single strand DNA breaks in T- and B-lymphocytes and granulocytes in workers exposed to benzene. *Toxicol Lett* 134:87-95. [https://doi.org/10.1016/S0378-4274\(02\)00167-4](https://doi.org/10.1016/S0378-4274(02)00167-4).
- Sun JD, Medinsky MA, Birnbaum LS, et al. 1990. Benzene hemoglobin adducts in mice and rats; Characterization of formation and physiological modeling. *Fundam Appl Toxicol* 15:468-475.
- Sun P, Zhang Z, Wu F, et al. 2007. Association of the genetic polymorphism of EPHX1 and EPHX2 with the susceptibility to chronic benzene poisoning. *Front Med China* 1(3):320-326. <https://doi.org/10.1007/s11684-007-0062-y>.
- Surrallés J, Autio K, Nylund L, et al. 1997. Molecular cytogenetic analysis of buccal cells and lymphocytes from benzene-exposed workers. *Carcinogenesis* 18(4):817-823. <https://doi.org/10.1093/CARCIN/18.4.817>.

8. REFERENCES

- Susten A, Dames B, Burg J, et al. 1985. Percutaneous penetration of benzene in hairless mice: An estimate of dermal absorption during tire-building operations. *Am J Ind Med* 7(4):323-335. <https://doi.org/10.1002/ajim.4700070408>.
- Suzuki S, Atai H, Hatakeyama Y, et al. 1989. Administration-route-related differences in the micronucleus test with benzene. *Mutat Res* 223:407-410. [https://doi.org/10.1016/0165-1218\(89\)90097-9](https://doi.org/10.1016/0165-1218(89)90097-9).
- Swaen GM, van Amelsvoort L, Twisk JJ, et al. 2010. Low level occupational benzene exposure and hematological parameters. *Chem Biol Interact* 184(1-2):94-100. <https://doi.org/10.1016/j.cbi.2010.01.007>.
- Sweeney LM, Gearhart JM. 2020. Examples of physiologically based pharmacokinetic modeling applied to risk assessment. In: Fisher JW, Gearhart JM, Lin Z, eds. *Physiologically based pharmacokinetic (PBPK) modeling*. Academic Press, 281-299. <https://doi.org/10.1016/B978-0-12-818596-4.00011-4>.
- Swenberg JA, Petzold GL, Harbach PR. 1976. In vitro DNA damage/alkaline elution assay for predicting carcinogenic potential. *Biochem Biophys Res Commun* 72:732-738. [https://doi.org/10.1016/S0006-291X\(76\)80100-3](https://doi.org/10.1016/S0006-291X(76)80100-3).
- Symanski E, Stock TH, Tee PG, et al. 2009. Demographic, residential, and behavioral determinants of elevated exposures to benzene, toluene, ethylbenzene, and xylenes among the U.S. population: results from 1999-2000 NHANES. *J Toxicol Environ Health A* 72(14):903-912. <https://doi.org/10.1080/15287390902959706>.
- Tabak HH, Quave SA, Mashni CI, et al. 1981. Biodegradability studies with organic priority pollutant compounds. *J Water Pollut Control Fed* 53:1503-1518.
- Tan YM, Chan M, Chukwudebe A, et al. 2020. PBPK model reporting template for chemical risk assessment applications. *Regul Toxicol Pharmacol* 115:104691. <https://doi.org/10.1016/j.yrtph.2020.104691>.
- Taniguchi S, Niitsuya M, Inoue Y, et al. 1999. Evaluation of passive smoking by measuring urinary trans, trans-muconic acid and exhaled carbon monoxide levels. *Ind Health* 37(1):88-94. <https://doi.org/10.2486/indhealth.37.88>.
- Taningher M, Perrotta A, Malacarne D, et al. 1995. Lack of significant promoting activity by benzene in the rat liver model of carcinogenesis. *J Toxicol Environ Health* 45:481-488. <https://doi.org/10.1080/15287399509532010>.
- Tanooka H. 1977. Development and application of *Bacillus subtilis* test systems for mutagens, involving DNA-repair deficiency and suppressible auxotrophic mutations. *Mutat Res* 42:19-32. [https://doi.org/10.1016/S0027-5107\(77\)80004-3](https://doi.org/10.1016/S0027-5107(77)80004-3).
- Tatrai E, Rodics K, Ungvary G. 1980a. Embryotoxic effects of simultaneously applied exposure of benzene and toluene. *Folia Morphol* 28:286-289.
- Tatrai E, Ungvary GY, Hudak A, et al. 1980b. Concentration dependence of the embryotoxic effects of benzene inhalation in CFY rats. *J Hyg Epidemiol Microbiol Immunol* 24(3):363-371.
- Tauber J. 1970. Instant benzol death. *J Occup Med* 12:91-92.
- Teisinger J, Fišerová-Bergerová B. 1955. Valeus comparée de la détermination des sulfates et du phénol contenus dans l'urine pour l'évaluation de la concentration du benzène dans l'air. *Arch Mal Prof* 16:221- 232.
- Thienes H, Haley TJ. 1972. Benzene. In: *Clinical toxicology*. 5th ed. Philadelphia, PA: Lea & Febiger, 124-127.
- Thomas KW, Pellizzari ED, Clayton CA, et al. 1993. Temporal variability of benzene exposures for residents in several New Jersey homes with attached garages or tobacco smoke. *J Expo Anal Environ Epidemiol* 3(1):49-73.
- Tian W, Wang TS, Fang Y, et al. 2020. Aberrant lncRNA profiles are associated with chronic benzene poisoning and acute myelocytic leukemia. *J Occup Environ Med* 62(7):e308-e317. <https://doi.org/10.1097/jom.0000000000001875>.

8. REFERENCES

- Tice RR, Costa DL, Drew RT. 1980. Cytogenetic effects of inhaled benzene in murine bone marrow; Induction of sister chromatid exchanges, chromosomal aberrations, and cellular proliferation inhibition in DBA/2 mice. *Proc Natl Acad Sci U S A* 77:2148-2152. <https://doi.org/10.1073/PNAS.77.4.2148>.
- Tice RR, Vogt TF, Costa DL. 1982. Cytogenetic effects of inhaled benzene in murine bone marrow. *Environ Sci Res* 25:257-275.
- Toft K, Olofsson T, Tunek A, et al. 1982. Toxic effects on mouse bone marrow caused by inhalation of benzene. *Arch Toxicol* 51:295-302. <https://doi.org/10.1007/BF00317008>.
- Tompa A, Major J, Jakab MG. 1994. Monitoring of benzene-exposed workers for genotoxic effects of benzene; Improved-working-condition-related decrease in the frequencies of chromosomal aberrations in peripheral blood lymphocytes. *Mutat Res* 304(2):159-165. [https://doi.org/10.1016/0027-5107\(94\)90207-0](https://doi.org/10.1016/0027-5107(94)90207-0).
- Tondel M, Persson B, Carstensen J. 1995. Myelofibrosis and benzene exposure. *Occup Med* 45(1):51-52. <https://doi.org/10.1093/OCCMED/45.1.51>.
- Topham JC. 1980. Do induced sperm-head abnormalities in mice specifically identify mammalian mutagens rather than carcinogens? *Mutat Res* 74:379-387. [https://doi.org/10.1016/0165-1161\(80\)90195-8](https://doi.org/10.1016/0165-1161(80)90195-8).
- Topp E, Scheunert I, Korte F. 1989. Kinetics of the uptake of ¹⁴C-labeled chlorinated benzene from soil by plants. *Ecotoxicol Environ Saf* 17:157-166. [https://doi.org/10.1016/0147-6513\(89\)90034-1](https://doi.org/10.1016/0147-6513(89)90034-1).
- Tough IM, Court Brown WM. 1965. Chromosome aberrations and exposure to ambient benzene. *Lancet* 1:684.
- Tough IM, Smith PG, Brown WMC. 1970. Chromosome studies on workers exposed to atmospheric benzene. *Eur J Cancer* 6:49-55.
- Travis CC, Quillen JL, Arms AD. 1990. Pharmacokinetics of benzene. *Toxicol Appl Pharmacol* 102:400-420. [https://doi.org/10.1016/0041-008X\(90\)90037-U](https://doi.org/10.1016/0041-008X(90)90037-U).
- TRI22. 2023. Benzene. TRI explorer: release reports. Washington, DC: Toxics Release Inventory. U.S. Environmental Protection Agency. https://enviro.epa.gov/triexplorer/tri_release.chemical. December 28, 2023.
- Tsai SP, Fox EE, Ransdell JD, et al. 2004. A hematology surveillance study of petrochemical workers exposed to benzene. *Regul Toxicol Pharmacol* 40(1):67-73. <https://doi.org/10.1016/j.yrtph.2004.05.010>.
- Tsuruta H. 1989. Skin absorption of organic solvent vapors in nude mice in vivo. *Ind Health* 27:37-47.
- Tsutsumi M, Lasker JM, Shimizu M, et al. 1989. The intralobular distribution of ethanol-inducible P450IIE1 in rat and human liver. *Hepatology* 10(4):437-446. <https://doi.org/10.1002/hep.1840100407>.
- Tucker WA, Huang C, Bral JM. 1986. Validation of transport model. In: Benzene in Florida groundwater: An assessment of the significance to human health. Washington, DC: American Petroleum Council, Florida Petroleum Council, 93-108.
- Tunsaringkarn T, Suwansaksri J, Soogarun S, et al. 2011. Genotoxic monitoring and benzene exposure assessment of gasoline station workers in metropolitan Bangkok: sister chromatid exchange (SCE) and urinary trans, trans-muconic acid (t,t-MA). *Asian Pac J Cancer Prev* 12(1):223-227.
- Tuo J, Loft S, Thomsen MS, et al. 1996. Benzene-induced genotoxicity in mice in vivo detection by the alkaline comet assay; Reduction by CYP2E1 inhibition. *Mutat Res* 368:213-219. [https://doi.org/10.1016/S0165-1218\(96\)90063-4](https://doi.org/10.1016/S0165-1218(96)90063-4).
- Turkall RM, Skowronski G, Gerges S, et al. 1988. Soil absorption alters kinetics and bioavailability of benzene in orally exposed male rats. *Arch Environ Contam Toxicol* 17:159-164. <https://doi.org/10.1007/BF01056020>.
- Turteltaub KW, Mani C. 2003. Benzene metabolism in rodents at doses relevant to human exposure from urban air. Boston, MA: Health Effects Institute. Research Report 113.
- Uchirin CG, Mangels G. 1987. Sorption equilibria of benzene and toluene on two New Jersey coastal plain ground water aquifer solids. *J Environ Sci Health A* 22:743-758.

8. REFERENCES

- Ugrekheldze D, Korte F, Kvesitadze G. 1997. Uptake and transformation of benzene and toluene by plant leaves. *Ecotoxicol Environ Saf* 37(1):24-29. <https://doi.org/10.1006/eesa.1996.1512>.
- Ungvary G, Tatrai E. 1985. On the embryotoxic effects of benzene and its alkyl derivatives in mice, rats and rabbits. *Arch Toxicol Suppl* 8:425-430. https://doi.org/10.1007/978-3-642-69928-3_95.
- USGS. 2003. Methods of analysis by the U.S. Geological Survey National Water Quality Laboratory - Determination of gasoline oxygenates, selected degradates, and BTEX in water by heated purge and trap/gas chromatography/mass spectrometry. Denver, CO: U.S. Geological Survey. Water-Resources Investigations Report 03-4079.
- USGS. 2014. Water quality in principal aquifers of the United States, 1991–2010. Reston, VA: U.S. Geological Survey. Circular 1360. <https://doi.org/10.3133/cir1360>.
- USGS. 2020. Datasets from groundwater-quality and select quality-control data from the national water-quality assessment project, January through December 2016, and previously unpublished data from 2013 to 2015. U.S. Geological Survey. <https://doi.org/10.5066/P9W4RR74>.
- USITC. 2024. Benzene. DataWeb. U.S. International Trade Commission. <https://dataweb.usitc.gov/>. January 31, 2024.
- Uzma N, Kumar B, Salar K, et al. 2008. In vitro and in vivo evaluation of toxic effect of benzene on lymphocytes and hepatocytes. *Internet J Toxicol* 6(2):1-7. <https://ispub.com/IJTO/6/2/7846>. January 26, 2015.
- Vacha J, Znojil V, Seidel HJ, et al. 1990. Ferrokinetics and erythropoiesis in mice after long-term inhalation of benzene. *Blut* 60(1):41-47. <https://doi.org/10.1007/BF01720202>.
- Vaishnav DD, Babeu L. 1987. Comparison of occurrence and rates of chemical biodegradation in natural waters. *Bull Environ Contam Toxicol* 39:237-244. <https://doi.org/10.1007/BF01689412>.
- Valentine JL, Seaton MJ, Asgharian B. 1996b. Benzene metabolism and toxicity in transgenic CYP2E1 knockout mice. *Toxicologist* 30(1):73.
- Valentine JL, Lee SS, Seaton MJ, et al. 1996a. Reduction of benzene metabolism and toxicity in mice that lack CYP2E1 expression. *Toxicol Appl Pharmacol* 141(1):205-213. [https://doi.org/10.1016/S0041-008X\(96\)80026-3](https://doi.org/10.1016/S0041-008X(96)80026-3).
- van Sittert NJ, Boogaard PJ, Beulink GD. 1993. Application of the urinary S-phenylmercapturic acid test as a biomarker for low levels of exposure to benzene in industry. *Br J Ind Med* 50(5):460-469. <https://doi.org/10.1136/oem.50.5.460>.
- van Wijngaarden E, Stewart PA. 2003. Critical literature review of determinants and levels of occupational benzene exposure for United States community-based case-control studies. *Appl Occup Environ Hyg* 18(9):678-693. <https://doi.org/10.1080/10473220301376>.
- Van Winkle MR, Scheff PA. 2001. Volatile organic compounds, polycyclic aromatic hydrocarbons and elements in the air of ten urban homes. *Indoor Air* 11(1):49-64. <https://doi.org/10.1034/j.1600-0668.2001.011001049.x>.
- Vermeulen R, Lan Q, Qu Q, et al. 2023. Nonlinear low dose hematotoxicity of benzene; a pooled analyses of two studies among Chinese exposed workers. *Environ Int* 177:108007. <https://doi.org/10.1016/j.envint.2023.108007>.
- Vieira I, Sonnier M, Cresteil T. 1996. Developmental expression of CYP2E1 in the human liver: Hypermethylation control of gene expression during the neonatal period. *Eur J Biochem* 238:476-483.
- Vigliani EC, Forni A. 1976. Benzene and leukemia. *Environ Res* 11:122-127.
- Vlaanderen J, Lan Q, Kromhout H, et al. 2011. Occupational benzene exposure and the risk of lymphoma subtypes: a meta-analysis of cohort studies incorporating three study quality dimensions. *Environ Health Perspect* 119(2):159-167. <https://doi.org/10.1289/ehp.1002318>.
- Vlaanderen J, Lan Q, Kromhout H, et al. 2012. Occupational benzene exposure and the risk of chronic myeloid leukemia: a meta-analysis of cohort studies incorporating study quality dimensions. *Am J Ind Med* 55(9):779-785. <https://doi.org/10.1002/ajim.22087>.
- Vogel E, Günther H. 1967. Benzene oxide-oxepin valence tautomerism. *Angew Chem Int Ed Engl* 6(5):385-476. <https://doi.org/10.1002/anie.196703851>.

8. REFERENCES

- Vogel TM, Grbić-Galić D. 1986. Incorporation of oxygen from water into toluene and benzene during anaerobic fermentative transformation. *Appl Environ Microbiol* 52:200-202. <https://doi.org/10.1128/aem.52.1.200-202.1986>.
- Waidyanatha S, Rothman N, Fustinoni S, et al. 2001. Urinary benzene as a biomarker of exposure among occupationally exposed and unexposed subjects. *Carcinogenesis* 22(2):279-286. <https://doi.org/10.1093/CARCIN/22.2.279>.
- Waidyanatha S, Rothman N, Li G, et al. 2004. Rapid determination of six urinary benzene metabolites in occupationally exposed and unexposed subjects. *Anal Biochem* 327(2):184-199. <https://doi.org/10.1016/j.ab.2004.01.008>.
- Wallace LA. 1989a. Major sources of benzene exposure. *Environ Health Perspect* 82:165-169. <https://doi.org/10.1289/EHP.8982165>.
- Wallace LA. 1989b. The exposure of the general population to benzene. *Cell Biol Toxicol* 5(3):297-314. <https://doi.org/10.1007/BF01795358>.
- Wallace LA. 1995. Human exposure to environmental pollutants: a decade of experience. *Clin Exp Allergy* 25:4-9.
- Wallace LA, Pellizzari ED. 1986. Personal air exposure and breath concentrations of benzene and other volatile hydrocarbons for smokers and nonsmokers. *Toxicol Lett* 35:113-116. [https://doi.org/10.1016/0378-4274\(87\)90094-4](https://doi.org/10.1016/0378-4274(87)90094-4).
- Wallace LA, Pellizzari ED, Hartwell TD, et al. 1987. Exposures to benzene and other volatile compounds from active and passive smoking. *Arch Environ Health* 42:272-279. <https://doi.org/10.1080/00039896.1987.9935820>.
- Wallace LA, Nelson WC, Ziegenfus R, et al. 1991. The Los Angeles team study: Personal exposures, indoor-outdoor air concentrations, and breath concentrations of 25 volatile organic compounds. *J Expo Anal Environ Epidemiol* 1(2):157-192.
- Wang Q, Ye R, Ye YJ, et al. 2012. mRNA expression levels among cell regulatory and DNA damage genes in benzene-exposed workers in China. *J Occup Environ Med* 54(12):1467-1470. <https://doi.org/10.1097/JOM.0b013e318223d56c>.
- Wang B, Han L, Wang K, et al. 2021a. Gender differences in hematotoxicity of benzene-exposed workers, three cross-sectional studies on 218,061 subjects. *Environ Sci Pollut Res Int* 28(40):57297-57307. <https://doi.org/10.1007/s11356-021-14657-0>.
- Wang J, Guo X, Chen Y, et al. 2021b. Association between benzene exposure, serum levels of cytokines and hematological measures in Chinese workers: A cross-sectional study. *Ecotoxicol Environ Saf* 207:111562. <https://doi.org/10.1016/j.ecoenv.2020.111562>.
- Wang TS, Tian W, Fang Y, et al. 2021c. Changes in miR-222 expression, DNA repair capacity, and MDM2-p53 axis in association with low-dose benzene genotoxicity and hematotoxicity. *Sci Total Environ* 765:142740. <https://doi.org/10.1016/j.scitotenv.2020.142740>.
- Wang T, Cao Y, Xia Z, et al. 2024. Review on novel toxicological effects and personalized health hazard in workers exposed to low doses of benzene. *Arch Toxicol* 98(2):365-374. <https://doi.org/10.1007/s00204-023-03650-w>.
- Ward CO, Kuna RA, Snyder NK, et al. 1985. Subchronic inhalation toxicity of benzene in rats and mice. *Am J Ind Med* 7(5-6):457-473. <https://doi.org/10.1002/ajim.4700070510>.
- Ward JB, Ammenheuser MM, Ramanujam VMS, et al. 1992. The mutagenic effects of low level sub-acute inhalation exposure to benzene in CD-1 mice. *Mutat Res* 268(1):49-57. [https://doi.org/10.1016/0027-5107\(92\)90082-D](https://doi.org/10.1016/0027-5107(92)90082-D).
- Ward E, Hornung R, Morris J, et al. 1996. Risk of low red or white blood cell count related to estimated benzene exposure in a rubberworker cohort (1940-1975). *Am J Ind Med* 29(3):247-257. [https://doi.org/10.1002/\(SICI\)1097-0274\(199603\)29:3<247::AID-AJIM4>3.0.CO;2-N](https://doi.org/10.1002/(SICI)1097-0274(199603)29:3<247::AID-AJIM4>3.0.CO;2-N).
- Weisel CP. 2010. Benzene exposure: an overview of monitoring methods and their findings. *Chem Biol Interact* 184(1-2):58-66. <https://doi.org/10.1016/j.cbi.2009.12.030>.
- Weisel CP, Alimokhtari S, Sanders PF. 2008. Indoor air VOC concentrations in suburban and rural New Jersey. *Environ Sci Technol* 42(22):8231-8238. <https://doi.org/10.1021/es8005223>.

8. REFERENCES

- Wells MS, Nerland DE. 1991. Hematotoxicity and concentration-dependent conjugation of phenol in mice following inhalation exposure to benzene. *Toxicol Lett* 56:159-166. [https://doi.org/10.1016/0378-4274\(91\)90102-c](https://doi.org/10.1016/0378-4274(91)90102-c).
- Wester RC, Maibach HI, Gruenke LD, et al. 1986. Benzene levels in ambient air and breath of smokers and nonsmokers in urban and pristine environments. *J Toxicol Environ Health* 18:567-573. <https://doi.org/10.1080/15287398609530894>.
- Wetmore BA, Struve MF, Gao P, et al. 2008. Genotoxicity of intermittent co-exposure to benzene and toluene in male CD-1 mice. *Chem Biol Interact* 173(3):166-178. <https://doi.org/10.1016/j.cbi.2008.03.012>.
- White MC, Johnson CA, Ashley, et al. 1993. Exposure to methyl tertiary-butyl ether from oxygenated gasoline in Stamford, Connecticut. *Arch Environ Health* 50(3):183-189. <https://doi.org/10.1080/00039896.1995.9940385>.
- WHO. 2010. Benzene. WHO guidelines for indoor air quality: Selected pollutants. World Health Organization. 15-49. <https://www.who.int/publications/i/item/9789289002134>. April 25, 2012.
- WHO. 2022. Guidelines for drinking-water quality. Fourth edition incorporating the first and second addenda. Geneva: World Health Organization. <https://www.who.int/publications/i/item/9789240045064>. September 18, 2023.
- Wiester MJ, Winsett DW, Richards JH, et al. 2002. Partitioning of benzene in blood; Influence of hemoglobin type in humans and animals. *Environ Health Perspect* 110(3):255-261. <https://doi.org/10.1289/EHP.02110255>.
- Williams GM, Tong C, Ved BS. 1985. Tests with the rat hepatocyte primary culture/DNA-repair test. *Prog Mutat Res* 5:341-345.
- Williams AD, Grantz KL, Zhang C, et al. 2019. Ambient volatile organic compounds and racial/ethnic disparities in gestational diabetes mellitus: Are Asian/Pacific Islander women at greater risk? *Am J Epidemiol* 188(2):389-397. <https://doi.org/10.1093/aje/kwy256>.
- Wilson BH, Smith GB, Rees JF. 1986. Biotransformation of selected alkylbenzenes and halogenated hydrocarbons in methanogenic aquifer material: A microcosm study. *Environ Sci Technol* 20:997-1002.
- Winek CL, Collom WD. 1971. Benzene and toluene fatalities. *J Occup Med* 13:259-261.
- Winek CL, Collom WD, Wecht CH. 1967. Fatal benzene exposure by glue sniffing. *Lancet* 1(7491):683. [https://doi.org/10.1016/s0140-6736\(67\)92578-0](https://doi.org/10.1016/s0140-6736(67)92578-0).
- Witz G, Rao GS, Goldstein BD. 1985. Short-term toxicity of trans,trans-muconialdehyde. *Toxicol Appl Pharmacol* 80:511-516.
- Witz G, Kirley TA, Maniara WM, et al. 1990a. The metabolism of benzene to muconic acid, a potential biological marker of benzene exposure. *Adv Exp Med Biol* 283:613-618. https://doi.org/10.1007/978-1-4684-5877-0_77.
- Witz G, Maniara W, Mylavarapu V, et al. 1990b. Comparative metabolism of benzene and trans,trans-muconaldehyde to trans,trans-muconic acid in DBA/2N and C57BL/6 mice. *Biochem Pharmacol* 40:1275-1280. [https://doi.org/10.1016/0006-2952\(90\)90393-Y](https://doi.org/10.1016/0006-2952(90)90393-Y).
- Witz G, Zhang Z, Goldstein BD. 1996. Reactive ring-opened aldehyde metabolites in benzene toxicity. *Environ Health Perspect* 104(Suppl 6):1195-1199. <https://doi.org/10.1289/EHP.961041195>.
- Wolf MA, Rowe VK, McCollister DD, et al. 1956. Toxicological studies of certain alkylated benzene and benzene; experiments on laboratory animals. *AMA Arch Ind Health* 14(4):387-398.
- Wong O. 1995. Risk of acute myeloid leukaemia and multiple myeloma in workers exposed to benzene. *Occup Environ Med* 52:380-384. <https://doi.org/10.1136/oem.52.6.380>.
- Wong O, Raabe GK. 1997. Multiple myeloma and benzene exposure in a multinational cohort of more than 250,000 petroleum workers. *Regul Toxicol Pharmacol* 26:188-199.
- Wong O, Raabe GK. 2000. Non-Hodgkin's lymphoma and exposure to benzene in a multinational cohort of more than 308,000 petroleum workers, 1937-1996. *J Occup Environ Med* 42(5):554-568.
- Wood JA, Porter ML. 1987. Hazardous pollutants in Class II landfills. *J Air Pollut Control Assoc* 37:609-615.

8. REFERENCES

- WQP. 2023. Benzene. Water quality portal. Advisory Committee on Water Information (ACWI); Agricultural Research Service (ARS); Environmental Protection Agency (EPA); National Water Quality Monitoring Council (NWQMC); United States Geological Survey (USGS). <https://www.waterqualitydata.us/portal/>. January 31, 2024.
- Wu F, Zhang Z, Wan J, et al. 2008. Genetic polymorphisms in hMTH1, hOGG1 and hMYH and risk of chronic benzene poisoning in a Chinese occupational population. *Toxicol Appl Pharmacol* 233(3):447-453. <https://doi.org/10.1016/j.taap.2008.09.008>.
- Yang L, Yu W, Liu WW. 2010. [Effect of benzene exposure at low dose for a long term on regulatory T cells in peripheral blood]. *Zhonghua Lao Dong Wei Sheng Zhi Ye Bing Za Zhi* 28(6):477. (Chinese)
- Yardley-Jones A, Anderson D, Jenkinson PC, et al. 1988. Genotoxic effects in peripheral blood and urine of workers exposed to low level benzene. *Br J Ind Med* 45:694-700. <https://doi.org/10.1136/oem.45.10.694>.
- Yardley-Jones A, Anderson D, Lovell DP, et al. 1990. Analysis of chromosomal aberrations in workers exposed to low level benzene. *Br J Ind Med* 47(1):48-51. <https://doi.org/10.1136/oem.47.1.48>.
- Ye LL, Zhang GH, Huang JW, et al. 2015. Are polymorphisms in metabolism protective or a risk for reduced white blood cell counts in a Chinese population with low occupational benzene exposures? *Int J Occup Environ Health* 21(3):232-240. <https://doi.org/10.1179/2049396714y.0000000091>.
- Yin SN, Li GL, Tain FD, et al. 1987a. Leukemia in benzene workers: A retrospective cohort study. *Br J Ind Med* 44:124-128.
- Yin S, Li G, Hu Y, et al. 1987b. Symptoms and signs of workers exposed to benzene, toluene or the combination. *Ind Health* 25:113-130. <https://doi.org/10.2486/indhealth.25.113>.
- Yin SN, Li Q, Liu Y, et al. 1987c. Occupational exposure to benzene in China. *Br J Ind Med* 44:192-195. <https://doi.org/10.1136/oem.44.3.192>.
- Yin SN, Li GL, Tain FD, et al. 1989. A retrospective cohort study of leukemia and other cancers in benzene workers. *Environ Health Perspect* 82:207-213. <https://doi.org/10.1289/EHP.8982207>.
- Yin SN, Hayes RB, Linet MS, et al. 1996a. A cohort study of cancer among benzene-exposed workers in China: Overall results. *Am J Ind Med* 29(3):227-235. [https://doi.org/10.1002/\(SICI\)1097-0274\(199603\)29:3<227::AID-AJIM2>3.0.CO;2-N](https://doi.org/10.1002/(SICI)1097-0274(199603)29:3<227::AID-AJIM2>3.0.CO;2-N).
- Yin SN, Hayes RB, Linet MS, et al. 1996b. An expanded cohort study of cancer among benzene-exposed workers in China. *Environ Health Perspect* 104(Suppl 6):1339-1341. <https://doi.org/10.2307/3433187>.
- Yokley K, Tran HT, Pekari K, et al. 2006. Physiologically-based pharmacokinetic modeling of benzene in humans: a Bayesian approach. *Risk Anal* 26(4):925-943. <https://doi.org/10.1111/j.1539-6924.2006.00789.x>.
- Young RJ, Rinsky RA, Infante PF, et al. 1978. Benzene in consumer products. *Science* 199:248.
- Yu R, Weisel CP. 1996. Measurement of benzene in human breath associated with an environmental exposure. *J Expo Anal Environ Epidemiol* 6(3):261-277.
- Zarani F, Papazafiri P, Kappas A. 1999. Induction of micronuclei in human lymphocytes by organic solvents in vitro. *J Environ Pathol Toxicol Oncol* 18(1):21-28.
- Zelko IN, Dassanayaka S, Malovichko MV, et al. 2021. Chronic benzene exposure aggravates pressure overload-induced cardiac dysfunction. *Toxicol Sci* 185(1):64-76. <https://doi.org/10.1093/toxsci/kfab125>.
- Zhang Z, Goldstein BD, Witz G. 1995a. Iron-stimulated ring-opening of benzene in a mouse liver microsomal system. Mechanistic studies and formation of a new metabolite. *Biochem Pharmacol* 50(10):1607-1617. [https://doi.org/10.1016/0006-2952\(95\)02043-8](https://doi.org/10.1016/0006-2952(95)02043-8).
- Zhang Z, Xiang Q, Glatt H, et al. 1995b. Studies of pathways of ring opening of benzene in a Fenton system. *Free Radic Biol Med* 18(3):411-419.
- Zhang L, Rothman N, Wang Y, et al. 1998a. Increased aneusomy and long arm deletion of chromosomes 5 and 7 in the lymphocytes of Chinese workers exposed to benzene. *Carcinogenesis* 19(11):1955-1961. <https://doi.org/10.1093/CARCIN/19.11.1955>.

8. REFERENCES

- Zhang L, Wang Y, Shang N, et al. 1998b. Benzene metabolites induce the loss and long arm deletion of chromosomes 5 and 7 in human lymphocytes. *Leuk Res* 22(2):105-113.
- Zhang L, Rothman N, Wang Y, et al. 1999. Benzene increases aneuploidy in the lymphocytes of exposed workers: A comparison of data obtained by fluorescence in situ hybridization in interphase and metaphase cells. *Environ Mol Mutagen* 34(4):260-268.
- Zhang J, Yin L, Liang G, et al. 2011. Detection of CYP2E1, a genetic biomarker of susceptibility to benzene metabolism toxicity in immortal human lymphocytes derived from the Han Chinese Population. *Biomed Environ Sci* 24(3):300-309. <https://doi.org/10.3967/0895-3988.2011.03.014>.
- Zhang L, Zhang C, Cheng Z, et al. 2013. Biodegradation of benzene, toluene, ethylbenzene, and o-xylene by the bacterium *Mycobacterium cosmeticum* byf-4. *Chemosphere* 90(4):1340-1347. <https://doi.org/10.1016/j.chemosphere.2012.06.043>.
- Zhang GH, Ye LL, Wang JW, et al. 2014. Effect of polymorphic metabolizing genes on micronucleus frequencies among benzene-exposed shoe workers in China. *Int J Hyg Environ Health* 217(7):726-732. <https://doi.org/10.1016/j.ijheh.2014.03.003>.
- Zhang S, Chen H, Wang A, et al. 2017. Assessment of genotoxicity of four volatile pollutants from cigarette smoke based on the in vitro γ H2AX assay using high content screening. *Environ Toxicol Pharmacol* 55:30-36. <https://doi.org/10.1016/j.etap.2017.07.005>.
- Zhang X, Deng Q, He Z, et al. 2020. Influence of benzene exposure, fat content, and their interactions on erythroid-related hematologic parameters in petrochemical workers: a cross-sectional study. *BMC Public Health* 20(1):382. <https://doi.org/10.1186/s12889-020-08493-z>.
- Zhu H, Li Y, Trush MA. 1995. Differences in xenobiotic detoxifying activities between bone marrow stromal cells from mice and rats: Implications for benzene-induced hematotoxicity. *J Toxicol Environ Health* 46(2):183-201. <https://doi.org/10.1080/15287399509532028>.