

## Supplemental Material

### Title

An Exploratory Study of Air Quality near Natural Gas Operations

### Authors

Theo Colborn, Kim Schultz, Lucille Herrick, Carol Kwiatkowski

Colborn T, Schultz K, Herrick L, and Kwiatkowski C. 2014. An exploratory study of air quality near natural gas operations. *Hum Ecol Risk Assess* 20(1):86-105.

Supplemental material: Table 4 references

**1,2,4-Trimethylbenzene**

- Gralewicz S, Wiaderna D, Tomas T, *et al.* 1997. Behavioral changes following 4-week inhalation exposure to pseudocumene (1,2,4-trimethylbenzene) in the rat. *Neurotoxicol Teratol* 19(4):327-333.
- Gralewicz S, Wiaderna D. 2001. Behavioral effects following subacute inhalation exposure to m-xylene or trimethylbenzene in the rat: a comparative study. *Neurotoxicology* 22(1):79-89.
- Janik-Spiechowicz E, Wyszynska K, Dziubaltowska E. 1998. Genotoxicity evaluation of trimethylbenzenes. *Mutat Res* 412(3):299-305.
- Korsak Z, Rydzynski K, Jajte J. 1997. Respiratory irritative effects of trimethylbenzenes: an experimental animal study. *Int J Occup Med Environ Health* 10(3):303-311.
- Korsak Z, Rydzynski K. 1996. Neurotoxic effects of acute and subchronic inhalation exposure to trimethylbenzene isomers (pseudocumene, mesitylene, hemimellitene) in rats. *Int J Occup Med Environ Health* 9(4):341-349.
- Korsak Z, Stetkiewicz J, Majcherek W, *et al.* 2000. Sub-chronic inhalation toxicity of 1,2,4-trimethylbenzene (pseudocumene) in rats. *Int J Occup Med Environ Health* 13(2):155-164.
- Lutz P, Gralewicz S, Wiaderna D, *et al.* 2010. Contrasting effects of 4-week inhalation exposure to pseudocumene or hemimellitene on sensitivity to amphetamine and propensity to amphetamine sensitization in the rat. *Int J Occup Med Environ Health* 23(1):85-94.
- Maltoni C, Ciliberti A, Pinto C, *et al.* 1997. Results of long-term experimental carcinogenicity studies of the effects of gasoline, correlated fuels, and major gasoline aromatics on rats. *Ann N Y Acad Sci* 837:15-52.
- Myhre O, Fonnum F. 2001. The effect of aliphatic, naphthenic, and aromatic hydrocarbons on production of reactive oxygen species and reactive nitrogen species in rat brain synaptosome fraction: the involvement of calcium, nitric oxide synthase, mitochondria, and phospholipase A. *Biochem Pharmacol* 62(1):119-128.
- Myhre O, Vestad TA, Sagstuen E, *et al.* 2000. The effects of aliphatic (n-nonane), naphthenic (1,2,4-trimethylcyclohexane), and aromatic (1,2,4-trimethylbenzene) hydrocarbons on respiratory burst in human neutrophil granulocytes. *Toxicol Appl Pharmacol* 167(3):222-230.

Saillenfait AM, Gallissot F, Sabate JP, *et al.* 2005. Developmental toxicity of two trimethylbenzene isomers, mesitylene and pseudocumene, in rats following inhalation exposure. *Food Chem Toxicol* 43(7):1055-1063.

### **2-Butanone (MEK)**

Cunningham J, Sharkawi M, Plaa GL. 1989. Pharmacological and metabolic interactions between ethanol and methyl n-butyl ketone, methyl isobutyl ketone, methyl ethyl ketone, or acetone in mice. *Fundam Appl Toxicol* 13(1):102-109.

Raunio H, Liira J, Elovaara E, *et al.* 1990. Cytochrome P450 isozyme induction by methyl ethyl ketone and m-xylene in rat liver. *Toxicol Appl Pharmacol* 103(1):175-179.

Robertson P Jr, White EL, Bus JS. 1989. Effects of methyl ethyl ketone pretreatment on hepatic mixed-function oxidase activity and on in vivo metabolism of n-hexane. *Xenobiotica* 19(7):721-729.

Schwetz BA, Mast TJ, Weigel RJ, *et al.* 1991. Developmental toxicity of inhaled methyl ethyl ketone in Swiss mice. *Fundam Appl Toxicol* 16(4):742-748.

### **2-Methylpentane**

Ono Y, Takeuchi Y, Hisanaga N. 1981. A comparative study on the toxicity of n-hexane and its isomers on the peripheral nerve. *Int Arch Occup Environ Health* 48(3):289-294.

### **3-Methylpentane**

Ono Y, Takeuchi Y, Hisanaga N. 1981. A comparative study on the toxicity of n-hexane and its isomers on the peripheral nerve. *Int Arch Occup Environ Health* 48(3):289-294.

### **Acenaphthylene**

Gupta M, Miggens J, Parrish A, *et al.* 1998. Ah receptor-independent induction of CYP1A2 gene expression in genetically inbred mice. *Environ Toxicol Pharmacol* 5(3):205-213.

Ryu DY, Levi PE, Fernandez-Salguero P, *et al.* 1996. Piperonyl butoxide and acenaphthylene induce cytochrome P450 1A2 and 1B1 mRNA in aromatic hydrocarbon-responsive receptor knock-out mouse liver. *Mol Pharmacol* 50(3):443-446.

Till M, Riebniger D, Schmitz HJ, Schrenk D. 1999. Potency of various polycyclic aromatic hydrocarbons as inducers of CYP1A1 in rat hepatocyte cultures. *Chem Biol Interact* 117(2):135-150.

## Acetaldehyde

- Abe K, Yamaguchi S, Sugiura M, *et al.* 1999. The ethanol metabolite acetaldehyde inhibits the induction of long-term potentiation in the rat dentate gyrus in vivo. *Br J Pharmacol* 127(8):1805-1810.
- Blass JP, Lewis CA. 1973. Inhibition by acetaldehyde of the pyruvate dehydrogenase complex from ox brain and ox kidney. *Biochem J* 131(2):415-416.
- Cannizzaro C, La Barbera M, Plescia F, *et al.* Ethanol modulates corticotropin releasing hormone release from the rat hypothalamus: does acetaldehyde play a role? *Alcohol Clin Exp Res.* 2010; 34(4):588-593.
- Chiba S, Tsukada M. 1988. Possible mechanism of acetaldehyde-induced noradrenaline release from sympathetic nerve terminals in isolated blood vessels. *Br J Pharmacol* 95(1):177-182.
- Cobb CF, Van Thiel DH, Gavaler JS, *et al.* 1981. Effects of ethanol and acetaldehyde on the rat adrenal. *Metabolism.* 30(6):537-543.
- Correa M, Arizzi-Lafrance MN, Salamone JD. 2009. Infusions of acetaldehyde into the arcuate nucleus of the hypothalamus induce motor activity in rats. *Life Sci* 84(11-12):321-327.
- Franco-Perez J, Padilla M, Paz C. 2006. Sleep and brain monoamine changes produced by acute and chronic acetaldehyde administration in rats. *Behav Brain Res* 174(1):86-92.
- Giavini E, Broccia M L, Prati M, *et al.* 1992. Effects of ethanol and acetaldehyde on rat embryos developing in vitro. *In Vitro Cell Dev Biol 28A(3 Pt 1)*:205-210.
- Liu Y, Brymora J, Zhang H, *et al.* 2011. Leptin and acetaldehyde synergistically promotes alphaSMA expression in hepatic stellate cells by an interleukin 6-dependent mechanism. *Alcohol Clin Exp Res* 35(5):921-928.
- McCarroll JA, Phillips PA, Park S, *et al.* 2003. Pancreatic stellate cell activation by ethanol and acetaldehyde: is it mediated by the mitogen-activated protein kinase signaling pathway? *Pancreas* 27(2):150-160.
- Sanchez-Catalan MJ, Hipolito L, Zornoza T, *et al.* 2009. Motor stimulant effects of ethanol and acetaldehyde injected into the posterior ventral tegmental area of rats: role of opioid receptors. *Psychopharmacology (Berl)* 204(4):641-653.
- Sershen H, Shearman E, Fallon S, *et al.* 2009. The effects of acetaldehyde on nicotine-induced transmitter levels in young and adult brain areas. *Brain Res Bull* 79(6):458-462.
- Shiohara E, Tsukada M, Chiba S, *et al.* 1985. Effect of chronic administration of acetaldehyde by inhalation on ( $\text{Na}^+ + \text{K}^+$ )-activated adenosine triphosphatase activity of rat brain membranes. *Toxicology* 34(4):277-284.

Soffritti M, Belpoggi F, Lambertin L, *et al.* 2002. Results of long-term experimental studies on the carcinogenicity of formaldehyde and acetaldehyde in rats. Ann N Y Acad Sci 982:87-105.

Solomon LR. 1988. Effects of acetaldehyde on human red cell metabolism: evidence for the formation of enzyme inhibitors. Clin Chim Acta 175(3):249-265.

Sreenathan RN, Padmanabhan R, Singh S. 1982. Teratogenic effects of acetaldehyde in the rat. Drug Alcohol Depend 9(4):339-350.

Sreenathan RN, Singh S, Padmanabhan R. 1984. Effect of acetaldehyde on skeletogenesis in rats. Drug Alcohol Depend 14(2):165-174.

Sreenathan RN, Singh S, Padmanabhan R. 1984. Implication of the placenta in acetaldehyde-induced intrauterine growth retardation. Drug Alcohol Depend 13(2):199-204.

Tambour S, Didone V, Tirelli E, *et al.* 2006. Locomotor effects of ethanol and acetaldehyde after peripheral and intraventricular injections in Swiss and C57BL/6J mice. Behav Brain Res 172(1):145-154.

WHO, IARC Working Group on the Evaluation of Carcinogenic Risks to Humans. 1999. Acetaldehyde. IARC Monogr Eval Carcinog Risks Hum 71:319-335.

### **Acetone**

Bluzat R, Jonot O, Lespinasse G, *et al.* 1979. Chronic toxicity of acetone in the fresh water snail Lymnea stagnalis. Toxicology 14(2):179-19

Charbonneau M, Brodeur J, du Souich P, *et al.* 1986. Correlation between acetone-potentiated CCl<sub>4</sub>-induced liver injury and blood concentrations after inhalation or oral administration. Toxicol Appl Pharmacol 84(2):286-294.

Chen RM, Ueng TH. 1997. Induction of cytochromes P450 1A, 2B and 2E in hamster tissues by acetone. Arch Toxicol 71(8):489-495.

Cunningham J, Sharkawi M, Plaa GL. 1989. Pharmacological and metabolic interactions between ethanol and methyl n-butyl ketone, methyl isobutyl ketone, methyl ethyl ketone, or acetone in mice. Fundam Appl Toxicol 13(1):102-109.

Dick RB, Brown WD, Setzer JV, *et al.* 1988. Effects of short duration exposures to acetone and methyl ethyl ketone. Toxicol Lett 43(1-3):31-49.

Dick RB, Setzer JV, Taylor BJ, *et al.* 1989. Neurobehavioural effects of short duration exposures to acetone and methyl ethyl ketone. Br J Ind Med 46(2):111-121.

Dietz D. 1991. NTP technical report on the toxicity studies of Acetone in F344/N Rats and B6C3F1 Mice (Drinking Water Studies) (CAS No. 67-64-1). Toxic Rep Ser 3:1-38.

- Lee DE, Pai J, Mullapudui U, *et al.* 2008. The effects of inhaled acetone on place conditioning in adolescent rats. *Pharmacol Biochem Behav* 89(1):101-105.
- Longo V, Ingelman-Sundberg M. 1993. Acetone-dependent regulation of cytochromes P450<sub>2E1</sub> and P450<sub>2B1</sub> in rat nasal mucosa. *Biochem Pharmacol* 46(11):1945-1951.
- Mathias MG, Almeida BB, Bueno JE, *et al.* 2010. Lipid peroxidation and antioxidant system in rats acutely treated with acetone. *Exp Clin Endocrinol Diabetes* 118(6):368-370.
- Pozsgai G, Sandor K, Perkecz A, *et al.* 2007. Topical acetone treatment induces neurogenic oedema on the sensitized mouse ear: an in vivo study using transient receptor potential vanilloid 1 (TRPV1) receptor knockout mice. *Inflamm Res* 56(11):459-467.
- Ronis MJ, Huang J, Longo V, *et al.* 1998. Expression and distribution of cytochrome P450 enzymes in male rat kidney: effects of ethanol, acetone and dietary conditions. *Biochem Pharmacol* 55(2):123-129.
- Sanchez-Catalan MJ, Hipolito L, Guerri C, *et al.* 2008. Distribution and differential induction of CYP2E1 by ethanol and acetone in the mesocorticolimbic system of rat. *Alcohol Alcohol* 43(4):401-407.
- Satoh T, Omae K, Nakashima H, *et al.* 1996. Relationship between acetone exposure concentration and health effects in acetate fiber plant workers. *Int Arch Occup Environ Health* 68(3):147-153.
- Zarnowska I, Luszczki JJ, Zarnowski T, *et al.* 2009. Pharmacodynamic and pharmacokinetic interactions between common antiepileptic drugs and acetone, the chief anticonvulsant ketone body elevated in the ketogenic diet in mice. *Epilepsia* 50(5):1132-1140.
- ### Benzaldehyde
- Demir E, Kocaoglu S, Kaya B. 2010. Assessment of genotoxic effects of benzyl derivatives by the comet assay. *Food Chem Toxicol* 48(5):1239-1242.
- Furman GM, Silverman DM, Schatz RA. 1998. Inhibition of rat lung mixed-function oxidase activity following repeated low-level toluene inhalation: possible role of toluene metabolites. *J Toxicol Environ Health A* 54(8):633-645.
- Kluwe WM, Montgomery CA, Giles HD, *et al.* 1983. Encephalopathy in rats and nephropathy in rats and mice after subchronic oral exposure to benzaldehyde. *Food Chem Toxicol* 21(3):245-250.
- Lacroix G, Tissot S, Rogerieux F, *et al.* 2002. Decrease in ovalbumin-induced pulmonary allergic response by benzaldehyde but not acetaldehyde exposure in a Guinea pig model. *J Toxicol Environ Health A* 65(14):995-1012.

Laham S, Broxup B, Robinet M, *et al.* 1991. Subacute inhalation toxicity of benzaldehyde in the Sprague-Dawley rat. *Am Ind Hyg Assoc J* 52(12):503-510.

Mattia CJ, Adams JD Jr, Bondy SC. 1993. Free radical induction in the brain and liver by products of toluene catabolism. *Biochem Pharmacol* 46(1):103-110.

Philips N, Burchill D, O'Donoghue D, *et al.* 2004. Identification of benzene metabolites in dermal fibroblasts as nonphenolic: regulation of cell viability, apoptosis, lipid peroxidation and expression of matrix metalloproteinase 1 and elastin by benzene metabolites. *Skin Pharmacol Physiol* 17(3):147-152.

Tabatabaie T, Floyd RA. 1996. Inactivation of glutathione peroxidase by benzaldehyde. *Toxicol Appl Pharmacol* 141(2):389-393.

## Benzene

ATSDR. 2007. Toxicological Profile for Benzene. Atlanta GA: Department of Health & Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry. 438 pp.

Au WW, Ramanujam VM, Ward JB Jr, *et al.* 1991. Chromosome aberrations in lymphocytes of mice after sub-acute low-level inhalation exposure to benzene. *Mutat Res* 260(2):219-224.

Badham HJ, Renaud SJ, Wan J, *et al.* 2010. Benzene-initiated oxidative stress: Effects on embryonic signaling pathways. *Chem Biol Interact* 184(1-2):218-221.

Badham HJ, Winn LM. 2010. In utero and in vitro effects of benzene and its metabolites on erythroid differentiation and the role of reactive oxygen species. *Toxicol Appl Pharmacol* 244(3):273-279.

Boley SE, Wong VA, French JE, *et al.* 2002. p53 heterozygosity alters the mRNA expression of p53 target genes in the bone marrow in response to inhaled benzene. *Toxicol Sci* 66(2):209-215.

Fan XH. 1992. Effect of exposure to benzene on natural killer (NK) cell activity and interleukin-2 (IL-2) production of C57BL/6 mice. *Nippon Ika Daigaku Zasshi* 59(5):393-399.

Giuliano M, Stellavato A, Cammarota M, *et al.* 2009. Effects of low concentrations of benzene on human lung cells in vitro. *Toxicol Lett* 188(2):130-136.

Hirabayashi Y, Inoue T. 2010. Benzene-induced bone-marrow toxicity: a hematopoietic stem-cell-specific, aryl hydrocarbon receptor-mediated adverse effect. *Chem Biol Interact* 184(1-2):252-258.

- 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.
- 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.
- Lupo PJ, Symanski E, Waller DK, *et al.* 2011. Maternal exposure to ambient levels of benzene and neural tube defects among offspring: Texas, 1999-2004. *Environ Health Perspect* 119(3):397-402.
- NTP. 1986 Apr. NTP Toxicology and carcinogenesis studies of benzene (CAS No. 71-43-2) in F344/N rats and B6C3F1 mice (gavage studies). *Natl Toxicol Program Tech Rep Ser* 289:1-277.
- Pandey AK, Gurbani D, Bajpayee M, *et al.* 2009. In silico studies with human DNA topoisomerase-II alpha to unravel the mechanism of in vitro genotoxicity of benzene and its metabolites. *Mutat Res* 661(1-2):57-70.
- Rithidech K, Au WW, Ramanujam VM, *et al.* 1987. Induction of chromosome aberrations in lymphocytes of mice after subchronic exposure to benzene. *Mutat Res* 188(2):135-140.
- WHO, IARC Working Group on the Evaluation of Carcinogenic Risks to Humans. 1987. Benzene (Group 1). *IARC Monogr Eval Carcinog Risks Hum Suppl* 7:120-122.
- Yoon BI, Hirabayashi Y, Kawasaki Y, *et al.* 2001. Mechanism of action of benzene toxicity: cell cycle suppression in hemopoietic progenitor cells (CFU-GM). *Exp Hematol* 29(3):278-285.
- Yoon BI, Hirabayashi Y, Kawasaki Y, *et al.* 2004. Exacerbation of benzene pneumotoxicity in connexin 32 knockout mice: enhanced proliferation of CYP2E1-immunoreactive alveolar epithelial cells. *Toxicology* 195(1):19-29.
- Benzo(a)anthracene**
- Fang WF, Strobel HW. 1982. Effects of cyclophosphamide and polycyclic aromatic hydrocarbons on cell growth and mixed-function oxidase activity in a human colon tumor cell line. *Cancer Res* 42(9):3676-3681.
- Forster U, Luippold G, Schwarz LR. 1986. Induction of monooxygenase and UDP-glucuronosyltransferase activities in primary cultures of rat hepatocytes. *Drug Metab Dispos* 14(3):353-360.
- Khan IU, Bickers DR, Haqqi TM, *et al.* 1992. Induction of CYP1A1 mRNA in rat epidermis and cultured human epidermal keratinocytes by benz(a)anthracene and beta-naphthoflavone. *Drug Metab Dispos* 20(5):620-624.

Nakama A, Kuroda K, Yamada A. 1995. Induction of cytochrome P450-dependent monooxygenase in serum-free cultured Hep G2 cells. *Biochem Pharmacol* 50(9):1407-1412.

Shimada T, Inoue K, Suzuki Y, *et al.* 2002. Arylhydrocarbon receptor-dependent induction of liver and lung cytochromes P450 1A1, 1A2, and 1B1 by polycyclic aromatic hydrocarbons and polychlorinated biphenyls in genetically engineered C57BL/6J mice. *Carcinogenesis* 23(7):1199-1207.

Skupinska K, Misiewicz I, Kasprzycka-Guttman T. 2007. A comparison of the concentration-effect relationships of PAHs on CYP1A induction in HepG2 and Mcf7 cells. *Arch Toxicol* 81(3):183-200.

WHO, IARC Working Group on the Evaluation of Carcinogenic Risks to Humans. 1983 Apr. Polynuclear Aromatic Compounds, Part 1: Chemical, Environmental and Experimental Data. Summary of Data Reported and Evaluation. IARC Monogr Eval Carcinog Risks Hum 32:477 pp.

### **Benzo(a)pyrene**

Aboutabl ME, Zordoky BN, El-Kadi AO. 2009. 3-methylcholanthrene and benzo(a)pyrene modulate cardiac cytochrome P450 gene expression and arachidonic acid metabolism in male Sprague Dawley rats. *Br J Pharmacol* 158(7):1808-1819.

Albert RE, Miller ML, Cody TE, Talaska G, *et al.* 1996. Epidermal cytokinetics, DNA adducts, and dermal inflammation in the mouse skin in response to repeated benzo[a]pyrene exposures. *Toxicol Appl Pharmacol* 136(1):67-74.

Archibong AE, Ramesh A, Niaz MS, *et al.* 2008. Effects of benzo(a)pyrene on intra-testicular function in F-344 rats. *Int J Environ Res Public Health* 5(1):32-40.

Booker CD, White KL Jr. 2005. Benzo(a)pyrene-induced anemia and splenomegaly in NZB/WF1 mice. *Food Chem Toxicol* 43(9):1423-1431.

Bouayed J, Desor F, Rammal H, *et al.* 2009. Effects of lactational exposure to benzo[alpha]pyrene (B[alpha]P) on postnatal neurodevelopment, neuronal receptor gene expression and behaviour in mice. *Toxicology* 259(3):97-106.

Bouayed J, Desor F, Soulimani R. 2009. Subacute oral exposure to benzo[alpha]pyrene (B[alpha]P) increases aggressiveness and affects consummatory aspects of sexual behaviour in male mice. *J Hazard Mater* 169(1-3):581-585.

Briede JJ, Godschalk RW, Emans MT, *et al.* 2004. In vitro and in vivo studies on oxygen free radical and DNA adduct formation in rat lung and liver during benzo[a]pyrene metabolism. *Free Radic Res* 38(9):995-1002.

- Brown LA, Khousbouei H, Goodwin JS, *et al.* 2007. Down-regulation of early ionotropic glutamate receptor subunit developmental expression as a mechanism for observed plasticity deficits following gestational exposure to benzo(a)pyrene. *Neurotoxicology* 28(5):965-978.
- Carlson EA, Li Y, Zelikoff JT. 2004. Benzo[a]pyrene-induced immunotoxicity in Japanese medaka (*Oryzias latipes*): relationship between lymphoid CYP1A activity and humoral immune suppression. *Toxicol Appl Pharmacol* 201(1):40-52.
- De Jong WH, Kroese ED, Vos JG, *et al.* 1999. Detection of immunotoxicity of benzo[a]pyrene in a subacute toxicity study after oral exposure in rats. *Toxicol Sci* 50(2):214-220.
- Dong W, Wang L, Thornton C, *et al.* 2008. Benzo(a)pyrene decreases brain and ovarian aromatase mRNA expression in *Fundulus heteroclitus*. *Aquat Toxicol* 88(4):289-300.
- Hatzi VI, Terzoudi GI, Stavropoulou C, Malik SI, *et al.* 2011. Lack of association between GSTT1 polymorphism and endogenous or benzo[a]pyrene-induced sister chromatid exchanges as analyzed in metaphase or G2-phase lymphocytes. *Mol Biol Rep* 38(6):3959-3966.
- He C, Zuo Z, Shi X, Li R, *et al.* 2011. Effects of benzo(a)pyrene on the skeletal development of *Sebastiscus marmoratus* embryos and the molecular mechanism involved. *Aquat Toxicol* 101(2):335-341.
- Kristensen P, Eilertsen E, Einarsdottir E, *et al.* 1995. Fertility in mice after prenatal exposure to benzo[a]pyrene and inorganic lead. *Environ Health Perspect* 103(6):588-590.
- Lu LJ, Disher RM, Reddy MV, *et al.* 1986. 32P-postlabeling assay in mice of transplacental DNA damage induced by the environmental carcinogens safrole, 4-aminobiphenyl, and benzo(a)pyrene. *Cancer Res* 46(6):3046-3054.
- McCallister MM, Maguire M, Ramesh A, *et al.* 2008. Prenatal exposure to benzo(a)pyrene impairs later-life cortical neuronal function. *Neurotoxicology* 29(5):846-854.
- Mohamed el-SA, Song WH, Oh SA, *et al.* 2010. The transgenerational impact of benzo(a)pyrene on murine male fertility. *Hum Reprod* 25(10):2427-2433.
- Nakayama A, Riesen I, Kollner B, *et al.* 2008. Surface marker-defined head kidney granulocytes and B lymphocytes of rainbow trout express benzo[a]pyrene-inducible cytochrome P4501A protein. *Toxicol Sci* 103(1):86-96.
- Neal MS, Zhu J, Holloway AC, *et al.* 2007. Follicle growth is inhibited by benzo-[a]-pyrene, at concentrations representative of human exposure, in an isolated rat follicle culture assay. *Hum Reprod* 22(4):961-967.

- Verhofstad N, van Oostrom CT, van Benthem J, *et al.* 2010. DNA adduct kinetics in reproductive tissues of DNA repair proficient and deficient male mice after oral exposure to benzo(a)pyrene. *Environ Mol Mutagen* 51(2):123-129.
- Wang MY, Lu LJ. 1990. Differential effect of gestation stage on benzo(a)pyrene-induced micronucleus formation and/or covalent DNA modifications in mice. *Cancer Res* 50(7):2146-2151.
- WHO, IARC Working Group on the Evaluation of Carcinogenic Risks to Humans. 1983 Apr. Polynuclear Aromatic Compounds, Part 1: Chemical, Environmental and Experimental Data. Summary of Data Reported and Evaluation. IARC Monogr Eval Carcinog Risks Hum 32:477 pp.
- Wu J, Ramesh A, Nayyar T, *et al.* 2003. Assessment of metabolites and AhR and CYP1A1 mRNA expression subsequent to prenatal exposure to inhaled benzo(a)pyrene. *Int J Dev Neurosci* 21(6):333-346.
- Benzo(b)fluoranthene**
- Andrysiak Z, Vondracek J, Machala M, *et al.* 2007. The aryl hydrocarbon receptor-dependent deregulation of cell cycle control induced by polycyclic aromatic hydrocarbons in rat liver epithelial cells. *Mutat Res* 615(1-2):87-97.
- Kim A, Park M, Yoon TK, *et al.* 2011. Maternal exposure to benzo[b]fluoranthene disturbs reproductive performance in male offspring mice. *Toxicol Lett* 203(1):54-61.
- Lu GH, Wang C, Zhu Z. 2009. The dose-response relationships for EROD and GST induced by polyaromatic hydrocarbons in *Carassius auratus*. *Bull Environ Contam Toxicol* 82(2):194-199.
- Nesnow S, Ross JA, Stoner GD, *et al.* 1995. Mechanistic linkage between DNA adducts, mutations in oncogenes and tumorigenesis of carcinogenic environmental polycyclic aromatic hydrocarbons in strain A/J mice. *Toxicology* 105(2-3):403-413.
- Pushparajah DS, Umachandran M, Nazir T, *et al.* 2008. Up-regulation of CYP1A/B in rat lung and liver, and human liver precision-cut slices by a series of polycyclic aromatic hydrocarbons; association with the Ah locus and importance of molecular size. *Toxicol In Vitro* 22(1):128-145.
- Shimada T, Inoue K, Suzuki Y, *et al.* 2002. Arylhydrocarbon receptor-dependent induction of liver and lung cytochromes P450 1A1, 1A2, and 1B1 by polycyclic aromatic hydrocarbons and polychlorinated biphenyls in genetically engineered C57BL/6J mice. *Carcinogenesis* 23(7):1199-1207.

WHO, IARC Working Group on the Evaluation of Carcinogenic Risks to Humans. 1983 Apr. Polynuclear Aromatic Compounds, Part 1: Chemical, Environmental and Experimental Data. Summary of Data Reported and Evaluation. IARC Monogr Eval Carcinog Risks Hum 32:477 pp.

### **Benzo(g,h,i)perylene**

WHO, IARC Working Group on the Evaluation of Carcinogenic Risks to Humans. 1983 Apr. Polynuclear Aromatic Compounds, Part 1: Chemical, Environmental and Experimental Data. Summary of Data Reported and Evaluation. IARC Monogr Eval Carcinog Risks Hum 32:477 pp.

### **Benzo(k)fluoranthene**

Bado-Nilles A, Quentel C, Thomas-Guyon H, *et al.* 2009. Effects of two oils and 16 pure polycyclic aromatic hydrocarbons on plasmatic immune parameters in the European sea bass, *Dicentrarchus labrax* (Linne). *Toxicol In Vitro* 23(2):235-241.

Billiard SM, Bols NC, Hodson PV. 2004. In vitro and in vivo comparisons of fish-specific CYP1A induction relative potency factors for selected polycyclic aromatic hydrocarbons. *Ecotoxicol Environ Saf* 59(3):292-299.

Bols NC, Schirmer K, Joyce EM, *et al.* 1999. Ability of polycyclic aromatic hydrocarbons to induce 7-ethoxyresorufin-o-deethylase activity in a trout liver cell line. *Ecotoxicol Environ Saf* 44(1):118-128.

Brunstrom B, Halldin K. 1998. EROD induction by environmental contaminants in avian embryo livers. *Comp Biochem Physiol C Pharmacol Toxicol Endocrinol* 121(1-3):213-219.

Jeon TW, Jin CH, Lee SK, *et al.* 2005. In vivo and in vitro immunosuppressive effects of benzo[k]fluoranthene in female Balb/c mice. *J Toxicol Environ Health A* 68(23-24):2033-2050.

Kummer V, Maskova J, Zraly Z, *et al.* 2008. Estrogenic activity of environmental polycyclic aromatic hydrocarbons in uterus of immature Wistar rats. *Toxicol Lett* 180(3):212-221.

LaVoie EJ, Hecht SS, Amin S, *et al.* 1980. Identification of mutagenic dihydrodiols as metabolites of benzo(j)fluoranthene and benzo(k)fluoranthene. *Cancer Res* 40(12):4528-4532.

WHO, IARC Working Group on the Evaluation of Carcinogenic Risks to Humans. 1983 Apr. Polynuclear Aromatic Compounds, Part 1: Chemical, Environmental and Experimental Data. Summary of Data Reported and Evaluation. IARC Monogr Eval Carcinog Risks Hum 32:477 pp.

## **Butyraldehyde**

Walker RB, Fitz LD, Williams LM, *et al.* 1996. The effect on ephedrine prodrugs on locomotor activity in rats. *Gen Pharmacol* 27(1):109-111.

## **Chrysene**

ATSDR. 1995. Toxicological Profile for Polycyclic Aromatic Hydrocarbons. Atlanta GA: Department of Health & Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry. 487 pp.

Babich H, Sardana MK, Borenfreund E. 1988. Acute cytotoxicities of polynuclear aromatic hydrocarbons determined in vitro with the human liver tumor cell line, HepG2. *Cell Biol Toxicol* 4(3):295-309.

Bado-Nilles A, Gagnaire B, Thomas-Guyon H, *et al.* 2008. Effects of 16 pure hydrocarbons and two oils on haemocyte and haemolymphatic parameters in the Pacific oyster, *Crassostrea gigas* (Thunberg). *Toxicology In Vitro* 22(6):1610-1617.

Elovaara E, Mikkola J, Stockmann-Juvala H, *et al.* 2007. Polycyclic aromatic hydrocarbon (PAH) metabolizing enzyme activities in human lung, and their inducibility by exposure to naphthalene, phenanthrene, pyrene, chrysene, and benzo(a)pyrene as shown in the rat lung and liver. *Arch Toxicol* 81(3):169-182.

Falahatpisheh MH, Donnelly KC, Ramos KS. 2001. Antagonistic interactions among nephrotoxic polycyclic aromatic hydrocarbons. *J Toxicol Environ Health A* 62(7):543-560.

Grover PL, Sims P, Mitchley BC, *et al.* 1975. The carcinogenicity of polycyclic hydrocarbon epoxides in newborn mice. *Br J Cancer* 31(2):182-188.

Peden-Adams MM, Liu J, Knutson S, *et al.* 2007. Alterations in immune function and CYP450 activity in adult male deer mice (*Peromyscus maniculatus*) following exposure to benzo[a]pyrene, pyrene, or chrysene. *J Toxicol Environ Health A* 70(21):1783-1791

WHO, IARC Working Group on the Evaluation of Carcinogenic Risks to Humans. 1983 Apr. Polynuclear Aromatic Compounds, Part 1: Chemical, Environmental and Experimental Data. Summary of Data Reported and Evaluation. IARC Monogr Eval Carcinog Risks Hum 32:477 pp.

## **Crotonaldehyde**

Andre E, Campi B, Materazzi S, *et al.* 2008. Cigarette smoke-induced neurogenic inflammation is mediated by alpha,beta-unsaturated aldehydes and the TRPA1 receptor in rodents. *J Clin Invest* 118(7):2574-2582.

- Bridges RB, Hsieh L, Haack DG. 1980. Effects of cigarette smoke and its constituents on the adherence of polymorphonuclear leukocytes. *Infect Immun* 29(3):1096-1101.
- Bridges RB, Kraal JH, Huang LJ, *et al.* 1977. Effects of cigarette smoke components on in vitro chemotaxis of human polymorphonuclear leukocytes. *Infect Immun* 16(1):240-248.
- Budiawan, Eder E. 2000. Detection of 1,N(2)-propanodeoxyguanosine adducts in DNA of Fischer 344 rats by an adapted (32)P-post-labeling technique after per os application of crotonaldehyde. *Carcinogenesis* 21(6):1191-1196.
- Chung FL, Tanaka T, Hecht SS. 1986. Induction of liver tumors in F344 rats by crotonaldehyde. *Cancer Res* 46(3):285-289.
- Cooper KO, Witmer CM, Witz G. 1987. Inhibition of microsomal cytochrome c reductase activity by a series of alpha, beta-unsaturated aldehydes. *Biochem Pharmacol* 36(5):627-631.
- Dexheimer TS, Kozekova A, Rizzo CJ, *et al.* 2008. The modulation of topoisomerase I-mediated DNA cleavage and the induction of DNA-topoisomerase I crosslinks by crotonaldehyde-derived DNA adducts. *Nucleic Acids Res* 36(12):4128-4136.
- Dicker E, Cederbaum AI. 1984. Inhibition of the oxidation of acetaldehyde and formaldehyde by hepatocytes and mitochondria by crotonaldehyde. *Arch Biochem Biophys* 234(1):187-196.
- Dicker E, Cederbaum AI. 1986. Inhibition of CO<sub>2</sub> production from aminopyrine or methanol by cyanamide or crotonaldehyde and the role of mitochondrial aldehyde dehydrogenase in formaldehyde oxidation. *Biochim Biophys Acta* 883(1):91-97.
- Dittberner U, Eisenbrand G, Zankl H. 1995. Genotoxic effects of the alpha, beta-unsaturated aldehydes 2-trans-butenal, 2-trans-hexenal and 2-trans, 6-cis-nonadienal. *Mutat Res* 335(3):259-265.
- Eisenbrand G, Schuhmacher J, Golzer P. 1995. The influence of glutathione and detoxifying enzymes on DNA damage induced by 2-alkenals in primary rat hepatocytes and human lymphoblastoid cells. *Chem Res Toxicol* 8(1):40-46.
- Grundfest CC, Chang J, Newcombe D. 1982. Acrolein: a potent modulator of lung macrophage arachidonic acid metabolism. *Biochim Biophys Acta* 713(1):149-159.
- Iersel ML, Ploemen JP, Struik I, *et al.* 1996. Inhibition of glutathione S-transferase activity in human melanoma cells by alpha,beta-unsaturated carbonyl derivatives. Effects of acrolein, cinnamaldehyde, citral, crotonaldehyde, curcumin, ethacrynic acid, and trans-2-hexenal. *Chem Biol Interact* 102(2):117-132.

- Jha AM, Kumar M. 2006. In vivo evaluation of induction of abnormal sperm morphology in mice by an unsaturated aldehyde crotonaldehyde. *Mutat Res* 603(2):159-163.
- Jha AM, Singh AC, Sinha U, *et al.* 2007. Genotoxicity of crotonaldehyde in the bone marrow and germ cells of laboratory mice. *Mutat Res* 632(1-2):69-77.
- Kawanishi M, Matsuda T, Sasaki G, *et al.* 1998. A spectrum of mutations induced by crotonaldehyde in shuttle vector plasmids propagated in human cells. *Carcinogenesis* 19(1):69-72.
- Lambert C, McCue J, Portas M, *et al.* 2005. Acrolein in cigarette smoke inhibits T-cell responses. *J Allergy Clin Immunol* 116(4):916-922.
- Lee SE, Jeong SI, Kim GD, *et al.* 2011. Upregulation of heme oxygenase-1 as an adaptive mechanism for protection against crotonaldehyde in human umbilical vein endothelial cells. *Toxicol Lett* 201(3):240-248.
- Liu XY, Yang ZH, Pan XJ, *et al.* 2010. Crotonaldehyde induces oxidative stress and caspase-dependent apoptosis in human bronchial epithelial cells. *Toxicol Lett* 195(1):90-98.
- Liu XY, Yang ZH, Pan XJ, *et al.* 2010. Gene expression profile and cytotoxicity of human bronchial epithelial cells exposed to crotonaldehyde. *Toxicol Lett* 197(2):113-122.

### **Cyclohexane**

- Bernard AM, de Russis R, Normand JC, *et al.* 1989. Evaluation of the subacute nephrotoxicity of cyclohexane and other industrial solvents in the female Sprague-Dawley rat. *Toxicol Lett* 45(2-3):271-280.
- Gupta KP, Mehrotra NK. 1990. Mouse skin ornithine decarboxylase induction and tumor promotion by cyclohexane. *Cancer Lett* 51(3):227-233.
- Savolainen H, Pfaffli P. 1980. Burden and dose-related neurochemical effects of intermittent cyclohexane vapour inhalation in rats. *Toxicol Lett* 7(1):17-22.

### **Cyclopentane**

- Fang Z, Sonner J, Lesser MJ, *et al.* 1996. Anesthetic and convulsant properties of aromatic compounds and cycloalkanes: implications for mechanisms of narcosis. *Anesth Analg* 83(5):1097-1104.

### **Dibenzo(a,h)anthracene**

- Anderson LM, Ruskie S, Carter J, *et al.* 1995. Fetal mouse susceptibility to transplacental carcinogenesis: Differential influence of Ah receptor phenotype on effects of 3-methylcholanthrene, 12-dimethylbenz[a]anthracene, and benzo[a]pyrene. *Pharmacogenetics* 5(6):364-372.

- Adams LM, Ethier SP, Ullrich RL. 1987. Enhanced in vitro proliferation and in vivo tumorigenic potential of mammary epithelium from BALB/c mice exposed in vivo to gamma-radiation and/or 7,12-dimethylbenz[a]anthracene. *Cancer Res* 47(16):4425-4431.
- Amagase H, Schaffer EM, Milner JA. 1996. Dietary components modify the ability of garlic to suppress 7,12-dimethylbenz(a)anthracene-induced mammary DNA adducts. *J Nutr* 126(4):817-824.
- Andersson AC, Henningsson S, Lundell L, *et al.* 1976. Diamines and polyamines in DMBA-induced breast carcinoma containing mast cells resistant to compound 48/80. *Agents Actions* 6(5):577-583.
- Arif JM, Smith WA, Gupta RC. 1997. Tissue distribution of DNA adducts in rats treated by intramammillary injection with dibenzo[a,l]pyrene, 7,12-dimethylbenz[a]anthracene and benzo[a]pyrene. *Mutat Res* 378(1-2):31-39.
- Azuine MA, Bhide SV. 1992. Chemopreventive effect of turmeric against stomach and skin tumors induced by chemical carcinogens in Swiss mice. *Nutr Cancer* 17(1):77-83.
- Balasenthil S, Ramachandran CR, Nagini S. 2001. S-allylcysteine, a garlic constituent, inhibits 7,12-dimethylbenz[a]anthracene-induced hamster buccal pouch carcinogenesis. *Nutr Cancer* 40(2):165-172.
- Batcioglu K, Karagozler AA, Ozturk IC, *et al.* 2005. Comparison of chemopreventive effects of Vitamin E plus selenium versus melatonin in 7,12-dimethylbenz(a)anthracene-induced mouse brain damage. *Cancer Detect Prev* 29(1):54-58.
- Burchiel SW, Davis DA, Gomez MP, *et al.* 1990. Inhibition of lymphocyte activation in splenic and gut-associated lymphoid tissues following oral exposure of mice to 7,12-dimethylbenz[a]anthracene. *Toxicol Appl Pharmacol* 105(3):434-442.
- Burchiel SW, Hadley WM, Barton SL, *et al.* 1988. Persistent suppression of humoral immunity produced by 7,12-dimethylbenz(A)anthracene (DMBA) in B6C3F1 mice: correlation with changes in spleen cell surface markers detected by flow cytometry. *Int J Immunopharmacol* 10(4):369-376.
- Chen YK, Lin LM, Hsue SS, *et al.* 2002. The mRNA expression of placental glutathione S-transferase isoenzyme in hamster buccal-pouch carcinomas using reverse transcription-polymerase chain reaction. *Oral Oncol* 38(2):158-162.
- Dean JH, Ward EC, Murray MJ, *et al.* 1986. Immunosuppression following 7,12-dimethylbenz[a]anthracene exposure in B6C3F1 mice--II. Altered cell-mediated immunity and tumor resistance. *Int J Immunopharmacol* 8(2):189-198.

- Fu X, Latendresse JR, Muskhelishvili L, *et al.* 2005. Dietary modulation of 7,12-dimethylbenz[a]anthracene (DMBA)-induced adrenal toxicity in female Sprague-Dawley rats. *Food Chem Toxicol* 43(5):765-774.
- Galvan N, Page TJ, Czuprynski CJ, *et al.* 2006. Benzo(a)pyrene and 7,12-dimethylbenz(a)anthracene differentially affect bone marrow cells of the lymphoid and myeloid lineages. *Toxicology & Applied Pharmacology* 213(2):105-116.
- Gao J, Lauer FT, Mitchell LA, *et al.* 2007. Microsomal epoxide hydrolase is required for 7,12-dimethylbenz[a]anthracene (DMBA)-induced immunotoxicity in mice. *Toxicol Sci* 98(1):137-144.
- Mandal PK, McDaniel LR, Prough RA, *et al.* 2001. 7,12-Dimethylbenz[a]anthracene inhibition of steroid production in MA-10 mouse Leydig tumor cells is not directly linked to induction of CYP1B1. *Toxicol Appl Pharmacol* 175(3):200-208.
- Oravec CT, Samuel MJ, D'Ambrosio SM. 1985. Metabolism of 7,12-dimethylbenz(a)anthracene and its DNA adduct formation in human fetal kidney and intestinal cells in culture. *Drug Metabolism & Disposition* 13(1):76-80.
- Pasqualini C, Sarrieau A, Dussaillant M, *et al.* 1990. Estrogen-like effects of 7,12-dimethylbenz(a)anthracene on the female rat hypothalamo-pituitary axis. *J Steroid Biochem* 36(5):485-491.
- Singh NP, Turturro A, Hart RW. 1984. Stage-specific induction of sister-chromatid exchanges in utero. *Mutat Res* 128(1):17-24.
- Stoner GD, Schut HA, Daniel FB, *et al.* 1986. A comparison of covalent DNA binding of benzo[a]pyrene and 7,12-dimethylbenz[a]anthracene in respiratory tissues from human, rat and mouse. *Cancer Lett* 30(3):231-241.
- Talas ZS, Ozdemir I, Gok Y, *et al.* 2010. Role of selenium compounds on tyrosine hydroxylase activity, adrenomedullin and total RNA levels in hearts of rats. *Regul Pept* 159(1-3):137-141.
- Topping DC, Pal BC, Martin DH, *et al.* 1978. Pathologic changes induced in respiratory tract mucosa by polycyclic hydrocarbons of differing carcinogenic activity. *Am J Pathol* 93(2):311-324.
- Vaswani KK, Tejwani GA, Abou-Issa HM. 1986. Effect of 7,12-dimethylbenz[a]anthracene-induced mammary carcinogenesis on the opioid peptide levels in the rat central nervous system. *Cancer Lett* 31(2):115-122.
- Ward EC, Murray MJ, Lauer LD, *et al.* 1984. Immunosuppression following 7,12-dimethylbenz[a]anthracene exposure in B6C3F1 mice. I. Effects on humoral immunity and host resistance. *Toxicol Appl Pharmacol* 75(2):299-308.

Weitzman GA, Miller MM, London SN, *et al.* 1992. Morphometric assessment of the murine ovarian toxicity of 7,12-dimethylbenz(a)anthracene. *Reprod Toxicol* 6(2):137-141.

WHO, IARC Working Group on the Evaluation of Carcinogenic Risks to Humans. 1983 Apr. Polynuclear Aromatic Compounds, Part 1: Chemical, Environmental and Experimental Data. Summary of Data Reported and Evaluation. IARC Monogr Eval Carcinog Risks Hum 32:477 pp.

### Ethanol

Badr FM, Bartke A, Dalterio S, *et al.* 1977. Suppression of testosterone production by ethyl alcohol. Possible mode of action. *Steroids* 30(5):647-655.

Barnes GR. 1984. The effects of ethyl alcohol on visual pursuit and suppression of the vestibulo-ocular reflex. *Acta Otolaryngol Suppl* 406:161-166.

Budzinska K. 2005. Biphasic effect of ethyl alcohol on short-term potentiation of the respiratory activity in the rabbit. *J Physiol Pharmacol* 56 Suppl 4:31-38.

Clark OH, Gerend PL. 1986. Effect of ethyl alcohol on the TSH-receptor-cyclase system in thyroid and nonthyroid tissues. *World J Surg* 10(5):787-796.

Cutler MG, Ewart FG, Mackintosh JH. 1979. Growth and behavioural effects of ethyl alcohol on the offspring of mice; a comparison with its short-term actions. *Psychopharmacology (Berl)* 66(1):35-39.

Docter RF, Perkins RB. 1961. The effects of ethyl alcohol on autonomic and muscular responses in humans. I. Dosage of 0.5 milliliter per kilogram. *Q J Stud Alcohol* 22:374-386.

Ewart FG, Cutler MG. 1979. Effects of ethyl alcohol on development and social behaviour in the offspring of laboratory mice. *Psychopharmacology (Berl)* 62(3):247-251.

Furuya H, Aikawa H, Yoshida T, *et al.* 1996. Effects of ethyl alcohol administration to rat dams during the gestation period on learning behavior and on levels of monoamines and metabolites in rat pup brain after birth. *Environ Health Prev Med* 1(2):87-92.

Gordon CJ, Stead AG. 1988. Effect of ethyl alcohol on thermoregulation in mice following the induction of hypothermia or hyperthermia. *Pharmacol Biochem Behav* 29(4):693-698.

Kelly SJ, Black AC Jr, West JR. 1989. Changes in the muscarinic cholinergic receptors in the hippocampus of rats exposed to ethyl alcohol during the brain growth spurt. *J Pharmacol Exp Ther* 249(3):798-804.

Lu G, Sarr MG, Szurszewski JH. 1997. Effects of ethyl alcohol on canine jejunal circular smooth muscle. *Dig Dis Sci* 42(12):2403-2410.

Soffritti M, Belpoggi F, Cevolani D, *et al.* 2002. Results of long-term experimental studies on the carcinogenicity of methyl alcohol and ethyl alcohol in rats. Ann N Y Acad Sci 982:46-69.

Wecker JR, Ison JR. 1984. Acute exposure to methyl or ethyl alcohol alters auditory function in the rat. Toxicology & Applied Pharmacology 74(2):258-266.

WHO, IARC Working Group on the Evaluation of Carcinogenic Risks to Humans. 1988 Jan. Alcohol Drinking (Group 1). 5. Summary of Data Reported and Evaluation. IARC Monogr Eval Carcinog Risks Hum 44:35.

### **Ethylene**

Perovic S, Seack J, Gamulin V, *et al.* 2001. Modulation of intracellular calcium and proliferative activity of invertebrate and vertebrate cells by ethylene. BMC Cell Biol 2:7.

### **Fluorene**

ATSDR. 1995. Toxicological Profile for Polycyclic Aromatic Hydrocarbons. Atlanta GA: Department of Health & Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry. 487 pp.

Goncalves R, Scholze M, Ferreira AM, *et al.* 2008. The joint effect of polycyclic aromatic hydrocarbons on fish behavior. Environ Res 108(2):205-213.

Schirmer K, Dixon DG, Greenberg BM, *et al.* 1998. Ability of 16 priority PAHs to be directly cytotoxic to a cell line from the rainbow trout gill. Toxicology 127(1-3):129-141.

### **Formaldehyde**

ATSDR. 1999. Toxicological Profile for Formaldehyde. Atlanta GA: Department of Health & Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry. 468 pp.

Hayasaka Y, Hayasaka S, Nagaki Y. 2001. Ocular changes after intravitreal injection of methanol, formaldehyde, or formate in rabbits. Pharmacol Toxicol 89(2):74-78.

NTP. 2010. Report on carcinogens background document: formaldehyde. Research Triangle Park, NC: U.S. Department of Health and Human Services, Public Health Service, National Toxicology Program. 552 pp.

Oyama Y, Sakai H, Arata T, *et al.* 2002. Cytotoxic effects of methanol, formaldehyde, and formate on dissociated rat thymocytes: a possibility of aspartame toxicity. Cell Biol Toxicol 18(1):43-50.

Patel KG, Bhatt HV, Choudhury AR. 2003. Alteration in thyroid after formaldehyde (HCHO) treatment in rats. *Ind Health* 41(3):295-297.

Shaham J, Gurvich R, Kaufman Z. 2002. Sister chromatid exchange in pathology staff occupationally exposed to formaldehyde. *Mutat Res* 514(1-2):115-123.

Speit G, Merk O. 2002. Evaluation of mutagenic effects of formaldehyde in vitro: detection of crosslinks and mutations in mouse lymphoma cells. *Mutagenesis* 17(3):183-187.

WHO, IARC Working Group on the Evaluation of Carcinogenic Risks to Humans. 2006. Formaldehyde. *IARC Monogr Eval Carcinog Risks Hum* 88:39-325.

### **Hexaldehyde**

Angioy AM, Tomassini Barbarossa I, Crnjar R, *et al.* 1987. Reflex cardiac response to various olfactory stimuli in the blowfly, *Protophormia terraenovae*. *Neurosci Lett* 81(3):263-266.

Brambilla G, Cajelli E, Canonero R, *et al.* 1989. Mutagenicity in V79 Chinese hamster cells of n-alkanals produced by lipid peroxidation. *Mutagenesis* 4(4):277-279.

Ernstgard L, Iregren A, Sjogren B, *et al.* 2006. Acute effects of exposure to hexanal vapors in humans. *Journal of Occupational & Environmental Medicine* 48(6):573-580.

Hamaguchi-Hamada K, Hamada S, Yagi T. 2004. Exposure to hexanal odor induces extraordinary Fos expression in the medial preoptic area and amygdala of Fyn tyrosine kinase-deficient mice. *Brain Res Mol Brain Res* 130(1-2):187-190.

Kako H, Fukumoto S, Kobayashi Y, *et al.* 2008. Effects of direct exposure of green odour components on dopamine release from rat brain striatal slices and PC12 cells. *Brain Res Bull* 75(5):706-712.

Kako H, Kobayashi Y, Yokogoshi H. 2011. Effects of n-hexanal on dopamine release in the striatum of living rats. *Eur J Pharmacol* 651(1-3):77-82.

Pulkkinen P, Sinervirta R, Janne J. 1977. Mechanism of action of oxidized polyamines on the metabolism of human spermatozoa. *J Reprod Fertil* 51(2):399-404.

### **Indeno(1,2,3-cd)pyrene**

Bols NC, Schirmer K, Joyce EM, *et al.* 1999. Ability of polycyclic aromatic hydrocarbons to induce 7-ethoxyresorufin-o-deethylase activity in a trout liver cell line. *Ecotoxicol Environ Saf* 44(1):118-128.

- Brunstrom B. 1992. Embryolethality and induction of 7-ethoxyresorufin O-deethylase in chick embryos by polychlorinated biphenyls and polycyclic aromatic hydrocarbons having Ah receptor affinity. *Chem Biol Interact* 81(1-2):69-77.
- Deutsch-Wenzel RP, Brune H, Grimmer G, *et al.* 1983. Experimental studies in rat lungs on the carcinogenicity and dose-response relationships of eight frequently occurring environmental polycyclic aromatic hydrocarbons. *J Natl Cancer Inst* 71(3):539-544.
- Lu GH, Wang C, Zhu Z. 2009. The dose-response relationships for EROD and GST induced by polycyclic aromatic hydrocarbons in *Carassius auratus*. *Bull Environ Contam Toxicol* 82(2):194-199.
- Rice JE, Coleman DT, Hosted TJ Jr, *et al.* 1985. Identification of mutagenic metabolites of indeno[1,2,3-cd]pyrene formed in vitro with rat liver enzymes. *Cancer Res* 45(11 Pt 1):5421-5425.
- Wang SH, Liang CT, Liu YW, *et al.* 2009. Crosstalk between activated forms of the aryl hydrocarbon receptor and glucocorticoid receptor. *Toxicology* 262(2):87-97.
- WHO, IARC Working Group on the Evaluation of Carcinogenic Risks to Humans. 1983 Apr. Polynuclear Aromatic Compounds, Part 1: Chemical, Environmental and Experimental Data. Summary of Data Reported and Evaluation. IARC Monogr Eval Carcinog Risks Hum 32:477 pp.
- ### Isoprene
- Melnick R. 1995. NTP technical report on the toxicity studies of Isoprene (CAS No. 78-79-5) Administered by Inhalation to F344/N Rats and B6C3F1 Mice. *Toxic Rep Ser* 31:1-G5.
- Melnick RL, Sills RC, Roycroft JH, *et al.* 1994. Isoprene, an endogenous hydrocarbon and industrial chemical, induces multiple organ neoplasia in rodents after 26 weeks of inhalation exposure. *Cancer Res* 54(20):5333-5339.
- NTP. 1999 Jul. NTP Toxicology and carcinogenesis studies of isoprene (CAS No. 78-79-5) in F344/N rats (inhalation studies). *Natl Toxicol Program Tech Rep Ser* 486:1-176.
- Placke ME, Griffis L, Bird M, *et al.* 1996. Chronic inhalation oncogenicity study of isoprene in B6C3F1 mice. *Toxicology* 113(1-3):253-262.
- Shelby MD. 1990. Results of NTP-sponsored mouse cytogenetic studies on 1,3-butadiene, isoprene, and chloroprene. *Environ Health Perspect* 86:71-73.
- Sun JD, Dahl AR, Bond JA, *et al.* 1989. Characterization of hemoglobin adduct formation in mice and rats after administration of. *Toxicol Appl Pharmacol* 100(1):86-95.
- WHO, IARC Working Group on the Evaluation of Carcinogenic Risks to Humans. 1999. Isoprene. IARC Monogr Eval Carcinog Risks Hum 71:1015-1025.

## **Methacrolein**

Larsen ST, Nielsen GD. 2000 Apr 3. Effects of methacrolein on the respiratory tract in mice. *Toxicol Lett* 114(1-3):197-202.

Nojgaard JK, Christensen KB, Wolkoff P. 2005 Apr 10. The effect on human eye blink frequency of exposure to limonene oxidation products and methacrolein. *Toxicol Lett* 156(2):241-51.

## **Methylcyclopentane**

Ono Y, Takeuchi Y, Hisanaga N. 1981. A comparative study on the toxicity of n-hexane and its isomers on the peripheral nerve. *Int Arch Occup Environ Health* 48(3):289-294.

## **Methylene chloride**

Agency for Toxic Substances and Disease Registry (ATSDR). 2001. Methylene chloride. ToxFAQs :1-2.

Aranyi C, O'Shea WJ, Graham JA, *et al.* 1986. The effects of inhalation of organic chemical air contaminants on murine lung host defenses. *Fundam Appl Toxicol* 6(4):713-720.

ATSDR. 2000. Toxicological Profile for Methylene chloride. Atlanta GA: Department of Health & Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry. 313 pp.

Ballantyne B, Gazzard MF, Swanston DW. 1976. The ophthalmic toxicology of dichloromethane. *Toxicology* 6(2):173-187.

Brown-Woodman PD, Hayes LC, Huq F, *et al.* 1998. In vitro assessment of the effect of halogenated hydrocarbons: chloroform, dichloromethane, and dibromoethane on embryonic development of the rat. *Teratology* 57(6):321-333.

Burek JD, Nitschke KD, Bell TJ, *et al.* 1984. Methylene chloride: a two-year inhalation toxicity and oncogenicity study in rats and hamsters. *Fundam Appl Toxicol* 4(1):30-47.

Foster JR, Green T, Smith LL, *et al.* 1994. Methylene chloride: an inhalation study to investigate toxicity in the mouse lung using morphological, biochemical and Clara cell culture techniques. *Toxicology* 91(3):221-234.

Fuxe K, Andersson K, Hansson T, *et al.* 1984. Central catecholamine neurons and exposure to dichloromethane. Selective changes in amine levels and turnover in tel- and diencephalic DA and NA nerve terminal systems and in the secretion of anterior pituitary hormones in the male rat. *Toxicology* 29(4):293-305.

Graves RJ, Green T. 1996. Mouse liver glutathione S-transferase mediated metabolism of methylene chloride to a mutagen in the CHO/HPRT assay. *Mutat Res* 367(3):143-150.

- Kobayashi A, Ando A, Tagami N, *et al.* 2008. Severe optic neuropathy caused by dichloromethane inhalation. *J Ocul Pharmacol Ther* 24(6):607-612.
- Maronpot RR, Devereux TR, Hegi M, *et al.* 1995. Hepatic and pulmonary carcinogenicity of methylene chloride in mice: a search for mechanisms. *Toxicology* 102(1-2):73-81.
- NTP. 1986 Jan. NTP Toxicology and carcinogenesis studies of dichloromethane (methylene chloride) (CAS No. 75-09-2) in F344/N rats and B6C3F1 mice (inhalation studies). *Natl Toxicol Program Tech Rep Ser* 306:1-208.
- Olvera-Bello AE, Estrada-Muniz E, Elizondo G, *et al.* 2010. Susceptibility to the cytogenetic effects of dichloromethane is related to the glutathione S-transferase theta phenotype. *Toxicol Lett* 199(3):218-224.
- Pankow D, Gutewort R, Ponsold W, *et al.* 1979. Effect of dichloromethane on the sciatic motor conduction velocity of rats. *Experientia* 35(3):373-374.
- Rebert CS, Matteucci MJ, Pryor GT. 1989. Acute effects of inhaled dichloromethane on the EEG and sensory-evoked potentials of Fischer-344 rats. *Pharmacol Biochem Behav* 34(3):619-629.
- Rosengren LE, Kjellstrand P, Aurell A, *et al.* 1986. Irreversible effects of dichloromethane on the brain after long term exposure: a quantitative study of DNA and the glial cell marker proteins S-100 and GFA. *Br J Ind Med* 43(5):291-299.
- Sahu S, Lowther D, Ulsamer A. 1980. Biochemical studies on pulmonary response to inhalation of methylene chloride. *Toxicol Lett* 7(1):41-45.
- Schwetz BA, Leong KJ, Gehring PJ. 1975. The effect of maternally inhaled trichloroethylene, perchloroethylene, methyl chloroform, and methylene chloride on embryonal and fetal development in mice and rats. *Toxicology & Applied Pharmacology* 32(1):84-96.
- WHO, IARC Working Group on the Evaluation of Carcinogenic Risks to Humans. 1999. Dichloromethane. *IARC Monogr Eval Carcinog Risks Hum* 71:251-315.
- ### m-Xylene
- ATSDR. 2007. Toxicological Profile for Xylene. Atlanta GA: Department of Health & Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry. 385 pp.
- Backes WL, Sequeira DJ, Cawley GF, *et al.* 1993. Relationship between hydrocarbon structure and induction of P450: effects on protein levels and enzyme activities. *Xenobiotica* 23(12):1353-1366.
- Blanchard KT, Morris JB. 1994. Effects of m-xylene on rat nasal cytochrome P450 mixed function oxidase activities. *Toxicol Lett* 70(2):253-259.

- Bowen SE, Hamilton J, Balster RL. 1998. A method for adjusting exposure levels of volatile solvents based on effects on schedule-controlled behavior. *Neurotoxicol Teratol* 20(2):169-180.
- Cruz SL, Balster RL, Woodward JJ. 2000. Effects of volatile solvents on recombinant N-methyl-D-aspartate receptors expressed in *Xenopus* oocytes. *Br J Pharmacol* 131(7):1303-1308.
- Elovaara E, Zitting A, Nickels J, *et al.* 1987. m-Xylene inhalation destroys cytochrome P-450 in rat lung at low exposure. *Arch Toxicol* 61(1):21-26.
- Foy JW, Silverman DM, Schatz RA. 1996. Low-level m-Xylene inhalation alters pulmonary and hepatic cytochrome P-450 activity in the rat. *J Toxicol Environ Health* 47(2):135-144.
- Iyadomi M, Higaki Y, Ichiba M, *et al.* 1998. Evaluation of organic solvent-induced inflammation modulated by neuropeptides in the abdominal skin of hairless rats. *Ind Health* 36(1):40-51.
- Savolainen K, Riihimaki V, Luukkonen R, *et al.* 1985. Changes in the sense of balance correlate with concentrations of m-xylene in venous blood. *Br J Ind Med* 42(11):765-769.
- ### Naphthalene
- Abdo KM, Grumbein S, Chou BJ, *et al.* 2001. Toxicity and carcinogenicity study in F344 rats following 2 years of whole-body exposure to naphthalene vapors. *Inhal Toxicol* 13(10):931-950.
- Ahmad I, Pacheco M, Santos MA. 2003. Naphthalene-induced differential tissue damage association with circulating fish phagocyte induction. *Ecotoxicology & Environmental Safety* 54(1):7-15.
- Asikainen A, Tarhanen J, Poso A, *et al.* 2003. Predictive value of comparative molecular field analysis modelling of naphthalene inhibition of human CYP2A6 and mouse CYP2A5 enzymes. *Toxicol In Vitro* 17(4):449-455.
- ATSDR. 2005. Toxicological Profile for Naphthalene, 1-Methylnaphthalene, and 2-Methylnaphthalene. Atlanta GA: Department of Health & Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry. 347 pp.
- Bagchi D, Balmoori J, Bagchi M, *et al.* 2002. Comparative effects of TCDD, endrin, naphthalene and chromium (VI) on oxidative stress and tissue damage in the liver and brain tissues of mice. *Toxicology* 175(1-3):73-82.
- Bagchi M, Bagchi D, Balmoori J, *et al.* 1998. Naphthalene-induced oxidative stress and DNA damage in cultured macrophage J774A.1 cells. *Free Radic Biol Med* 25(2):137-143.

- Black JA, Birge WJ, Westerman AG, *et al.* 1983. Comparative aquatic toxicology of aromatic hydrocarbons. *Fundam Appl Toxicol* 3(5):353-358.
- Chen Y, Yi L, Yan G, *et al.* 2010. alpha-Lipoic acid alters post-translational modifications and protects the chaperone activity of lens alpha-crystallin in naphthalene-induced cataract. *Curr Eye Res* 35(7):620-630.
- Chen Y, Yi L, Yan GQ, *et al.* 2010. Decreased chaperone activity of alpha-crystallins in naphthalene-induced cataract possibly results from C-terminal truncation. *J Int Med Res* 38(3):1016-1028.
- Cho TM, Rose RL, Hodgson E. 2006. In vitro metabolism of naphthalene by human liver microsomal cytochrome P450 enzymes. *Drug Metabolism & Disposition* 34(1):176-183.
- Diodovich C, Malerba I, Bowe G, *et al.* 2003. Naphthalene exposure: effects on gene expression and proliferation in human cord blood cells. *J Biochem Mol Toxicol* 17(5):286-294.
- Evanson M, Van Der Kraak GJ. 2001. Stimulatory effects of selected PAHs on testosterone production in goldfish and rainbow trout and possible mechanisms of action. *Comp Biochem Physiol C Toxicol Pharmacol* 130(2):249-258.
- Fanucchi MV, Buckpitt AR, Murphy ME, *et al.* 1997. Naphthalene cytotoxicity of differentiating Clara cells in neonatal mice. *Toxicology & Applied Pharmacology* 144(1):96-104.
- Genter MB, Marlowe J, Kerzee JK, *et al.* 2006. Naphthalene toxicity in mice and aryl hydrocarbon receptor-mediated CYPs. *Biochemical & Biophysical Research Communications* 348(1):120-123.
- Gesto M, Tintos A, Alvarez R, *et al.* 2009. Alterations in the brain monoaminergic neurotransmitters of rainbow trout related to naphthalene exposure at the beginning of vitellogenesis. *Fish Physiol Biochem* 35(3):453-465.
- Gesto M, Tintos A, Soengas JL, *et al.* 2006. Effects of acute and prolonged naphthalene exposure on brain monoaminergic neurotransmitters in rainbow trout (*Oncorhynchus mykiss*). *Comparative Biochemistry & Physiology C-Toxicology & Pharmacology* 144(2):173-183.
- Karagiannis TC, Li X, Tang MM, *et al.* 2012. Molecular model of naphthalene-induced DNA damage in the murine lung. *Hum Exp Toxicol*. 31(1):42-50.
- Lawson GW, Van Winkle LS, Toskala E, *et al.* 2002. Mouse strain modulates the role of the ciliated cell in acute tracheobronchial airway injury-distal airways. *Am J Pathol* 160(1):315-327.

Linnoila RI, Jensen-Taubman S, Kazanjian A, *et al.* 2007. Loss of GFI1 impairs pulmonary neuroendocrine cell proliferation, but the neuroendocrine phenotype has limited impact on post-naphthalene airway repair. *Lab Invest* 87(4):336-344.

NTP. 1992 Apr. NTP Toxicology and carcinogenesis studies of naphthalene (CAS No. 91-20-3) in B6C3F1 mice (inhalation studies). *Natl Toxicol Program Tech Rep Ser* 410:1-172.

NTP. 2000 Dec. NTP Toxicology and carcinogenesis studies of naphthalene (CAS No. 91-20-3) in F344/N rats (inhalation studies). *Natl Toxicol Program Tech Rep Ser* 500:1-173.

Pollino CA, Georgiades E, Holdway DA. 2009. Physiological changes in reproductively active rainbowfish (*Melanotaenia fluviatilis*) following exposure to naphthalene. *Ecotoxicol Environ Saf* 72(4):1265-1270.

Sarojini R, Nagabhushanam R, Fingerman M. 1995. Naphthalene-induced atresia in the ovary of the crayfish, *Procambarus clarkii*. *Ecotoxicology & Environmental Safety* 31(1):76-83.

Shopp GM, White KL Jr, Holsapple MP, *et al.* 1984. Naphthalene toxicity in CD-1 mice: general toxicology and immunotoxicology. *Fundam Appl Toxicol* 4(3 Pt 1):406-419.

Tintos A, Gesto M, Alvarez R, *et al.* 2006. Interactive effects of naphthalene treatment and the onset of vitellogenesis on energy metabolism in liver and gonad, and plasma steroid hormones of rainbow trout *Oncorhynchus mykiss*. *Comp Biochem Physiol C Toxicol Pharmacol* 144(2):155-165.

Tintos A, Gesto M, Miguez JM, *et al.* 2007. Naphthalene treatment alters liver intermediary metabolism and levels of steroid hormones in plasma of rainbow trout (*Oncorhynchus mykiss*). *Ecotoxicol Environ Saf* 66(2):139-147.

Vijayavel K, Balasubramanian MP. 2008. Reproductive dysfunction induced by naphthalene in an estuarine crab *Scylla serrata* with reference to vitellogenesis. *Ecotoxicol Environ Saf* 69(1):89-94.

WHO, IARC Working Group on the Evaluation of Carcinogenic Risks to Humans. 2002. Naphthalene. *IARC Monogr Eval Carcinog Risks Hum* 82:367-435.

### **n-Butane**

Doring G, Baumeister FA, Peters J, *et al.* 2002. Butane abuse associated Encephalopathy. *Klin Padiatr* 214(5):295-298.

Edwards KE, Wenstone R. 2000. Successful resuscitation from recurrent ventricular fibrillation secondary to butane inhalation. *Br J Anaesth* 84(6):803-805.

Evans AC, Raistrick D. 1987. Phenomenology of intoxication with toluene-based adhesives and butane gas. Br J Psychiatry 150:769-773.

Novosel I, Kovacic Z, Gusic S, *et al.* 2011. Immunohistochemical detection of early myocardial damage in two sudden deaths due to intentional butane inhalation. Two case reports with review of literature. J Forensic Leg Med 18(3):125-131.

Raines DE, Claycomb RJ, Forman SA. 2003. Modulation of GABA(A) receptor function by nonhalogenated alkane anesthetics: the effects on agonist enhancement, direct activation, and inhibition. Anesth Analg 96(1):112-118.

### **n-Decane**

Aam BB, Myhre O, Fonnum F. 2003. Transcellular signalling pathways and TNF-alpha release involved in formation of reactive oxygen species in rat alveolar macrophages exposed to tert-butylcyclohexane. Arch Toxicol 77(12):678-684.

Kristiansen U, Nielsen GD. 1988. Activation of the sensory irritant receptor by C7-C11 n-alkanes. Arch Toxicol 61(6):419-425.

Lammers JH, Muijser H, Owen DE, *et al.* 2011. Neurobehavioral effects of acute exposure to normal (n-) paraffins. Int J Toxicol 30(1):47-58.

### **n-Heptane**

Goel SK, Rao GS, Pandya KP. 1982. Toxicity of n-hexane and n-heptane: some biochemical changes in liver and serum. Toxicol Lett 14(3-4):169-174.

Myhre O, Fonnum F. 2001. The effect of aliphatic, naphthenic, and aromatic hydrocarbons on production of reactive oxygen species and reactive nitrogen species in rat brain synaptosome fraction: the involvement of calcium, nitric oxide synthase, mitochondria, and phospholipase A. Biochem Pharmacol 62(1):119-128.

Savolainen H, Pfaffli P. 1980. Neurochemical effects on rats of n-heptane inhalation exposure. Arch Environ Contam Toxicol 9(6):727-732.

Singh S, Zhao K, Singh J. 2003. In vivo percutaneous absorption, skin barrier perturbation, and irritation from JP-8 jet fuel components. Drug Chem Toxicol 26(2):135-146.

Takeuchi Y, Ono Y, Hisanaga N, *et al.* 1980. A comparative study on the neurotoxicity of n-pentane, n-hexane, and n-heptane in the rat. Br J Ind Med 37(3):241-247.

### **n-Hexane**

De Martino C, Malorni W, Amantini MC, *et al.* 1987. Effects of respiratory treatment with n-hexane on rat testis morphology. I. A light microscopic study. Exp Mol Pathol 46(2):199-216.

- Huang J, Kato K, Shibata E, *et al.* 1989. Effects of chronic n-hexane exposure on nervous system-specific and muscle-specific proteins. *Arch Toxicol* 63(5):381-5.
- Khedun SM, Maharaj B, Leary WP, *et al.* 1992. The effect of hexane on the ventricular fibrillation threshold of the isolated perfused rat heart. *Toxicology* 71(1-2):145-150.
- Maharaj B, Khedun SM, Gregory MA, *et al.* 1993. The effects of hexane on rat myocardium: a morphometric and morphological study. *Int J Exp Pathol* 74(2):145-150.
- McDermott C, O'Donoghue MH, Heffron JJ. 2008. n-Hexane toxicity in Jurkat T-cells is mediated by reactive oxygen species. *Arch Toxicol* 82(3):165-171.
- McNamara BC, Jefcoate CR. 1988. Synergistic stimulation of pregnenolone synthesis in rat adrenal mitochondria by n-hexane and cardiolipin. *Arch Biochem Biophys* 260(2):780-788.
- Nylén P, Ebendal T, Eriksdotter-Nilsson M, *et al.* 1989. Testicular atrophy and loss of nerve growth factor-immunoreactive germ cell line in rats exposed to n-hexane and a protective effect of simultaneous exposure to toluene or xylene. *Arch Toxicol* 63(4):296-307.
- Rabovsky J, Judy DJ, Pailes WH. 1986. In vitro effects of straight-chain alkanes (n-hexane through n-dodecane) on rat liver and lung cytochrome P-450. *J Toxicol Environ Health* 18(3):409-421.
- Takeuchi Y, Ono Y, Hisanaga N, *et al.* 1980. A comparative study on the neurotoxicity of n-pentane, n-hexane, and n-heptane in the rat. *Br J Ind Med* 37(3):241-247.

### n-Nonane

- Aam BB, Myhre O, Fonnum F. 2003. Transcellular signalling pathways and TNF-alpha release involved in formation of reactive oxygen species in rat alveolar macrophages exposed to tert-butylcyclohexane. *Arch Toxicol* 77(12):678-684.
- Babu RJ, Chatterjee A, Ahaghotu E, *et al.* 2004. Percutaneous absorption and skin irritation upon low-level prolonged dermal exposure to nonane, dodecane and tetradecane in hairless rats. *Toxicol Ind Health* 20(6-10):109-118.
- Babu RJ, Chatterjee A, Singh M. 2004. Assessment of skin irritation and molecular responses in rat skin exposed to nonane, dodecane and tetradecane. *Toxicol Lett* 153(2):255-266.
- Carpenter CP, Geary DL Jr, Myers RC, *et al.* 1978. Petroleum hydrocarbon toxicity studies XVII. Animal response to n-nonane vapor. *Toxicol Appl Pharmacol* 44(1):53-61.
- Dreiem A, Myhre O, Fonnum F. 2002. Relationship between lipophilicity of C6-10 hydrocarbon solvents and their ROS-inducing potency in rat cerebellar granule cells. *Neurotoxicology* 23(6):701-709.

- Edwards JE, Rose RL, Hodgson E. 2005. The metabolism of nonane, a JP-8 jet fuel component, by human liver microsomes, P450 isoforms and alcohol dehydrogenase and inhibition of human P450 isoforms by JP-8. *Chem Biol Interact* 151(3):203-211.
- Kanikkannan N, Patel R, Jackson T, *et al.* 2001. Percutaneous absorption and skin irritation of JP-8 (jet fuel). *Toxicology* 161(1-2):1-11.
- Khan S, Mukhtar H, Pandya KP. 1980. n-Octane and n-nonane induced alterations in xenobiotic metabolising enzyme activities and lipid peroxidation of rat liver. *Toxicology* 16(3):239-245.
- Khan S, Pandya KP. 1985. Hepatotoxicity in albino rats exposed to n-octane and n-nonane. *J Appl Toxicol* 5(2):64-68.
- Pandya KP, Khan S. 1982. Effect of n-octane and n-nonane administration on alkaline phosphatase activity in tissues of female rats. *Biochem Pharmacol* 31(2):201-203.
- Patlolla RR, Mallampati R, Fulzele SV, *et al.* 2009. Dermal microdialysis of inflammatory markers induced by aliphatic hydrocarbons in rats. *Toxicol Lett* 185(3):168-174.

### **n-Octane**

- Haydon DA, Hendry BM. 1982. Nerve impulse blockage in squid axons by n-alkanes: the effect of axon diameter. *J Physiol* 333:393-403.
- Khan S, Pandya KP. 1980. Biochemical studies on the toxicity of n-octane and n-nonane. *Environ Res* 22(2):271-276.
- Khan S, Pandya KP. 1985. Hepatotoxicity in albino rats exposed to n-octane and n-nonane. *J Appl Toxicol* 5(2):64-68.
- Pandya KP, Khan S. 1982. Effect of n-octane and n-nonane administration on alkaline phosphatase activity in tissues of female rats. *Biochem Pharmacol* 31(2):201-203.
- Rabovsky J, Judy DJ, Pailes WH. 1986. In vitro effects of straight-chain alkanes (n-hexane through n-dodecane) on rat liver and lung cytochrome P-450. *J Toxicol Environ Health* 18(3):409-421.
- Schliemann S, Antonov D, Manegold N, *et al.* 2010. The lactic acid stinging test predicts susceptibility to cumulative irritation caused by two lipophilic irritants. *Contact Dermatitis* 63(6):347-356.
- Schliemann S, Antonov D, Manegold N, *et al.* 2011. Sensory irritation caused by two organic solvents-short-time single application and repeated occlusive test in stingers and non-stingers. *Contact Dermatitis* 65(2):107-114.

## **Phenanthrene**

- Benisek M, Kubincova P, Blaha L, *et al.* 2011. The effects of PAHs and N-PAHs on retinoid signaling and Oct-4 expression in vitro. *Toxicol Lett* 200(3):169-175.
- Black JA, Birge WJ, Westerman AG, *et al.* 1983. Comparative aquatic toxicology of aromatic hydrocarbons. *Fundam Appl Toxicol* 3(5):353-358.
- Buttignol MH, Barros MP, Macedo RC, *et al.* 2010. Phenanthrene decreases neutrophil function by disrupting intracellular redox balance. *J Appl Toxicol* 30(5):476-486.
- Carvalho PS, Kalil Dda C, Novelli GA, *et al.* 2008. Effects of naphthalene and phenanthrene on visual and prey capture endpoints during early stages of the dourado *Salminus brasiliensis*. *Mar Environ Res* 66(1):205-207.
- Evans AD, N'ipper M. 2007. Toxicity of phenanthrene and lindane mixtures to marine invertebrates. *Environmental Toxicology* 22(5):495-501.
- Hannam ML, Bamber SD, Galloway TS, *et al.* 2010. Effects of the model PAH phenanthrene on immune function and oxidative stress in the haemolymph of the temperate scallop *Pecten maximus*. *Chemosphere* 78(7):779-784.
- Incardona JP, Collier TK, Scholz NL. 2004. Defects in cardiac function precede morphological abnormalities in fish embryos exposed to polycyclic aromatic hydrocarbons. *Toxicol Appl Pharmacol* 196(2):191-205.
- Lisowska K, Dlugonski J. 2003. Concurrent corticosteroid and phenanthrene transformation by filamentous fungus *Cunninghamella elegans*. *J Steroid Biochem Mol Biol* 85(1):63-69.
- Lubitz S, Schober W, Pusch G, *et al.* 2010. Polycyclic aromatic hydrocarbons from diesel emissions exert proallergic effects in birch pollen allergic individuals through enhanced mediator release from basophils. *Environ Toxicol* 25(2):188-197.
- Mei X, Wu YY, Mao X, *et al.* 2011. Antagonism of phenanthrene cytotoxicity for human embryo lung fibroblast cell line HFL-I by green tea polyphenols. *Environ Pollut* 159(1):164-168.
- Monteiro PRR, Reis-Henriques MA, Coimbra J. 2000. Plasma steroid levels in female flounder (*Platichthys flesus*) after chronic dietary exposure to single polycyclic aromatic hydrocarbons. *Marine Environmental Research* 49(5):453-467.
- Monteiro PRR, Reis-Henriques MA, Coimbra J. 2000. Polycyclic aromatic hydrocarbons inhibit in vitro ovarian steroidogenesis in the flounder (*Platichthys flesus* L.). *Aquatic Toxicology* 48(4):549-559.

- Okay OS, Karacik B. 2007. Photoinduced toxicity of selected PAHs to the marine microalga *Phaeodactylum tricornutum*. *J Environ Sci Health A Tox Hazard Subst Environ Eng* 42(6):707-714.
- Paumen ML, Steenbergen E, Kraak MH, *et al.* 2008. Multigeneration exposure of the springtail *Folsomia candida* to phenanthrone: from dose-response relationships to threshold concentrations. *Environ Sci Technol* 42(18):6985-6990.
- Schafer S, Kohler A. 2009. Gonadal lesions of female sea urchin (*Psammechinus miliaris*) after exposure to the polycyclic aromatic hydrocarbon phenanthrene. *Mar Environ Res* 68(3):128-136.
- Schober W, Lubitz S, Belloni B, *et al.* 2007. Environmental polycyclic aromatic hydrocarbons (PAHs) enhance allergic inflammation by acting on human basophils. *Inhal Toxicol* 19 Suppl 1:151-156.
- Shimada T, Tanaka K, Takenaka S, *et al.* 2009. Reverse type I binding spectra of human cytochrome P450 1B1 induced by flavonoid, stilbene, pyrene, naphthalene, phenanthrene, and biphenyl derivatives that inhibit catalytic activity: a structure-function relationship study. *Chem Res Toxicol* 22(7):1325-1333.
- Yoshikawa T, Ruhr LP, Flory W, *et al.* 1985. Toxicity of polycyclic aromatic hydrocarbons. I. Effect of phenanthrene, pyrene, and their ozonized products on blood chemistry in rats. *Toxicol Appl Pharmacol* 79(2):218-226.
- Propionaldehyde**
- Brambilla G, Cajelli E, Canonero R, *et al.* 1989. Mutagenicity in V79 Chinese hamster cells of n-alkanals produced by lipid peroxidation. *Mutagenesis* 4(4):277-279.
- Capo C, Bongrand P, Benoliel AM, *et al.* 1979. Non-specific recognition in phagocytosis: ingestion of aldehyde-treated erythrocytes by rat peritoneal macrophages. *Immunology* 36(3):501-508.
- Costa M, Zhitkovich A, Harris M, *et al.* 1997. DNA-protein cross-links produced by various chemicals in cultured human lymphoma cells. *J Toxicol Environ Health* 50(5):433-449.
- Furnus CC, Ulrich MA, Terreros MC, *et al.* 1990. The induction of aneuploidy in cultured Chinese hamster cells by propionaldehyde and chloral hydrate. *Mutagenesis* 5(4):323-326.
- Propylene**
- NTP. 1985 Nov. NTP Toxicology and carcinogenesis studies of propylene (CAS No. 115-07-1) in F344/N rats and B6C3F1 mice (inhalation studies). *Natl Toxicol Program Tech Rep Ser* 272:1-146.

Quest JA, Tomaszewski JE, Haseman JK, *et al.* 1984. Two-year inhalation toxicity study of propylene in F344/N rats and B6C3F1 mice. *Toxicol Appl Pharmacol* 76(2):288-295.

### **p-Xylene**

Al-Ghamdi SS, Raftery MJ, Yaqoob MM. 2003. Acute solvent exposure induced activation of cytochrome P4502E1 causes proximal tubular cell necrosis by oxidative stress. *Toxicology in Vitro* 17(3):335-341.

Al-Ghamdi SS, Raftery MJ, Yaqoob MM. 2003. Organic solvent-induced proximal tubular cell toxicity via caspase-3 activation. *J Toxicol Clin Toxicol* 41(7):941-945.

Al-Ghamdi SS, Raftery MJ, Yaqoob MM. 2004. Toluene and p-xylene induced LLC-PK1 apoptosis. *Drug Chem Toxicol* 27(4):425-432.

ATSDR. 2007. Toxicological Profile for Xylene. Atlanta GA: Department of Health & Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry. 385 pp.

Bushnell PJ, Peele DB. 1988. Conditioned flavor aversion induced by inhaled p-xylene in rats. *Neurotoxicol Teratol* 10(3):273-277.

Bushnell PJ. 1988. Behavioral effects of acute p-xylene inhalation in rats: autoshaping, motor activity, and reversal learning. *Neurotoxicol Teratol* 10(6):569-577.

Day BJ, DeNicola DB, Marcus CB, *et al.* 1992. Effect of p-xylene inhalation on the bioactivation of bromobenzene in rat lung and liver. *Fundam Appl Toxicol* 19(1):50-56.

Dyer RS, Bercegeay MS, Mayo LM. 1988. Acute exposures to p-xylene and toluene alter visual information processing. *Neurotoxicol Teratol* 10(2):147-153.

Gagnaire F, Langlais C. 2005. Relative ototoxicity of 21 aromatic solvents. *Arch Toxicol* 79(6):346-354.

Maguin K, Lataye R, Campo P, *et al.* 2006. Ototoxicity of the three xylene isomers in the rat. *Neurotoxicol Teratol* 28(6):648-656.

Padilla SS, Lyerly DP. 1989. Effects of p-xylene inhalation on axonal transport in the rat retinal ganglion cells. *Toxicol Appl Pharmacol* 101(3):390-398.

Patel JM, Harper C, Drew RT. 1978. The biotransformation of p-xylene to a toxic aldehyde. *Drug Metab Dispos* 6(4):368-374.

Pyykko K. 1980. Effects of methylbenzenes on microsomal enzymes in rat liver, kidney and lung. *Biochim Biophys Acta* 633(1):1-9.

Saillenfait AM, Gallissot F, Morel G, *et al.* 2003. Developmental toxicities of ethylbenzene, ortho-, meta-, para-xylene and technical xylene in rats following inhalation exposure. *Food Chem Toxicol* 41(3):415-429.

Silverman DM, Schatz RA. 1991. Pulmonary microsomal alterations following short-term low level inhalation of p-xylene in rats. *Toxicology* 65(3):271-281.

Toftgard R, Nilsen OG. 1982. Effects of xylene and xylene isomers on cytochrome P-450 and in vitro enzymatic activities in rat liver, kidney and lung. *Toxicology* 23(2-3):197-212.

### Tetrahydrofuran

Chhabra RS, Elwell MR, Chou B, *et al.* 1990. Subchronic toxicity of tetrahydrofuran vapors in rats and mice. *Fundam Appl Toxicol* 14(2):338-345.

Chhabra RS, Herbert RA, Roycroft JH, *et al.* 1998. Carcinogenesis studies of tetrahydrofuran vapors in rats and mice. *Toxicol Sci* 41(2):183-188.

Giraudi G, Baggiani C. 1993. Solvent effect on testosterone-antitestosterone interaction. *Biochim Biophys Acta* 1157(2):211-216.

Henry TB, Menn FM, Fleming JT, *et al.* 2007. Attributing effects of aqueous C60 nano-aggregates to tetrahydrofuran decomposition products in larval zebrafish by assessment of gene expression. *Environ Health Perspect* 115(7):1059-1065.

Hermida SA, Possari EP, Souza DB, *et al.* 2006. 2'-deoxyguanosine, 2'-deoxycytidine, and 2'-deoxyadenosine adducts resulting from the reaction of tetrahydrofuran with DNA bases. *Chem Res Toxicol* 19(7):927-936.

Hughes LK, Ju M, Sheppard DN. 2008. Potentiation of cystic fibrosis transmembrane conductance regulator (CFTR) Cl<sup>-</sup> currents by the chemical solvent tetrahydrofuran. *Mol Membr Biol* 25(6-7):528-538.

NTP. 1998 Jun. NTP Toxicology and carcinogenesis studies of tetrahydrofuran (CAS No. 109-99-9) in F344/N rats and B6C3F1 mice (inhalation studies). *Natl Toxicol Program Tech Rep Ser* 475:1-244.

Werawattanachai N, Towiwat P, Unchern S, *et al.* 2007. Neuropharmacological profile of tetrahydrofuran in mice. *Life Sci* 80(18):1656-1663.

Yao Y, Guan J, Tang P, *et al.* 2010. Assessment of toxicity of tetrahydrofuran on the microbial community in activated sludge. *Bioresour Technol* 101(14):5213-5221.

### Toluene

Agency for Toxic Substances and Disease Registry (ATSDR). 2001. Toluene. ToxFAQs:1-2.

- Alfaro-Rodriguez A, Bueno-Nava A, Gonzalez-Pina R, *et al.* 2011. Chronic exposure to toluene changes the sleep-wake pattern and brain monoamine content in rats. *Acta Neurobiol Exp (Wars)* 71(2):183-192.
- Aranyi C, O'Shea WJ, Sherwood RL, *et al.* 1985. Effects of toluene inhalation on pulmonary host defenses of mice. *Toxicol Lett* 25(1):103-110.
- Atay AA, Kismet E, Turkbay T, *et al.* 2005 Summer. Bone mass toxicity associated with inhalation exposure to toluene. *Biol Trace Elem Res* 105(1-3):197-203.
- ATSDR. 2000. Toxicological Profile for Toluene. Atlanta GA: Department of Health & Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry. 357 pp.
- Bale AS, Tu Y, Carpenter-Hyland EP, *et al.* 2005. Alterations in glutamatergic and gabaergic ion channel activity in hippocampal neurons following exposure to the abused inhalant toluene. *Neuroscience* 130(1):197-206.
- Berenguer P, Soulage C, Perrin D, *et al.* 2003. Behavioral and neurochemical effects induced by subchronic exposure to 40 ppm toluene in rats. *Pharmacol Biochem Behav* 74(4):997-1003.
- Brown-Woodman PD, Webster WS, Picker K, *et al.* 1991. Embryotoxicity of xylene and toluene: an in vitro study. *Ind Health* 29(4):139-152.
- Burmistrov SO, Arutyunyan AV, Stepanov MG, *et al.* 2001. Effect of chronic inhalation of toluene and dioxane on activity of free radical processes in rat ovaries and brain. *Bull Exp Biol Med* 132(3):832-836.
- Burry M, Guizzetti M, Oberdoerster J, *et al.* 2003. Developmental neurotoxicity of toluene: in vivo and in vitro effects on astroglial cells. *Dev Neurosci* 25(1):14-19.
- Campagna D, Stengel B, Mergler D, *et al.* 2001. Color vision and occupational toluene exposure. *Neurotoxicol Teratol* 23(5):473-480.
- Cruz SL, Orta-Salazar G, Gauthereau MY, *et al.* 2003. Inhibition of cardiac sodium currents by toluene exposure. *Br J Pharmacol* 140(4):653-660.
- Fujimaki H, Win-Shwe TT, Yoshida Y, *et al.* 2011. Dysregulation of immune responses in an allergic mouse model following low-level toluene exposure. *Toxicology* 286(1-3):28-35.
- Furman GM, Silverman DM, Schatz RA. 1991. The effect of toluene on rat lung benzo[a]pyrene metabolism and microsomal membrane lipids. *Toxicology* 68(1):75-87.

- Gonzalez-Yebra AL, Kornhauser C, Wrobel K, *et al.* 2006. Occupational exposure to toluene and its possible causative role in renal damage development in shoe workers. International Archives of Occupational & Environmental Health 79(3):259-264.
- Gordon CJ, Gottipolu RR, Kenyon EM, *et al.* 2010. Aging and susceptibility to toluene in rats: a pharmacokinetic, biomarker, and physiological approach. J Toxicol Environ Health A 73(4):301-318.
- Gospe SM Jr, Zhou SS, Saeed DB, *et al.* 1996. Development of a rat model of toluene-abuse embryopathy. Pediatr Res 40(1):82-87.
- Gospe SM Jr, Zhou SS. 1998. Toluene abuse embryopathy: longitudinal neurodevelopmental effects of prenatal exposure to toluene in rats. Reprod Toxicol 12(2):119-126.
- Gotohda T, Nishimura A, Morita K. 2009. Immunohistochemical studies on early stage of hepatic damage induced by subacute inhalation of toluene vapor in rats. J Appl Toxicol 29(6):505-509.
- Gotohda T, Tokunaga I, Kubo S. 2005. Toluene inhalation-induced adrenocortical hypertrophy and endocrinological changes in rat. Life Sci 76(17):1929-1937.
- Hansson T, Pettersson BM, Eneroth P, *et al.* 1985. Neonatal exposure to toluene: effects on the development of liver microsomal cytochrome P-450 and serum hormone levels in the rat. Toxicology 37(1-2):39-50.
- Hsieh GC, Sharma RP, Parker RD, *et al.* 1990. Evaluation of toluene exposure via drinking water on levels of regional brain biogenic monoamines and their metabolites in CD-1 mice. Ecotoxicol Environ Saf 20(2):175-184.
- 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.
- Johnson AC, Canlon B. 1994. Progressive hair cell loss induced by toluene exposure. Hear Res 75(1-2):201-208.
- Johnson AC, Nylen P, Borg E, *et al.* 1990. Sequence of exposure to noise and toluene can determine loss of auditory sensitivity in the rat. Acta Otolaryngol 109(1-2):34-40.
- Kodavanti PR, Royland JE, Richards JE, *et al.* 2011. Toluene effects on oxidative stress in brain regions of young-adult, middle-age, and senescent Brown Norway rats. Toxicol Appl Pharmacol 256(3):386-98.
- Luderer U, Morgan MS, Brodkin CA, *et al.* 1999. Reproductive endocrine effects of acute exposure to toluene in men and women. Occupational & Environmental Medicine 56(10):657-666.

- Mokry J, Nosalova G. 2007. Evaluation of the cough reflex and airway reactivity in toluene- and ovalbumin-induced airway hyperresponsiveness. *J Physiol Pharmacol* 58 Suppl 5(Pt 1):419-426.
- Nakai N, Murata M, Nagahama M, et al. 2003. Oxidative DNA damage induced by toluene is involved in its male reproductive toxicity. *Free Radic Res* 37(1):69-76.
- Ng TP, Foo SC, Yoong T. 1992. Risk of spontaneous abortion in workers exposed to toluene. *Br J Ind Med* 49(11):804-808.
- NTP. 1990 Feb. NTP Toxicology and carcinogenesis studies of toluene (CAS No.108-88-3) in F344/N rats and B6C3F1 mice (inhalation studies). *Natl Toxicol Program Tech Rep Ser* 371:1-253.
- Ono A, Sekita K, Ohno K, et al. 1995. Reproductive and developmental toxicity studies of toluene. I. Teratogenicity study of inhalation exposure in pregnant rats. *J Toxicol Sci* 20(2):109-134.
- Pascual R, Bustamante C. 2010 Oct 8. Melatonin promotes distal dendritic ramifications in layer II/III cortical pyramidal cells of rats exposed to toluene vapors. *Brain Res* 1355:214-220.
- Roberts LG, Nicolich MJ, Schreiner CA. 2007. Developmental and reproductive toxicity evaluation of toluene vapor in the rat II. Developmental toxicity. *Reprod Toxicol* 23(4):521-531.
- Svensson BG, Nise G, Erfurth EM, et al. 1992. Neuroendocrine effects in printing workers exposed to toluene. *Br J Ind Med* 49(6):402-408.
- Tin-Tin Win-Shwe, Kunugita N, Yoshida Y, et al. 2012. Differential mRNA expression of neuroimmune markers in the hippocampus of infant mice following toluene exposure during brain developmental period. *J Appl Toxicol* 32(2):126–134.
- Tin-Tin-Win-Shwe, Yamamoto S, Nakajima D, et al. 2007. Modulation of neurological related allergic reaction in mice exposed to low-level toluene. *Toxicol Appl Pharmacol* 222(1):17-24.
- Wigger-Alberti W, Krebs A, Elsner P. 2000. Experimental irritant contact dermatitis due to cumulative epicutaneous exposure to sodium lauryl sulphate and toluene: single and concurrent application. *Br J Dermatol* 143(3):551-556.
- Yamamura K, Ikeda T, Maehara N, et al. 1981. Effects of toluene exposure on blood pressure and its responsiveness to impulse noise in rats. *Toxicol Lett* 9(4):361-365.
- Yelian FD, Dukelow WR. 1992. Cellular toxicity of toluene on mouse gamete cells and preimplantation embryos. *Arch Toxicol* 66(6):443-445.

Yin SN, Li GL, Hu YT, *et al.* 1987. Symptoms and signs of workers exposed to benzene, toluene or the combination. Ind Health 25(3):113-130.