



Polycyclic Aromatic Hydrocarbons (PAHs)

Polycyclic aromatic hydrocarbons (PAHs) are a class of chemicals that occur naturally in coal, crude oil, and gasoline. They also are produced when coal, oil, gas, wood, garbage, and tobacco are burned. PAHs generated from these sources can bind to or form small particles in the air. High-temperature cooking will form PAHs in meat and in other foods. Naphthalene is a PAH that is produced commercially in the United States to make other chemicals and mothballs. Cigarette smoke contains many PAHs.

How People Are Exposed to PAHs

People are usually exposed to mixtures of PAHs. Breathing air contaminated with motor vehicle exhaust, cigarette smoke, wood smoke, or fumes from asphalt roads are common ways exposure occurs. People take in PAHs when they eat grilled or charred meats or foods or foods on which PAH particles have settled from the air. After PAHs are swallowed, breathed in, or in some cases, passed through the skin, the body converts PAHs into breakdown products called metabolites that pass out of the body in the urine and feces.

How PAHs Affect People's Health

Human health effects from environmental exposure to low levels of PAHs are unknown. Large amounts of naphthalene in air can irritate eyes and breathing passages. Workers who have been exposed to large amounts of naphthalene from skin contact with the liquid form and from breathing naphthalene vapor have developed blood and liver abnormalities. Several of the PAHs and some specific mixtures of PAHs are considered to be cancer-causing chemicals.

Levels of PAH Metabolites in the U.S. Population

In the *Fourth National Report on Human Exposure to Environmental Chemicals (Fourth Report)*, CDC scientists measured ten different PAH metabolites in the urine of 2,504 or more participants aged six years and older who took part in the National Health and Nutrition Examination Survey (NHANES) during 2003–2004. The *Fourth Report* includes results from the earlier survey period of 2001–2002 for several PAH metabolites. By measuring PAH metabolites in urine, scientists can estimate the amounts of PAHs that have entered people's bodies.

PAHs were measured in most participants, indicating widespread exposure in the U.S. population. Research has found that urinary PAH metabolites are higher in adults who smoke than in nonsmoking adults.

Finding a measurable amount of one or more PAH metabolites in the urine does not mean that the levels of one or more PAH metabolites or PAHs cause an adverse health effect. Biomonitoring studies on levels of PAH metabolites provide physicians and public health officials with reference values so that they can determine whether people have been exposed to higher levels of these chemicals than are found in the general population. Biomonitoring data can also help scientists plan and conduct research on exposure and health effects.

For More Information

- Agency for Toxic Substances and Disease Registry
ToxFAQs for Polycyclic Aromatic Hydrocarbons (PAHs)
<http://www.atsdr.cdc.gov/tfacts69.html>

- Environmental Protection Agency
Consumer Factsheet on: BENZO(A)PYRENE
http://www.epa.gov/ogwdw000/contaminants/dw_contamfs/benzopyr.html

- United States Geological Survey
Definition Page for Polynuclear Aromatic Hydrocarbons
<http://toxics.usgs.gov/definitions/pah.html>

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