



## Dioxins

### WHAT ARE DIOXINS AND WHERE ARE THEY FOUND?

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Dioxins are a group of chemicals that form as unwanted byproducts from incomplete burning of household and industrial waste. They also can be produced during bleaching of paper pulp and the manufacturing of chlorinated chemicals like polychlorinated biphenyls (PCBs), chlorinated phenols, chlorinated benzene, and certain pesticides. Exhaust from vehicles, forest fires, and burning wood also releases dioxins into the air. Small amounts of dioxins are present in bleached paper products, including facial or toilet tissue, paper towels, and disposable diapers.

### WHAT HAPPENS TO DIOXINS THAT ENTER THE ENVIRONMENT?

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Dioxins have been detected in soil, surface water, sediment, plants, and animal tissue. Dioxins formed during the burning of fuel and wastes are released into the air. Soil near the burn areas also may be contaminated with dioxins. Surface water bodies can become contaminated when rainwater carries soil containing dioxins into surface water and when industries discharge dioxin-contaminated waste directly into surface water.

Dioxins do not easily dissolve in water, so they tend to settle to the bottom and cling to the sediment. Dioxins last for a long time in the environment before breaking down. In surface waters and sediments, dioxins can pass into aquatic organisms and eventually find their way into the food chain. Dioxins are easily absorbed by animals and are stored in fatty tissue.

### HOW CAN I BE EXPOSED TO DIOXINS?

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Most people are exposed to dioxins by eating meat, dairy products, fish, and other seafood. Dairy products and meat from grazing animals have lower dioxin levels than fish or other seafood. Fruits and other fresh produce can have dioxins in small amounts on their outer surfaces from pesticide sprays or contaminated dust. Freshwater fish, such as carp, catfish or buffalo fish, that feed on microscopic plants and animals could ingest dioxins present in the sediment. They are often eaten by larger animals, and the dioxins get into their body fat. People are generally not exposed to dioxins in surface water unless they contact contaminated sediments.

Dioxins also can enter your body through the air you breathe or by skin contact. Persons who burn household waste may come into contact with dioxins in the ash, soil, gas, or smoke. Agricultural workers using pesticides or solvents may be exposed to dioxins. Industrial accidents have been responsible for most cases of dioxin poisoning in humans. Firefighters and cleanup crews responding to electrical system fires and hazardous waste accidents also may be exposed to dioxins.

### HOW CAN DIOXINS AFFECT MY HEALTH?

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Dioxins are absorbed into the body through the digestive and respiratory tracts or through skin contact. They are then distributed throughout the body. Whether dioxins cause a health effect is determined by the dose, which depends on:

- how much gets into you body,
- how it gets into your body, and

- how long you have been exposed.

Dioxin exposure can cause a severe skin condition called chloracne, which results in small, pale yellow skin lesions that may last from weeks to years. Dioxins can cause short-term liver effects without any visible symptoms. Studies of people exposed to high levels of dioxins through occupation, accidents, or military service do not suggest that adverse health effects will occur at low levels. A large historical study suggested workers exposed to dioxins for many years had increased cancer rates. However, other environmental factors may be related to the cancer. Studies have shown that reproductive, immune, and nervous systems of the developing fetus and children are more susceptible to dioxins.

In animal studies, dioxins have caused nerve damage, birth defects, increased rates of miscarriages, and changes to the immune system. Although the U.S. Environmental Protection Agency has classified all but one dioxin as a probable human carcinogen (cancer causing chemical), there is not sufficient evidence to prove that dioxins cause cancer from exposure to the low levels normally found in the environment. Only dioxin, 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD), is listed as a known human carcinogen.

### IS THERE A MEDICAL TEST FOR DIOXINS?

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Tests are available to measure dioxins in the blood, body fat, and breast milk. A blood test is the best method for measuring exposure to large amounts of dioxins. Although measuring dioxins in the body is possible, the analysis is expensive, time-consuming, and not generally recommended because results do not predict whether one might develop harmful health effects.

### HOW CAN I REDUCE MY EXPOSURE TO DIOXINS?

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Dioxins accumulate in fish fat, so removing skin and trimming the fat before cooking will help reduce dioxin intake. Barbecuing, broiling, or baking fish on an elevated rack to allow fat to drip away helps further reduce exposure to dioxins. Another way to reduce exposure to dioxins is to thoroughly wash fruits and vegetables to rid them of any leftover pesticide or herbicide before eating. Persons who burn household, municipal, or industrial waste should minimize their exposure to the smoke and ash.

### WHERE CAN I GET MORE INFORMATION?

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