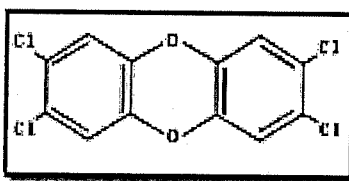


## Some Basic Facts about Dioxin

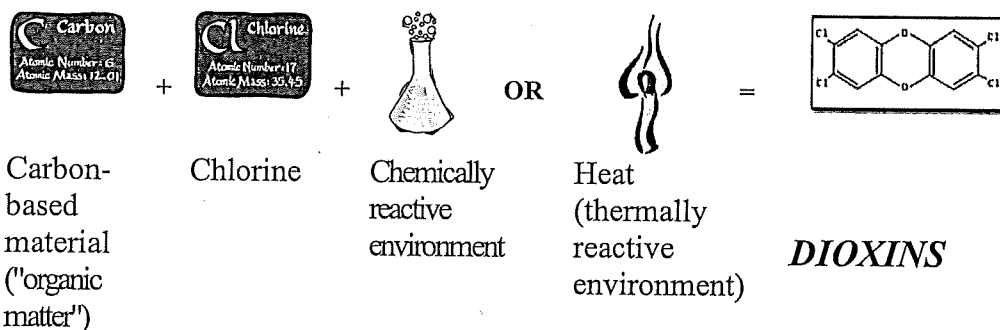
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Dioxins are probably the most studied chemical compound in the world today, yet there is still much about them that we don't know. What we *do* know, however, is enough to have many people calling for action. Although frequently referred to in the singular form, "dioxin," chlorinated dioxins are actually a group of chemicals that includes 75 dioxins, 135 furans and 209 polychlorinated biphenyls (PCBs). They are grouped together because their chemical structure is very similar, as are many of their suspected health effects. The most potent form of dioxin, 2,3,7,8-tetrachlorodibenzo-p-dioxin, is often referred to as 2,3,7,8-TCDD.



Unlike DDT, Agent Orange, or many chemicals that have gotten a lot of public attention over the past 30 years of increasing environmental awareness, companies don't intentionally make dioxin; it's not a "product" that they're trying to sell. Instead, it is a by-product of many industrial processes such as burning garbage, medical waste or hazardous waste; using chlorine-based bleaching chemicals to make white paper; manufacturing polyvinyl chloride (PVC) plastics and some chlorinated pesticides; secondary copper smelting; and other activities. (USEPA 1998)

The simplified "recipe" for dioxin is:



Dioxin has gained so much attention because years of scientific research have shown it to be one of the most toxic substances known to humans. In its final draft reassessment of dioxin's health effects, released in June 2000, the U.S. Environmental Protection Agency (USEPA) named dioxin as a known human carcinogen and reported the cancer risk from exposure to dioxin to be 10 times greater than it had reported in 1994.

Dioxin has been linked to a wide variety of health effects in people and animals. In addition to acknowledging the increased possibility of cancer, the recent USEPA draft reassessment also provided a better understanding of other potential health risks; in particular, how dioxin affects children's immune, reproductive and nervous systems. It can also affect how children think and learn. Dioxin's interference with these important systems may cause birth defects, affect sexual development, and weaken a child's ability to fight off illnesses. While adults most commonly exposed through food, children are exposed in their mother's womb during critical periods of development.

### Potential Health Effects of Dioxin

<p><b>Effects on the female reproductive system, including</b></p> <ul style="list-style-type: none"> <li>• hormone changes,</li> <li>• miscarriage,</li> <li>• decreased fertility,</li> <li>• changes in the menstrual cycle, and</li> <li>• endometriosis</li> </ul>	<p><b>Effects on the male reproductive system, including</b></p> <ul style="list-style-type: none"> <li>• lower sperm counts,</li> <li>• testicular deformities,</li> <li>• decreased sex drive,</li> <li>• changes in male hormone levels, and</li> <li>• feminization of hormonal and behavioral responses</li> </ul>
<p><b>Cancer of the soft or connective tissue,</b></p> <ul style="list-style-type: none"> <li>• lung,</li> <li>• liver, and</li> <li>• stomach;</li> <li>• non-Hodgkin's lymphoma</li> </ul>	<p><b>Effects in offspring such as</b></p> <ul style="list-style-type: none"> <li>• neurological and developmental problems,</li> <li>• delayed puberty and reduced fertility; and</li> <li>• damage to the central nervous system</li> </ul>
<p><b>Birth defects such as</b></p> <ul style="list-style-type: none"> <li>• cleft palate,</li> <li>• deformities of the reproductive organs and genitals</li> </ul>	<p><b>Immune system damage, including increased susceptibility to infectious disease</b></p>
<p><b>Thyroid dysfunction</b></p>	<p><b>Liver damage</b></p>
<p><b>Altered glucose tolerance and decreased insulin levels, leading to an increased risk of diabetes</b></p>	<p>(CHEJ 1999)</p>

What might be the most worrisome thing about dioxin is the fact that most Americans already have as much, or nearly as much, dioxin in their bodies as the amounts shown to cause adverse health effects in laboratory animals. Dioxin has a "half life" of seven years in the human body, which means that even if it were possible to stop all dioxin discharges today, half of the dioxin in our bodies would still be there in seven years.

## **Dioxin in the environment**

Scientists have studied the dioxin air emissions from incinerators and cement kilns, and found that dioxin can attach to dust particles or water vapor and travel up to 1,000 miles from the facility, even crossing international borders (CBNS, 2000). The dioxin then falls to the ground, where it often lands on hay or grazing pastures. The dioxin particles stick to the grass or hay and are then eaten by grazing animals. Dioxin concentrates in fat and is difficult to break down in the body, so it builds up in the food chain. When animals at the top of the food chain (including humans) eat other animals or animal products, such as meat, milk or dairy products, they will also take in some of that animal's body burden of dioxin. The USEPA has estimated that more than 95 percent of our dioxin exposure comes from meat and dairy products in our diet (EPA 2000).

Dioxin in wastewater from pulp mills that use chlorine-based bleaching chemicals to make white paper can contaminate fish. This makes fish, a major source of protein for many people, a significant source of dioxin exposure.

## **How can we get dioxins out of the environment?**

It is important to remember that although eliminating animal fat from your diet will reduce your dioxin intake, it will not make the dioxin problem go away. Instead, it will put farmers, ranchers and fishers out of business while allowing the polluting industries to keep discharging dioxin into the environment. The only way to address the dioxin problem is to phase out the processes that produce dioxin. Alternatives are readily available for many of the processes that generate dioxin. Clean production technologies, waste reduction, reuse and recycling can eliminate the need for garbage and hazardous waste incinerators and cement kilns. Alternative technologies are available to treat medical waste. What we need now are strong environmental regulations that prohibit, rather than attempt to control, dioxin emissions and encourage the development of cleaner processes. As dioxin expert Dr. Paul Connett has said, "If dioxin were a product [rather than an unwanted by-product], it would've been banned years ago."

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