

Natural Resources Defense Council
Issue Health

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Endocrine Disruptors

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1. What is the endocrine system?

The endocrine system is a complex network of glands and hormones that regulates many of the body's functions, including growth, development and maturation, as well as the way various organs operate. The endocrine glands -- including the pituitary, thyroid, adrenal, thymus, pancreas, ovaries, and testes -- release carefully-measured amounts of hormones into the bloodstream that act as natural chemical messengers, traveling to different parts of the body in order to control and adjust many life functions.

2. What is an endocrine disruptor?

An endocrine disruptor is a synthetic chemical that when absorbed into the body either mimics or blocks hormones and disrupts the body's normal functions. This disruption can happen through altering normal hormone levels, halting or stimulating the production of hormones, or changing the way hormones travel through the body, thus affecting the functions that these hormones control. Chemicals that are known human endocrine disruptors include diethylstilbestrol (the drug DES), dioxin, PCBs, DDT, and some other pesticides. Many chemicals, particularly pesticides and plasticizers, are suspected endocrine disruptors based on limited animal studies.

3. What are some likely routes of exposure to endocrine disruptors?

Exposure to endocrine disruptors can occur through direct contact with pesticides and other chemicals or through ingestion of contaminated water, food, or air. Chemicals suspected of acting as endocrine disruptors are found in insecticides, herbicides, fumigants and fungicides that are used in agriculture as well as in the home. Industrial workers can be exposed to chemicals such as detergents, resins, and plasticizers with endocrine disrupting properties. Endocrine disruptors enter the air or water as a byproduct of many chemical and manufacturing processes and when plastics and other materials are burned. Further, studies have found that endocrine disruptors can leach out of plastics, including the type of plastic used to make hospital intravenous bags. Many endocrine disruptors are persistent in the

environment and accumulate in fat, so the greatest exposures come from eating fatty foods and fish from contaminated water.

4. How do we know that endocrine disruptors are dangerous?

Many plant and animal species are showing signs of ill health due to exposure to endocrine disrupting chemicals. For example, fish in the Great Lakes, which are contaminated with polychlorinated biphenyls (PCBs) and other man-made chemicals, have numerous reproductive problems as well as abnormal swelling of the thyroid glands. Fish-eating birds in the Great Lakes area, such as eagles, terns, and gulls, have shown similar dysfunctions.

Scientists have also pointed to endocrine disruptors as the cause of a declining alligator population in Lake Apopka, Florida. The alligators in this area have diminished reproductive organs that prevent successful reproduction. These problems were connected to a large pesticide spill several years earlier, and the alligators were found to have endocrine disrupting chemicals in their bodies and eggs.

5. Should humans be concerned for their health based on evidence that fish, birds and alligators have been affected?

Yes. All vertebrates (fish, amphibians, reptiles, birds, and mammals, including humans) are fundamentally similar during early embryonic development. Scientists can therefore use the evidence acquired on other species to make predictions about endocrine disrupting effects on humans.

6. Is there direct evidence that humans are susceptible to endocrine disruption?

Yes. In the 1950s and 1960s pregnant women were prescribed diethylstilbestrol (DES), a synthetic estrogen, to prevent miscarriages. Not only did DES fail to prevent miscarriages, but it also caused health problems for many of these women's children. In 1971, doctors began reporting high rates of unusual vaginal cancers in teenage girls. Investigations of the girls' environmental exposures traced the problem to their mothers' use of DES. The girls also suffered birth defects of the uterus and ovaries, and immune system suppression.

7. Are children at greater risk from endocrine disruptor exposure?

Yes. Because endocrine disruptors affect the development of the body's vital organs and hormonal systems, infants, children and developing fetuses are more vulnerable to exposure. And as was the case with DES, parents' exposure to certain chemicals may produce unexpected -- and tragic -- effects in their children, even decades later.

8. These days don't chemicals have to be safe to be allowed on the market?

No. The majority of the more than 2,000 chemicals that come onto the market every year do not go through even the simplest tests to determine toxicity. Even when some tests are carried out, they do not assess whether or not a chemical has endocrine interfering properties.

9. What can I do to reduce my risk of exposure?

Educate yourself about endocrine disruptors, and educate your family and friends.

Buy organic food whenever possible.

Avoid using pesticides in your home or yard, or on your pet -- use baits or traps instead, keepin your home especially clean to prevent ant or roach infestations.

Find out if pesticides are used in your child's school or day care center and campaign for non-toxic alternatives.

Avoid fatty foods such as cheese and meat whenever possible.

If you eat fish from lakes, rivers, or bays, check with your state to see if they are contaminated.

Avoid heating food in plastic containers, or storing fatty foods in plastic containers or plastic wrap.

Do not give young children soft plastic teethers or toys, since these leach potential endocrine disrupting chemicals.

Support efforts to get strong government regulation of and increased research on endocrine disrupting chemicals.

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