What are Endocrine Disrupting Chemicals?

Endocrine disrupting chemicals interfere with hormonal communication between cells. Because hormones play a vital role in many processes, including organ development and function, mood and reproduction, endocrine disrupting chemicals could be having profound effects on our health. These substances are linked to reproductive abnormalities, immune disorders, obesity, cancer and other diseases. Endocrine disrupting chemicals are found in many everyday consumer products.

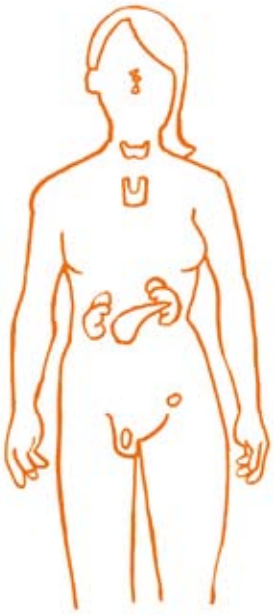
THE ENDOCRINE SYSTEM

The human body is made up from trillions of individual cells. Each cell is like a factory, constantly manufacturing the molecules which are ultimately responsible for all bodily functions, from temperature control to thought and rapid movement. This cellular manufacturing is what allows the body to stay healthy in response to an ever-changing environment, from inducing shivering when we get cold to absorbing excess sugar from the blood after eating.

In order to respond correctly to each change, cells in the body are constantly sending each other chemical messages to switch on and off these molecular manufacturing processes. Rapid responses, such as removing your hand from a hot object, are controlled by the nervous system. Larger events in life such as metabolism, mood, pregnancy and growth and development of organs are governed by the endocrine system: a set of glands which secrete hormones – the chemical messengers carried by the blood.

Transported at concentrations often as low as parts per trillion or less, hormones pass instructions to target cells where they initiate a complex cascade of changes to alter the molecules the target cell is manufacturing.

Endocrine glands include the thyroid gland, testes, and ovaries. Well-known hormones include oestrogen and testosterone, thyroxin and insulin. Because of the central role of hormones in the proper functioning of the body, disruption of the endocrine glands and hormone signalling can have a wide range of health effects from impaired mental development to increased risk of cancer.



CHEMICALS CAN INTERFERE WITH ENDOCRINE SIGNALLING

An endocrine disrupting chemical (EDC) alters the normal functioning of the endocrine system in a way which may harm the health of humans or wildlife, by giving cells in the body the wrong messages or preventing correct messages from being sent or received.

There are many ways in which EDCs can upset hormone signalling, by interfering with the function of the parts of the brain which regulate hormone release, activating or blocking signalling cascades, interfering with how hormones break down or become deactivated, or by making it harder for the body to produce, transport or store hormones.

For example, parabens and many UV-filters are endocrine disruptersbecause they can bind to and activate oestrogen receptors in target cells.

Phthalates are endocrine disruptors because they can block testosterone receptors, which can prevent processes essential for development of healthy reproductive organs in the male foetus from becoming activated.

It is not necessary for EDCs to be present in high concentrations for them to have a significant effect.

EDCs ARE LINKED TO A WIDE RANGE OF HEALTH PROBLEMS

Because correct hormone signalling is integral to the healthy functioning of the body, EDCs can have a wide range of potential health effects. Timing of exposure is as important as dose, as hormones play vital roles not only in maintaining the state of the body, but also the development of vital organs during foetal and childhood growth. The foetus and pregnant woman, infant and adolescent are those considered to be at greatest risk of harm from EDCs.

REPRODUCTIVE HEALTH: Male fertility and physical abnormalities of the male reproductive tract such as malformations of the penis and undescended testicles have been linked with exposure to chemicals, such as some phthalates, which inhibit the action of testosterone during foetal development.

CANCER: Endocrine disruptors can interfere with biological pathways involved in the initiation and progression of cancer and also re-programme organs so they are more likely to become cancerous later in life. For example, man-made oestrogens are thought to be involved in breast cancer development.

OBESITY: Exposure to EDCs could also make worse the effects of energy imbalances between diet and exercise, resulting in greater risk of obesity and obesity-related disorders such as diabetes and cardiovascular disease.

Immune system function, cognitive function and behavioural disorders, as well as increase in cardiovascular diseases, have also been linked with endocrine disruption.

EDCs ARE FOUND IN MANY CONSUMER PRODUCTS

Endocrine disrupting chemicals are found in many consumer products. Phthalates are used to make plastic soft and can be found in many products such as toys, electric cables, shower curtains and also in cosmetic products. Parabens are preservatives used in many cosmetic and personal care products and food items. UV filters are used in sunscreens, food packaging and inks for printing. Brominated flame retardants are added to furniture and electronic goods and can appear in high concentrations in house dust and are widespread in the environment.

Diet is a major source of exposure to many EDCs, from pesticides sprayed on fruit and vegetables to substances widely used in packaging materials and containers. EDCs are also found in a wide range of products including cash receipts, paints, gasoline, furniture, preserved wood and breast implants, as well as being used in processes such as dry cleaning and leather treatment.

There could potentially be a great many more EDCs but as yet very few chemicals have been adequately tested for endocrine disrupting properties.

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