Endocrine disrupters: potentially harmful chemicals for human hormones

July 5 2017

Potentially harmful chemicals which can interfere with the normal functioning of human hormones are known as endocrine disruptors (EDs).

These mostly manmade substances can cause a range of health problems.

EU member states Tuesday approved a European Commission list of criteria to help identify endocrine disruptors in products used to protect farm animals and plants from disease and insects—a move seen as a step toward a regulatory system on EDs.

Following is some background:

What is the endocrine system?

The body's endocrine tissues—in the ovaries and testes, as well as the adrenal, pituitary and thyroid glands—produce hormones that are secreted into the bloodstream to control and coordinate a range of critical body functions.

These hormones help regulate energy levels, reproduction, growth, development, as well as our response to stress and injury.

What are endocrine disrupters?

The term endocrine disrupter comes from a 1992 study by US epidemiologist Theo Colborn on the effects of chemical products on hormones.

According to the World Health Organization, an endocrine disruptor is a substance (or a mixture of substances) which disrupts the functions of the hormonal system and consequently is harmful to human health and reproduction, including at very weak levels of exposure.

How do EDs work?

From animal studies, researchers have learned that endocrine disruptors can mimic naturally occurring hormones such as the female sex hormone oestrogen, and the male hormone androgen.

They bind to a receptor within a human cell and block the natural hormone from binding to it. This blocks normal signalling, causing malfunctions within the body.

Disruptors can also influence the way natural hormones and their receptors are made and controlled, for example, altering the metabolism of the liver.

Where are EDs found?

Everywhere. People are exposed to hormone-disrupting chemicals through everyday products including food and drink, medications, pesticides, cosmetics, plastics, detergents, flame retardants, and toys—to name a few.

They can even be found in air and dust and can enter our bodies via the skin, breathing, drinking or eating. These chemicals can also be

transferred from a woman to her child via the placenta or breast milk.

There are thousands of chemicals that can—alone or in combination with others—potentially disturb our hormonal and immune systems.

What are the impacts?

The suspect compounds have been linked to altered reproductive function in males and females, increased incidence of breast cancer, disturbance of the nervous and immune systems, abnormal growth, and stunted development in children.

The endocrine disrupting capacity of some chemicals—the pesticide DDT, dioxins and toxic compounds called PCBs—are well known, but for thousands of others the impacts are still unproven. While many molecules have been individually tested for safety, few studies have examined how they interact with others.

Impacts—including spontaneous sex changes—have also been observed in amphibians exposed to synthetic hormones, such as oestrogen, in their water.

Concrete examples?

Bisphenol A (BPA) is used in large quantities to produce polycarbonate plastics and epoxy resins. The US National Toxicology Program (NTP) has expressed "some concern" for impacts at current levels of exposure on the brain, behaviour, and prostate glands of foetuses, infants and children.

Di(2-ethylhexyl) phthalate (DEHP) is a mass-produced chemical widely used in consumer food packaging, some children's products, and some

PVC medical devices. The NTP has said it might pose a risk to human development, especially in critically ill male infants.

Sources: US National Institute of Environmental Health Sciences, World Health Organization.