Experts say protocols for identifying endocrine-disrupting chemicals inadequate

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In a Statement of Principles unveiled today, The Endocrine Society proposes a streamlined definition for endocrine-disrupting chemicals (EDCs) and offers recommendations that will strengthen the ability of current screening programs to identify EDCs.

An endocrine-disrupting chemical (EDC) is a chemical or mixture of chemicals in the environment, that can interfere with any aspect of hormone action. The Endocrine Society's Scientific Statement published in 2009 provided an exhaustive summary of the scientific background that justifies concern for the effects of EDC exposures to humans and wildlife.

"Because of the interest and expertise of our members, The Endocrine Society is in a unique position to help inform the ongoing debate about the health effects of endocrine disruptors," said R. Thomas Zoeller, PhD, of the University of Massachusetts and lead author of the statement. "The new statement outlines key issues related to identifying EDCs and protecting humans and wildlife from their adverse effects."

The current statement addresses the importance of having an accurate definition for endocrine-disrupting chemicals. The definition is critical because it dictates the evidence required to identify a chemical as an EDC and informs the subsequent steps of assessing the risk of EDC exposures.

In the statement the Society proposes an EDC be defined as an

exogenous chemical, or mixture of chemicals, that interferes with any aspect of hormone action. This definition purposefully omits reference to adverse effects, as there is lack of agreement on what constitutes an adverse effect. According to the statement, the ability of a chemical to interfere with hormone action is a clear predictor of adverse outcome if exposure occurs during critical periods or developmental processes.

Recommendations in the statement include:

- Basic scientists actively engaged in the development of new knowledge in relevant disciplines should be involved in evaluating the weight-of-evidence of EDC studies, as well as in the design and interpretation of studies that inform the regulation of EDCs;
- State-of-the-art molecular and cellular techniques, and highly sensitive model systems, need to be built into current testing, in consultation with the appropriate system experts;
- Testing needs to include models of developmental exposure during critical life periods when organisms may be most vulnerable to even very low-dose exposures;
- The design and interpretation of tests must incorporate the biological principle that EDCs act through multiple mechanisms in physiological systems; and
- Endocrine principles, such as those outlined in this document, should be incorporated into programs by the U.S. Environmental Protection Agency (EPA) and other agencies charged with evaluating chemicals for endocrine-disrupting potential.

The statement also provides a list of principles intended to enhance the ability of current screening programs to identify EDCs. Principles in the statement include:

- Environmental chemicals that interfere with any aspect of hormone action should be presumed to produce adverse effects;
- EDC exposures during development can have effects on hormone action that cannot be corrected, leaving permanent adverse impacts on cognitive function and other health parameters;
- People are exposed to multiple EDCs at the same time, and these mixtures can have a greater effect on the hormone system than any single EDC alone; and
- The weight-of-evidence guidance developed by the EPA must be strengthened by adhering to principles of endocrinology outlined here, including low-dose effects and nonlinear or nonmonotonic dose-response curves.

More information: The statement, "Endocrine-Disrupting Chemicals and Public Health Protection: A Statement of Principles from The Endocrine Society," appears in the September 2012 issue of Endocrinology.

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