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GLOBAL RISK & REGULATION NEWS

Experts endorse Parma consensus on 'metabolic disruptors'

Obesogens too narrow a term for chemicals associated with weight gain, diabetes

1 July 2015 / Europe, North America, Risk assessment

Over 30, mainly US and Italian, experts have drawn up a consensus statement on environmental chemicals which disrupt metabolism, and are associated with "epidemics" of obesity and metabolic syndrome.

The consensus draws its name from a workshop, last year, in the Italian city of Parma, which reviewed the evidence for environmental chemicals in causing obesity, diabetes and other disorders, and sought to identify knowledge gaps for future research.

The ensuing "Parma statement" was recently published in the journal *Environmental Health,* with Jerry Heindel of the US National Institute of Environmental Health Sciences (NIEHS) as lead author. Other well-known signatories include Frederick vom Saal and Christopher Kassotis, both from the biology department of the University of Missouri, and Susan Nagel from the university's department of obstetrics.

The statement says there has been a global increase in obesity, diabetes and metabolic diseases over the past four decades, and since there has been no major genetic change, this must be due to "multifactorial" environmental components which include drugs, stress, nutrition and chemical exposures, and not solely overeating, lack of exercise and poor nutrition.

The "metabolic disruptor hypothesis" has a central position in the statement. It says that environmental chemicals can act during sensitive time periods to control fat tissue development, and altering food intake and metabolism through many organ systems.

Obesity and metabolic syndrome are endocrine diseases, the statement says, which are sensitive to environmental endocrine disrupting chemicals. And susceptibility is partly pre-programmed *in utero* and in early life through exposure to environmental factors, including chemicals.

Development *in utero* and the first few years of life are the most sensitive windows for metabolic disruption, the statement affirms. Existing data also confirm that effects of metabolic disruptors will be difficult to detect at the individual level, due to variability, and they differ depending on routes of exposure and dose. There may also be non-monotonic responses to doses of disruptors.

These observations are reflected in the statement's suggestions on future research strategies. These should focus on identifying adverse outcome pathways, windows of susceptibility, defining the role of chemicals in diabetes and assessing epigenetic markers underlying altered developmental programming of metabolism in animals and humans, it says.

Giving his personal view, Alan Poole, secretary general of the European Centre for the Ecotoxicology and Toxicology of Chemicals (Ecetoc), said he agreed it is necessary to identify a plausible "mode of action/adverse outcome pathway" describing how an environmental agent might produce, for example, obesity. Only then will it be possible to test it experimentally.

Epigenetics is a relatively new science, he said. "I believe I am safe in saying no one has described an adverse epigenetic event. The current position is that epigenetic change is a mode of action that might or might not result in an adverse health outcome. Current safety testing protocols will detect an adverse health outcome, whether it is caused by epigenetics or some other mode of action. However, epigenetic measurements together with other new technologies do provide the potential to predict adverse health outcomes and, thus, possibly save unnecessary animal testing."

The NIEHS is currently funding 57 studies into chemical exposures affecting obesity and diabetes (CW 17 March 2015 (https://chemicalwatch.com/23171/)).

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Further Information

Parma consensus statement on metabolic disruptors (http://www.ehjournal.net/content/14/1/54)