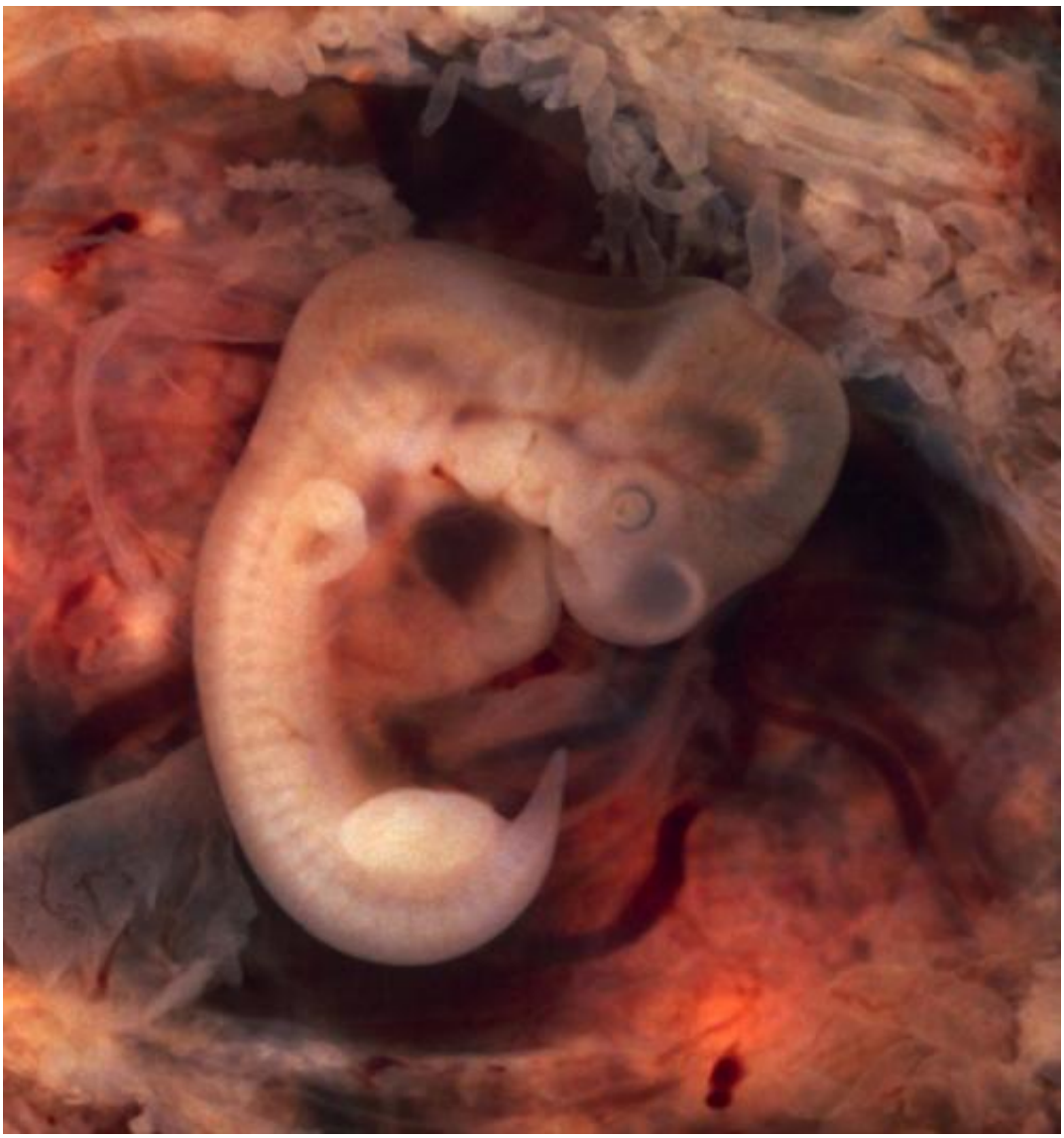
MedicalXpress

Parents' preconception exposure to environmental stressors can disrupt early development

August 4 2015



Human Embryo. Credit: Ed Uthman, MD/Wikipedia

Even before a child is conceived, the parents' exposure to environmental stressors can alter the way genes are expressed and ultimately harm the child's health when those genes are passed down to the next generation, according to a new article published in the Endocrine Society's journal *Endocrinology*.

Exposure to environmental stressors such as endocrine-disrupting chemicals, psychological stress and malnutrition may result in disadvantageous epigenetic "reprogramming" that can echo through multiple generations. When these stressors disrupt early developmental processes, they may cause changes in cellular gene expression, cell numbers or locations of cells that persist and lead to increased risk of cognitive disorders, obesity, diabetes and metabolic diseases later in life.

The article summarizes key insights from the 4th Conference on Prenatal Programming and Toxicity (PPTOX IV). More than 300 people attended the event in Boston, MA in October 2014. The meeting featured more than 60 oral and 130 poster presentations discussing the impact of chemical, physical and biological environmental stressors on the interconnected relationships of endocrine, immune and nervous systems.

Previous research on environmental stressors focused primarily on exposures during pregnancy and early childhood and their effects on the health of the offspring across the lifespan. However, presentations at PPTOX IV emphasized that the preconception period in both females and males is also a sensitive developmental window.

"In regard to environmental stressors, a good start lasts a lifetime," said Philippe Grandjean, MD, PhD, Professor of Environmental Medicine at the University of Southern Denmark and Adjunct Professor of

Environmental Health at the Harvard T.H.Chan School of Public Health and an author of the article. "Unfortunately, current testing paradigms do not properly assess the impact of risk factors during vulnerable exposure windows. Without new policies and guidelines, we cannot have a universal healthy start for children."

Researchers note that regulatory agencies currently may not appropriately take into account the potential for non-linear effects of certain environmental chemicals, meaning that exposure to low levels of a chemical can have different adverse effects than what could be experienced at exposure to higher levels of the same chemical.

The conference also highlighted the importance of placental function and the need to understand how changes in placental status may affect fetal development, as well as the importance of mixed stress exposures.

More information: "Life-long Implications of Developmental Exposure to Environmental Stressors: New Perspectives," press.endocrine.org/doi/10.1210/en.2015-1350

Provided by The Endocrine Society