Ann. N.Y. Acad. Sci. ISSN 0077-8923

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES
Issue: Annals *Meeting Reports*

Fetal programming and environmental exposures: implications for prenatal care and preterm birth

Thaddeus T. Schug,[1] Adrian Erlebacher,[2] Sarah Leibowitz,[3] Liang Ma,[4] Louis J. Muglia,[5] Oliver J. Rando,[6] John M. Rogers,[7] Roberto Romero,[8] Frederick S. vom Saal,[9] and David L. Wise[10]

[1]National Institute of Environmental Health Sciences, Research Triangle Park, North Carolina. [2]NYU School of Medicine, New York, New York. [3]The Rockefeller University, New York, New York. [4]Division of Dermatology, Department of Medicine, Washington University School of Medicine, St. Louis, Missouri. [5]Cincinnati Children's Hospital Medical Center and University of Cincinnati College of Medicine, Cincinnati, Ohio. [6]Department of Biochemistry and Molecular Pharmacology, University of Massachusetts Medical School, Worcester, Massachusetts. [7]Toxicity Assessment Division, National Health and Environmental Effects Research Laboratory, Office of Research and Development, United States Environmental Protection Agency, Research Triangle Park, North Carolina. [8]Perinatology Research Branch, NICHD, NIH, DHHS, Bethesda, Maryland. [9]Division of Biological Sciences, University of Missouri, Columbia, Missouri. [10]Merck Research Laboratories, West Point, Pennsylvania

Address for correspondence: Thaddeus T. Schug, National Institute of Environmental Health Sciences, P.O. Box 12233, Research Triangle Park, NC 27709. schugt@niehs.nih.gov

Sponsored by the New York Academy of Sciences and Cincinnati Children's Hospital Medical Center, with support from the National Institute of Environmental Health Sciences (NIEHS), the National Institute on Drug Abuse (NIDA), and Life Technologies, "Fetal Programming and Environmental Exposures: Implications for Prenatal Care and Preterm Birth" was held on June 11–12, 2012 at the New York Academy of Sciences in New York City. The meeting, comprising individual talks and panel discussions, highlighted basic, clinical, and translational research approaches, and highlighted the need for specialized testing of drugs, consumer products, and industrial chemicals, with a view to the unique impacts these can have during gestation. Speakers went on to discuss many other factors that affect prenatal development, from genetics to parental diet, revealing the extraordinary sensitivity of the developing fetus.

Keywords: genetic and epigenetic programming; fetal development; toxicity

Background and perspectives

Keynote address: Frederick S. vom Saal (University of Missouri–Columbia)

Fetal programming is an enormously complex process that relies on numerous environmental inputs from uterine tissue, the placenta, the maternal blood supply, and other sources. Recent evidence has made clear that the process is not based entirely on genetics, but rather on a delicate series of interactions between genes and the environment. It is likely that epigenetic ("above the genome") changes are responsible for modifying gene expression in the developing fetus, and these modifications can have long-lasting health impacts. Determining which epigenetic regulators are most vital in embryonic development will improve pregnancy outcomes and our ability to treat and prevent disorders that emerge later in life.

"Fetal Programming and Environmental Exposures: Implications for Prenatal Care and Preterm Birth" began with a keynote address by Frederick vom Saal, who explained that low-level exposure to endocrine disrupting chemicals (EDCs) perturbs hormone systems *in utero* and can have negative effects on fetal development. vom Saal presented data on the EDC bisphenol A (BPA), an estrogen-mimicking compound found in many plastics. He suggested that low-dose exposure to EDCs can alter the development process and enhance chances of acquiring adult diseases, such as breast cancer, diabetes, and even developmental disorders such as attention deficit disorder (ADHD).[1] vom Saal noted that conventional risk-assessment

doi: 10.1111/nyas.12003
Ann. N.Y. Acad. Sci. 1276 (2012) 37–46