Women exposed to organic pollutants in early pregnancy have more than four-times increased risk of gestational diabetes

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New research presented at this year's annual meeting of the European Association for the Study of Diabetes in Stockholm shows that a 10-times increased exposure to organic pollutants in early pregnancy is associated with a 4.4 times increased risk of a pregnant woman developing gestational diabetes. The research is by Assistant Professor Leda Chatzi, University of Crete, Heraklion, Greece.

Persistent Organic Pollutants (POPs) are a group of diverse substances, including polychlorinated biphenyls (PCBs) and organochlorine pesticides that are resistant to biodegradation and present almost everywhere in the environment. Exposure to endocrine disrupting chemicals such as POPs has been linked to type 2 diabetes and metabolic disturbances in epidemiological and animal studies, but little is known about POPs exposure during pregnancy and the development of gestational diabetes mellitus (GDM). Dichlorodiphenyldichloroethene (DDE-a breakdown product of DDT) and hexachlorobenzene (HCB) are synthetic chemicals that were used widely as pesticides, while PCBs were used in many industrial processes. These chemicals have been banned for decades but remain in the environment where they bioaccumulate in the bodies of animals and humans.

The purpose of this study was to determine the extent to which exposure to current low levels of different POPs in the first trimester of pregnancy is associated with GDM risk in 639 women from the Rhea

pregnancy cohort in Crete, Greece. The study is the Mother-Child Cohort in Crete, "Rhea" cohort which prospectively examines a population-based sample of pregnant women and their children at the prefecture of Heraklion, Crete, Greece. Female residents who became pregnant during a period of one year starting in February 2007 were contacted and asked to participate in the study. The first contact was made at the time of the first comprehensive ultrasound and several contacts followed (6th month of pregnancy, at birth, 9 months, 1st year, 4 and 7 years after birth). The Principal Investigator of the study is Assistant Professor Leda Chatzi.

The authors determined the concentrations of several PCBs, DDE, and HCB in first trimester maternal serum by mass spectrometry. Pregnant women were screened for gestational diabetes mellitus (GDM) between 24 and 28 weeks of gestation.

A total of 68 (7%) women had GDM, and the authors found that a 10-fold increase in total PCBs was associated with a 4.4 times increased risk of GDM after adjusting for pre-pregnancy BMI and several other confounders. The association was similar for non dioxin-like PCBs (4.4 times increased risk). However prenatal DDE and HCB exposure were not significantly associated with GDM risk.

The authors conclude: "These findings suggest that women with high PCBs levels in early pregnancy had higher risk for gestational diabetes. Further studies are needed to replicate these results and to evaluate potential biological mechanisms underlying the observed associations."

They add: "As countries around the world, including Greece, deal with an increasing prevalence of gestational diabetes, the findings are important from a public health perspective as knowledge of environmental risk factors could help to reverse this trend. Our future research in this cohort will examine whether prenatal exposure to POPs

is associated with alterations in glucose metabolism and diabetes development of the offspring in early childhood."

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