

High-fat diet, obesity during pregnancy harms stem cells in developing fetus

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Physician-scientists at OHSU Doernbecher Children's Hospital reveal a high-fat diet and obesity during pregnancy compromise the blood-forming, or hematopoietic, stem cell system in the fetal liver responsible for creating and sustaining lifelong blood and immune system function.

The life-long burden of a western-style diet on the heart and [circulatory system](#) have long been appreciated. However, prior to this study, no one had considered whether the developing [blood stem cells](#) might be similarly vulnerable to prenatal high-fat diet and/or [maternal obesity](#). The findings are published in the journal *Molecular Metabolism*.

"Our results offer a model for testing whether the effects of a high-fat

diet and obesity can be repaired through dietary intervention, a key question when extrapolating this data to human populations," said Daniel L. Marks, M.D., Ph.D., co-investigator and professor of pediatric endocrinology in the OHSU School of Medicine and Papé Family Pediatric Research Institute at OHSU Doernbecher Children's Hospital.

Several years ago, Marks and colleagues developed a mouse model that closely mimics the high-fat, high-simple-sugar diet currently consumed by many young women of childbearing age. Their subsequent research demonstrated that maternal overnutrition in mice significantly reduced the size of the fetal liver.

Armed with this information, Marks partnered with another stem cell expert, Peter Kurre, M.D., co-investigator on the current study and professor of pediatric oncology in the OHSU School of Medicine and the Papé Family Pediatric Research Institute at OHSU Doernbecher Children's Hospital.

Together, they discovered that the complex changes that occur as a result of maternal high-fat diet and obesity put significant constraints on the growth and expansion of blood [stem cells](#) in the fetal liver, which ultimately compromises the developing [immune system](#).

"In light of the spreading western-style, high-fat [diet](#) and accompanying obesity epidemic, this study highlights the need to better understand the previous unrecognized susceptibility of the stem and progenitor cell system," Kurre said. "These findings may provide broad context for the rise in immune disease and allergic disposition in children."

More information: Maternal high-fat diet and obesity compromise fetal hematopoiesis, *Molecular Metabolism*, 2014.

Provided by Oregon Health & Science University

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