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Scientists uncover new mechanism regulating fetal growth and neonatal survival

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Dr. Sylvain Meloche, Principal Investigator at the Institute for Research in Immunology and Cancer (IRIC) of the Université de Montréal, and his colleagues have uncovered the critical role played by the protein kinase Erk3 in fetal growth potential and lung maturation. The recent findings, published in the online early edition of the *Proceedings of the National Academy of Sciences,* reveal that the loss of Erk3 function in the mouse leads to fetal growth restriction and early neonatal lethality caused by respiratory distress.

Respiratory distress syndrome is a serious complication of premature and intrauterine growth-restricted infants and represents the primary contributor to neonatal morbidity and mortality. Intrauterine growth restriction (IUGR) refers to a condition in which the fetus fails to achieve its genetically determined size and is consequently smaller than expected for its gestational age. It results from defects that prevent the multiplication or growth of cells, leading to a decrease in organ size and function. To date, only few molecular mechanisms have been proposed to explain this complex condition. In this study, Dr. Meloche and his team demonstrate that the inactivation of Erk3 in mice mimics IUGR conditions in humans and is associated with decreased blood levels of IGF-2, a growth hormone promoting fetal development.

"Infants with IUGR have a significant risk for diabetes, hypertension and coronary heart disease later in life," explains Dr. Meloche, "IUGR is also associated with a higher risk of long-term neurodevelopmental outcomes. We hope that this study will shed new light on the molecular

mechanisms underlying this serious condition."

Dr. Meloche and his team intend to exploit this new mouse model to further the understanding of the genetic and biochemical pathways involved in fetal growth control and pulmonary maturation.

More information: Sonia Klinger, Benjamin Turgeon, Kim Lévesque, Geoffrey A. Wood, Kjersti M. Aagaard-Tillery, and Sylvain Meloche. Loss of Erk3 function in mice leads to intrauterine growth restriction, pulmonary immaturity, and neonatal lethality. PNAS published online before print September 15, 2009, doi:10.1073/pnas.0900919106

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