Medical Xpress

Stress during pregnancy leads to abdominal obesity in mice offspring

July 31 2012

A new report involving mice suggests that a relationship exists between maternal metabolic or psychological stress and the development of obesity, type 2 diabetes, and metabolic syndrome in her offspring. What's more, the report shows that if the stress cannot be reduced or eliminated, manipulating the neuropeptide Y (NPY) system in visceral fat may prevent maternal stress-induced obesity from occurring in the next generation. This discovery is reported in the August 2012 issue of The *FASEB Journal*.

"Obesity is a worldwide disease. Here we found that maternal stress, psychologically and metabolically, increases abdominal obesity and glucose intolerance in the next generation in a sex-specific manner, which is mediated by the NPY system in visceral fat," said Ruijun Han, a researcher involved in the work from the Department of Integrative Biology and Physiology, Stress Physiology Center at the University of Minnesota. "Our study suggested that NPY in the platelet-rich plasma and its Y2 receptor in the visceral fat, play an important role in maternal stress-programmed abdominal obesity and metabolic syndrome in offspring."

To make this discovery, Young and colleagues fed different groups of pregnant mice a low protein diet during pregnancy and lactation; a normal protein diet during pregnancy and lactation; or a low protein diet only during pregnancy. After weaning, all the pups were fed high fat diets for 18 weeks, and metabolic parameters and expression of NPY system in periphery tissues were monitored and measured.

"There are a lot of reasons why expectant mothers should not be under stress," said Gerald Weissmann, M.D., Editor-in-Chief of The FASEB Journal, "and this report adds yet another reason. What's most interesting, however, is that it provides some insight into how we can counter the negative effects of stress, even when it's not possible to reduce or eliminate the stressors themselves."

More information: Ruijun Han, Aiyun Li, Lijun Li, Joanna B. Kitlinska, and Zofia Zukowska. Maternal low-protein diet up-regulates the neuropeptide Y system in visceral fat and leads to abdominal obesity and glucose intolerance in a sex- and time-specific manner. *FASEB J.* doi:10.1096/fj.12-203943

Provided by Federation of American Societies for Experimental Biology