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EXCESSIVE FOLIC ACID FOUND TO ALTER BRAIN DEVELOPMENT AND BEHAVIOR

Findings Suggest Need for Regulation of Folic Acid Supplementation During Pregnancy

Scientists from New York State report that higher doses of folic acid during pregnancy and throughout life may have lasting negative effects.

The researchers found in their study that the higher doses of folic acid altered offspring's brain development and behavior in ways that are found in neurodevelopmental disorders.

These findings suggest that there may be a loss of benefit from unregulated amounts of folic acid throughout pregnancy. In contrast, popular belief favors high folic acid supplementation throughout pregnancy.

Federal guidelines stipulate supplementation of cereals and grains with folic acid to prevent spina bifida or neural tube closure defects in newborns. Adequate levels of folic acid are needed during the first trimester, when neural tube closure occurs and the risk is the highest for defects. However, these higher doses of folic acid are prescribed to women throughout the entire pregnancy. The potentially negative physiological consequences of this excessive supplementation were previously unknown.

The research study was conducted at the New York State Office for People With Developmental Disabilities' (OPWDD) Institute for Basic Research in Developmental Disabilities (IBR). Led by Mohammed A. Junaid, PhD, head of IBR's Structural Neurobiology Laboratory, the study was conducted in mice that are models of neurological disorders in humans. The research group further confirmed alterations in the levels of nine genes in pups whose dams were exposed to the higher dose of folic acid. Unintended changes in the genes can have deleterious effects on proper development. The negative effects observed in these pups were behavioral changes, including increased ultrasonic vocalizations, greater anxiety-like behavior, and hyperactivity.

IBR Director W. Ted Brown, MD, PhD, said, "Our finding that excessive folic acid may affect development has important public health implications. It suggests the need for folic acid supplementation during pregnancy to be regulated to prevent concentrations high enough to negatively alter gene expression."

OPWDD Acting Commissioner Kerry Delaney said, "This study's findings indicate the need for further research on how excessive folic acid can lead to developmental disabilities, including autism, and how appropriate folic

acid levels during pregnancy may help prevent these disabilities as well as neural tube closure defects."

The study, "Increasing maternal or post-weaning folic acid alters gene expression and moderately changes behavior in the offspring," was published in the July 9, 2014, issue of the journal *PLoS ONE* [http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0101674].

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About OPWDD and IBR:

The Institute for Basic Research in Developmental Disabilities (IBR) is the research arm of the New York State Office for People With Developmental Disabilities (OPWDD.) OPWDD is responsible for coordinating services for more than 126,000 New Yorkers with developmental disabilities. It provides services directly and through a network of nonprofit service-providing agencies.

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