Early supplementation may help offset early-life stress on the adult brain

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Early-life stress has been shown to impair learning and memory in later life, but new research, published online in *The FASEB Journal*, suggests that improved nutrition may help offset the negative effects of this stress. Specifically, using mice, scientists focused on essential micronutrients, including methionine, vitamins B6and B12, and folic acid, none of which are made by the body and need to be ingested through diet. They found that early-life stress reduces the levels of these nutrients in mouse pups, but supplementation prevented the reduction of methionine levels and even prevented some of the lasting negative effects of early-life stress on later learning and memory in adult offspring.

"Today's children are tomorrow's future," said Aniko Korosi, Ph.D., a researcher involved in the work from the Swammerdam Institute for Life Sciences and the Center for Neuroscience at the University of Amsterdam in Amsterdam, The Netherlands. "We hope that this study can contribute to novel nutritional strategies that help prevent lasting consequences of a stressful childhood on later mental health."

To make their discovery, Korosi and colleagues mimicked a stressful early-life environment during the first week after birth (postnatal days 2-9) for newborn mice and their mothers. Control mice and their mothers were housed in a normal environment. During the stress period, half of the mouse mothers (control and early-life stress) received a standard rodent diet, the other half received a diet that was supplemented with essential micronutrients. The lactating mouse mothers ate the diet and thereby developed elevated micronutrient levels in maternal milk and subsequently in the blood and the brains of their pups. After the initial stress period, all mice received a standard diet and environment. Once the mice became 4 months old, their learning and memory skills were tested in various cognitive/behavioral tasks. Mice that were previously exposed to early-life stress performed worse than control animals and demonstrated poor learning and memory skills. However, stress-exposed mice from mothers that received the supplemented diet performed equally well as the control mice did.

"The field of postnatal nutrition has sometimes taken a back seat to research on the maternal-fetal axis, but of course we cannot ever ignore either," said Thoru Pederson, Ph.D., Editor-in-Chief of *The FASEB Journal*. "Here we see strikingly beneficial cognitive effects of a sound postnatal diet. The nutrients tested were familiar ones, but the results speak for themselves."

More information: E. F. G. Naninck et al, Early micronutrient supplementation protects against early stress-induced cognitive impairments, *The FASEB Journal* (2016). DOI: 10.1096/fj.201600834R

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