

Diet rich in methionine may promote memory loss

31 March 2015

Memory loss has recently been associated with excessive silencing of genes through a process called methylation. Researchers at the University of Louisville investigated the effects of a diet rich in methionine—an amino acid most abundant in eggs, fish and meats—on memory loss. They found that the diet promoted memory loss through increased methylation of netrin, a protein important for maintaining the brain.

Anuradha Kalani will present "Epigenetic Silencing of Netrin Is Associated with Memory Loss by High Methionine, Low Folate and Vitamin B6/B12 Containing Diet" as part of a featured topic session "Diet, Nutrition and Adipose Tissue: You Are What You Eat" on Tuesday, March 31 (Room 206A of the Boston Convention and Exhibition) and at a poster session the same day at the Experimental Biology Meeting (Boston Convention and Exhibition).

Kalani et al. fed [mice](#) a [diet](#) containing high amounts of methionine and low amounts of folate and vitamins B6 and B12. They measured the mice's memory capability along with netrin and methylation levels in the mice's brains. They found that the longer the mice were on the diet, the less netrin was expressed and the more the netrin gene was methylated. According to the researchers, the data confirm that a high-methionine diet induces learning and memory defects and that [memory loss](#) appears associated with reduced levels of netrin because of its over-methylation.

From the researchers: "Studies have shown that a healthy diet can boost memory. On the contrary, our study's findings interestingly suggest that a diet rich in methionine—for example, red meat and some fish—can actually increase the risk for memory loss. Mice were fed an excess methionine diet and examined for memory function weekly. Our findings suggest that an excess methionine diet caused memory impairment and hyper-methylation that affected netrin expression, which

is a protein important in maintaining synaptic plasticity and involved in axonal guidance and neurogenesis. We further introduced netrin intracerebrally into the mice to confirm the association of netrin with memory loss. Mice were examined thrice a week post-netrin injection. The data suggest that netrin introduction helped in ~50% memory regain in mice on the diet. We are looking further into epigenetic factors like microRNA and other downstream genes that could be associated with memory loss."

Provided by American Physiological Society

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