Finally, an excuse for pregnant women to eat bacon and eggs

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If you're pregnant and looking for an excuse to eat bacon and eggs, now you've got one: a new research study published in the January 2010 print issue of the *FASEB Journal* by a team of University of North Carolina researchers shows that choline plays a critical role in helping fetal brains develop regions associated with memory. Choline is found in meats, including pork, as well as chicken eggs.

"Our study in mice indicates that the diet of a pregnant mother, especially choline in that diet, can change the epigenetic switches that control brain development in the fetus" said Steven Zeisel, the senior scientist involved in the work and a senior member of the *FASEB Journal*'s editorial board. "Understanding more about how diet modifies our genes could be very important for assuring optimal development."

Zeisel and colleagues made this discovery by feeding two groups of pregnant mice different diets during the window of time when a fetus develops its hippocampus, that part of the brain responsible for memory. The first group received no choline while the other received choline (1.1g/Kg). The group that received no choline had changes in epigenetic marks on the proteins (histones) that wrap genes in cells responsible for the creation of new brain cells (neural progenitor cells). Then, by isolating these cells from the developing brains and growing them in cell culture, the scientists determined the expression of genes for two proteins that regulate neuronal cell creation and maturation. These two proteins (G9a and Calb1) were changed in the brains of fetuses whose mothers were fed low choline diets.

"We may never be able to call bacon a health food with a straight face, but the emerging field of epigenetics is already making us rethink those things that we consider healthful and unhealthful," said Gerald Weissmann, MD, Editor-in-Chief of the FASEB Journal. "This is yet another example showing that good prenatal nutrition is vitally important throughout a child's entire lifetime."

The Agricultural Research Service's Nutrient Data Laboratory makes a database available to the public in an effort to help them get healthful amounts of choline in their diets. The database provides researchers and consumers with the means to estimate daily choline intake from consumption of more than 400 different foods and can be accessed at http://www.ars.usda.gov/main/site_main.htm?modecode=12-35-45-00. The Agricultural Research Service says that "experts suggest that an adequate choline intake is 425 milligrams a day for women and 550 milligrams a day for men. Top sources of choline include meat, nuts, and eggs."

More information: Mihai G. Mehedint, Mihai D. Niculescu, Corneliu N. Craciunescu, and Steven H. Zeisel. Choline deficiency alters global histone methylation and epigenetic marking at the Re1 site of the calbindin 1 gene. FASEB J. 2010 24: 184-195. www.fasebj.org/cgi/content/abstract/24/1/184

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