

# Nutrition News

Department of Human Nutrition



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## Choline – The Unknown Essential Nutrient?

You may have heard its name, or read about it in current popular magazines. Choline (pronounced KO-leen), a nutrient usually grouped with the vitamin B complex, is making the news and receiving well-deserved attention for its important roles in health. Although it was discovered in 1862, much more recent research has focused on choline's role in fetal development and its possible role in preventing birth defects. Other health benefits are being examined for the entire population.

Choline is required for the structural integrity of cell membranes, and is involved in many transport and transmission processes at the cell level throughout the body.

Choline appears to positively affect areas of the brain responsible for memory function and life-long learning ability, especially in developing fetuses and

newborn infants. This makes choline an especially important nutrient for pregnant and lactating women. In older adults, choline is being studied for its possible role in preventing dementia and Alzheimer's disease. Other research is examining the relationship between adequate choline in the diet and lower concentrations of homocysteine, an amino acid that serves as a marker of tissue damage and a known risk factor for cardiovascular disease.

A recent research study conducted at Stanford University School of Medicine looked at the choline levels of pregnant women who were folate-fortified but delivered babies with neural tube defects (NTD). The researchers observed that elevated choline was associated with reduced risks for NTD, and that women with lower choline levels had increased risk for

NTD, despite having adequate folate levels. The researchers noted that this makes sense from a science perspective, as choline and folate are highly interrelated, and a change in one affects the other. Choline deficiency could affect both folate and homocysteine metabolism.

Choline is available in the diet as free choline, or is bound into several esterified forms, including phosphatidylcholine. Lecithin, a substance commonly added to foods as an emulsifying agent, is rich in phosphatidylcholine and supplies choline to our diets. Most of the choline in foods is in the membrane of a variety of foods. Excellent dietary sources of choline include beef liver and eggs. Other foods especially rich in choline include milk, cauliflower, broccoli, wheat germ and peanuts. Free choline is found in oatmeal, soybeans, iceberg lettuce, kale and cabbage.

What's the bottom line for educators? Consumer awareness of choline is low. Almost three-fourths of moms surveyed were not aware of choline's benefits, and even more did not know food sources providing choline to the diet. Even physicians are relatively uninformed about the nutrient. Presently, few supplements provide choline, so dietary sources are essential to good health. For more information, including a downloadable Choline Tool Kit with patient/client education pieces, go to: [www.cholineinfo.org/index.asp](http://www.cholineinfo.org/index.asp). Also see the MOM newsletter, Vol. 1, Issue 3, at : <http://www.ksre.ksu.edu/humannutrition/mom.htm>, for more on choline and maternal nutrition.

### Adequate Intake levels for Choline are:

Population	Adequate Intake (AI) of Choline
Women ( $\geq$ 19 years of age)	425 milligrams
Pregnant Women (14-50 years of age)	450 milligrams
Breastfeeding Women (14-50) years of age)	550 milligrams
Men ( $\geq$ 19 years of age)	550 milligrams
Children (1-3 years of age)	200 milligrams
Children (4-8 years of age)	250 milligrams

Table Source: Dietary Reference Intakes, Institute of Medicine of the National Academies, National Academies Press, Washington, DC, 2006.

Sources: Shaw GM; Finnell,RH; et al (2009): Choline and risk of neural tube defects in a folate-fortified population. *Epidemiology* 20(5), 714-719.

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For more information about healthy eating, contact your local extension office. The Food Assistance Program can help people of all ages with low income buy nutritious foods for a better diet. To find out more, call toll-free 1-888-369-4777.

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