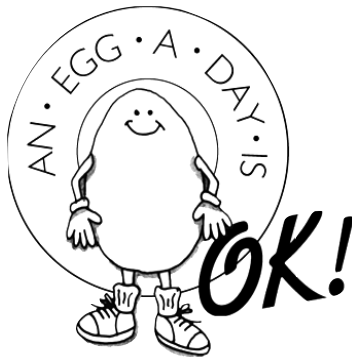


# Special Report



After 30 plus years of being maligned for its cholesterol content, now, thanks to an ever growing body of research studies, eggs are making a comeback. Even the American Heart Association allows healthy adults to enjoy 7 eggs per week. Study after study shows that dietary cholesterol has no effect on heart disease risk. Even though one large egg contains 215 mg of cholesterol, it has only 1.5 gm of saturated fat. More importantly, studies show that eggs contain important nutrients like choline, lutein, and zeaxanthin, that play important roles in health promotion and disease prevention.

## Research Vindicates Eggs

### Dietary Cholesterol Has Little Affect On Plasma Cholesterol

- Data from meta-analyses by Howell et al. (n=224) and Clarke et al. (n=80) on the relationship between dietary fat and cholesterol and plasma cholesterol levels demonstrate that dietary cholesterol has a limited effect on plasma cholesterol levels. Saturated fat, on the other hand, has a much greater effect on plasma cholesterol levels. Both analyses showed that a 50 mg change in dietary cholesterol was associated with 1 mg change in both plasma total and LDL cholesterol levels. While exchanging 1% of saturated fatty acid calories for polyunsaturated fatty acid calories would decrease plasma total and LDL cholesterol by 3.0 mg/dl and 2.2 mg/dl, respectively.

Clarke et al., *BMJ* 1997; 314:112-117.; Howell et al., *Am J Clin Nutr* 1997; 65:1747-1764.

- The Finnish Alpha-Tocopherol, Beta-Carotene Cancer Prevention Study of 21,930 male subjects found that dietary cholesterol was not associated with coronary heart disease risk. Subjects in the highest quintile of dietary cholesterol intake with 768 mg/day had similar CHD risk as subjects in the lowest quintile with 390 mg/day. The results of this study are consistent with other recent reports with similar results over a lower range of cholesterol intakes.

Ascherio et al., *BMJ* 1996;313:84-90.; Hu et al. *N Engl J Med* 1997; 337:1491-1499.; Pietinen et al., *Am J Epidemiol* 1997;145:876-887.

- According to researchers from the University of Washington, adding 2 eggs per day to the National Cholesterol Education Program (NCEP) Step 1 diet had no effect on plasma LDL cholesterol levels in people with elevated LDL levels. However, supplementing the NCEP diet with 2 eggs per day did raise plasma LDL cholesterol levels in people with elevated LDL and triglyceride levels. Plasma HDL concentrations increased in both groups. This study, along with earlier studies, indicates that certain populations are cholesterol sensitive and hyper-respond to cholesterol intake. It is estimated that 15-25% of Americans are sensitive to dietary cholesterol.

Knopp et al., *J Am Coll Nutr* 1997; 16:551-561.

- Based on a metabolic feeding study with 65 healthy postmenopausal women, a cholesterol intake of up to 828 mg/day had only a modest effect on plasma total and LDL cholesterol. This study also found that regardless of one's insulin sensitivity, an increase in dietary cholesterol had no significant effect on plasma lipid and lipoprotein levels. Insulin mediated glucose disposal mechanisms had no effect on the dietary cholesterol-blood cholesterol relationship.

Reaven et al., *Metabolism* 2001;50:594-597.

## Dietary Cholesterol vs Plasma Cholesterol

- Two large epidemiological studies, the Nurses' Health Study and Health Professionals Follow-up Study, with over 117,000 subjects showed that after adjusting for other CVD risk factors, there was no difference in CVD risk for people who ate 7 eggs per week or 1 egg per week. However, it was shown that people tended to eat eggs along with high fat foods such as bacon and whole milk.

Hu et al., *JAMA* 1999;281:1387-1394.

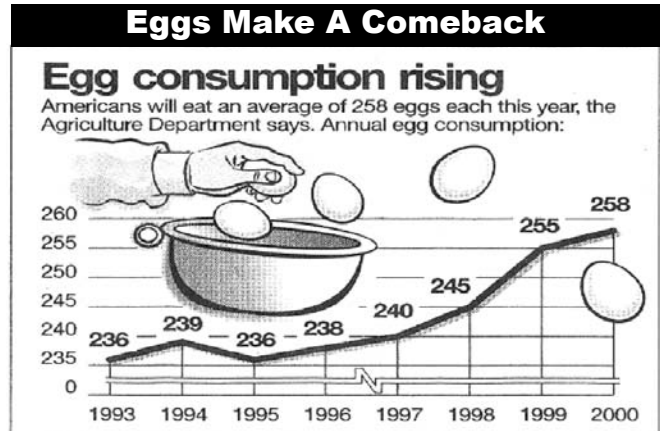
- One's genetic make-up does affect CHD risk. According to Finnish researchers, people with apo E 4/4 genotype are most sensitive to dietary cholesterol, as reflected by a 7.3 mg/dl increase in plasma total cholesterol per 100 mg of dietary cholesterol. Individuals with apo E3/3 genotype are hypo-responders with a 1.7 mg/dl change per every 100 mg of cholesterol.

Sarkkien et al., *Am J Clin Nutr* 1998; 68:1215-1222.

- A recent review article on dietary cholesterol and atherosclerosis relationship concluded that "the available epidemiological and clinical data indicate that for the

general population, dietary cholesterol makes no significant contribution to atherosclerosis and risk of cardiovascular disease." Also, there are no studies validating the "independent effect" of dietary cholesterol on CHD risk, especially, after accounting for confounding dietary covariables.

McNamara, *Biochim Biophys Acta* 2000;1529:310-320.



Source: USDA Economic Research Service

By Hilary Wasson and Bob Laird, USATODAY

## Reasons To Eat Eggs

- Compared to green leafy vegetables, which are commonly recommended for their carotenoid content, eggs and maize (corn) contain more lutein and zeaxanthin. Also, according to a study by Handelman et al., consumption of 1.3 egg yolks (380 µg lutein) per day for 4.5 weeks raised plasma lutein levels by 0.114 µmol/l. It is thought that compared to plant sources, carotenoids found in eggs are more bioavailable due to natural fats found in egg yolk.

Sommerburg et al., *Br J Ophthalmol* 1998; 82:907-910.; Handelman et al., *Am J Clin Nutr* 1999; 70:247-251.

- Results from the Los Angeles Atherosclerosis Study indicate that due to its anti-oxidative properties, lutein may delay atherosclerosis progression in arteries by neutralizing oxidative stressors in the blood vessel. The group with highest lutein intake noted least change in thickening of their arteries.

Dwyer et al., *Circulation* 2001; 103:2922-2927.

- Eggs contain the highest quality protein and is the standard by which all proteins are measured. One large egg contains 6 grams of protein. According to studies in elderly women, eating diets high in animal-proteins resulted in higher net protein synthesis than during a high-vegetable protein diet. Also, it showed that a low-protein diet resulted in significant losses in lean tissue, immune response and muscle function compared to a high-protein diet.

Castaneda et al., *Am J Clin Nutr* 1995; 62:30-39.; Pannemans et al., *Am J Clin Nutr* 1998; 68:1228-1235.

- Choline is an essential component for all normal cell function, but especially in brain development. Rat studies showed that treating pregnant rats resulted in smarter off-springs. Even in old age, these off-springs continued to out perform the control rats.

Montoya et al., *Brain Res Dev Brain Res* 2000; 123:25-32.

- Researchers from the Northwestern University found that choline supplementation resulted in significant improvement in verbal and visual memory in eleven subjects who were initially deficient in choline, due to long-term total parenteral nutrition therapy.

Buchman et al., *JPEN* 2001; 25:30-35.

*"Don't be afraid of eating eggs despite their cholesterol. ... Their yolks are among the richest known source of choline."*

Steven Zeisel, MD, Ph.D.  
Science News, Nov. 3, 2001

### Daily Choline Requirement

Men	550 mg
Women	425 mg
Pregnancy	450 mg
Lactation	550 mg

Large egg contains 215 mg of choline

