

Nutrition Advice from the Heart Foundation

The *Australian Heart Foundation* has the following comment regarding eggs.

Worried about whether you should be eating eggs? They're really nutritious and it's fine to have them regularly as part of a healthy diet. Eggs contain good quality protein, 11 vitamins and minerals, and are a source of healthy fats including omega-3 fats. One egg has about 5 g of fat - but most of this is unsaturated, a fat that you need to be healthy. An egg contains only about 1.5 g of saturated fat and no trans fat. As part of a healthy balanced diet you can eat up to 6 eggs each week without increasing your risk of heart disease. ¹

The website has a number of delicious egg-based recipes.

How was this figure of 6 eggs a week obtained? The dietary recommendations for cholesterol is 200 mg / day. (Let's assume that this is a valid recommendation.)

Size	Weight
Medium	42 to 49.9 grams
Large	50 to 58.9 grams
Extra Large	59 to 66.9 grams
Jumbo	67 to 71.9 grams
Extra Jumbo	72 to 78 grams

Based on this table, a 50 g egg is a not a large egg. One not very large egg contains 180 mg of cholesterol. If 200 mg of cholesterol is an acceptable daily limit of cholesterol, then that only allows one egg per day and only a very minimal amount of any other food which contains cholesterol.

About 63% of the energy from eggs is obtained from fat with 18% from saturated fat. 36% of the energy is obtain from protein. Eggs contain no fibre. Eggs cannot be considered a low-fat food.

Physicians' Health Study

A study of 21,327 participants from the *Physicians' Health Study 1* ² examined the role of egg consumption on health. The result from a 20 year average follow-up showed a significant correlation between egg consumption and all-cause mortality.

Egg consumption was divided into 5 categories – less than 1 egg per week, 1 egg per week, 2-4 eggs, 5-6 eggs per week and 7 or more eggs per week. Physicians consuming 7 or more eggs per week had a 31% increase in all-cause mortality compared with those consuming less than 1 egg per week. With diabetic physicians, the association was much higher with the increase in mortality doubled (2.05 times).

Eggs and Prostate Cancer

Another 2011 study ³ showed men who consumed 2.5 or more eggs per week had an 81% increased risk of lethal prostate cancer compared with men who consumed less than 0.5 eggs per week.

Egg Consumption and Diabetes in Jiangsu Province

Egg consumption has doubled in China in the 15 years from 1989-2004. ⁴

To assess the impact of egg consumption on type 2 diabetes in China, a survey was performed among 2849 adults in Jiangsu Province, China. Jiangsu is a coastal Chinese province north of Shanghai.

Dietary information was obtained by a validated food frequency questionnaire and 3 day weighed food records. Note that this survey did not rely on dietary recall.

Egg consumption was significantly and positively associated with diabetes risk. Below is the risk of diabetes according to egg consumption.

Egg Consumption	Women Odds Ratio	Men Odds Ratio
Less than 2 eggs per week	1.00	1.00
2-6 eggs per week	1.67	2.03
1 egg per day or greater	3.22	2.44

Also, plasma triglyceride and total cholesterol levels were significantly higher in women who consumed 2 eggs per week than those who consumed eggs less often.

Plasma triglyceride and total cholesterol levels were also significantly higher in women who consumed more than 2 eggs per week than those who consumed eggs less often.

The conclusion of this paper is,

Considering the high percentage of participants who consumed more than 1

egg/d in this population and the substantially increasing burden of diabetes in China and worldwide, a clearer message on egg consumption and diabetes risk is needed.

Gut Bacteria and Egg Consumption

Foods are more than simple the sum of their fat, protein, carbohydrate and cholesterol components.

There is an increasing awareness of the importance of gut flora and its role in health. ^{5 6 7 8}

Microbes in the intestines are essential for the breakdown of complex carbohydrates, the production of short chain fatty acids and synthesis of vitamins. More than 1000 different species have been identified.

Despite the vast number of bacteria species and people, there are only two types of bacteriological ecosystems in the gut, called enterotypes – those that are dominated by *Bacteroides* genus bacteria and those by *Prevotella* genera. Enterotypes are strongly associated with long-term diets, with *Bacteroides* bacteria being associated with protein and animal-fat based diets and *Prevotella* being associated with carbohydrate-based diets.

Bacteria are responsible for producing short-chain fatty acids (acetate, propionate, and butyrate) by the fermentation of dietary fibre. Short chain fatty acids increase intestinal pH (becomes more acidic), are important in maintaining the integrity of the lining of the intestine and prevents growth of dangerous pathogens. Short-chain fatty acids that are consumed do not have these benefits.

Gluten-free diets also have a significantly detrimental effect on the intestinal microflora and immune function in healthy people. The level of beneficial organisms are reduced, detrimental organisms are increased along with an increase in health risks. It is estimated that approximately 5-6% of the population have a need for a gluten-free diet. ⁹

Eggs contain choline. Choline is converted by our gut bacteria into trimethylamine (TMA) which is then converted into trimethylamine N-oxide (TMAO) in our liver. There is a significant link to TMAO levels in the blood and prostate cancer, strokes, heart attack and mortality. ¹⁰

Others have linked TMAO with many adverse outcomes.

Recent human studies have established that the levels of TMAO in serum are

positively correlated with impaired renal function, colorectal cancer, and cardiovascular disease (CVD). TMAO exacerbates atherosclerosis [...]. In addition, TMAO exacerbates impaired glucose tolerance, obstructs hepatic insulin signaling, and promotes adipose tissue inflammation of mice maintained on a high-fat high-sugar diet. ¹¹

The choline in foods, such as eggs, can be turned by gut bacteria into TMA. However, it is only produced by the *Bacteroides* bacteria that are prevalent in high-fat, low-fibre, animal-based diets. If your gut bacteria do not produce TMA then you will be free of TMAO.

Carnitine is similar in structure to choline and the major food source is red meat. Unlike choline, which is an essential nutrient, we have no need to consume carnitine. It is also found in dietary supplements and carnitine-energy drinks. ¹²

Footnotes

1. National Heart Foundation of Australia (n.d.) Eggs – The Heart Foundation [online]. Available from: <http://heartfoundation.org.au/healthy-eating/food-and-nutrition/protein-foods/eggs> (Accessed 18 February 2016)
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