

THE HEALTH BENEFITS OF EGGS



Eggs are an economical and nutrient rich food, which provide a range of health benefits. With 11 essential vitamins and minerals, including vitamins A, E and B12, as well as protein, omega-3s, antioxidants, choline and lutein – one serving of eggs* provides all the essential amino acids Australian bodies need.

TYPE 2 DIABETES

- Diabetes Australia recommends egg consumption as part of an overall balanced eating pattern.¹⁰
- New Australian research has found eating up to 12 eggs a week does not increase cardiovascular risk factors in people with pre-diabetes or type 2 diabetes (T2D) – despite conflicting dietary advice continuing around the world.¹¹
- The Australian DIABEGG Study demonstrated that individuals with pre-diabetes or T2D who followed a high-egg diet (≥ 12 eggs / week) for 12 months, which included a 3-month weight loss phase, had no adverse changes in cardiovascular risk factors, inflammatory or oxidative stress markers, or measures of glycemia.¹¹
- These findings suggest that it is safe for persons at high risk of T2D, and those diagnosed with T2D, to include eggs, an acceptable and convenient food source, in their diet regularly.¹¹

THE ROLE OF CHOLINE

- Choline is an essential nutrient, which plays an important role in infant brain development and cognition, liver function and metabolic health. It helps to metabolise fat, maintain healthy cell membranes and may improve brain functioning and memory.^{1,2}
- Previous international clinical studies indicate that for the majority of the population, choline consumption is far below current dietary recommendations.³ Vegetarians and vegans in particular, may be at risk of low intake.¹
- US research highlights the importance of choline during pregnancy, with higher maternal choline intake found to reduce the risk of preeclampsia⁴ in pregnant women; while also reducing the risk of neural tube defects^{5,6} and expression of genes linked to stress-related diseases⁷ in babies, and improving information processing speed in infants.⁸
- Eggs provide a readily absorbable form of choline⁹, and also provide more choline per kilojoule when compared to most other food sources.³
- To get the same amount of choline found in a single egg (125mg / 301 kilojoules), one would need to consume 3 $\frac{1}{4}$ cups of skim milk (1130 kilojoules) or 99g of wheat germ (1532 kilojoules).³



* ONE SERVE = 2 X 60G EGGS
(104G EDIBLE PORTION)





A MEAT ALTERNATIVE

- Eggs are a whole food and are part of one of the five major food groups, which form the key to eating well.¹²
- Eggs can play a significant role in a vegetarian diet as they contain high quality protein, vitamin B12, iron and omega-3s.
- In the context of a 12-week weight loss diet, consumption of 2 eggs per day showed similar weight loss and improvements in glycaemic control as consuming 100g lean meat per day.¹³
- The Heart Foundation of Australia states that eating 6-7 eggs a week (1 egg a day or 2-3 egg filled meals a week) as part of a healthy eating pattern, will not increase an individual's risk of heart disease.¹⁴
- For good health, the Australian Dietary Guidelines recommend daily inclusion of foods from the protein group, including eggs. Two large eggs (120g) provide one serve of protein for the average adult.¹²

WEIGHT MANAGEMENT

- As a source of high quality protein and 11 essential vitamins and minerals, eggs are a valuable food in the diet for weight management.
- Eggs are relatively low in kilojoules, with a serve of eggs providing just 7% of an average person's daily kilojoule requirements (8700kJ) – equivalent to 2 medium apples or 2 small slices of whole grain bread.¹⁵
- Recent findings from the CSIRO have shown higher egg consumption is associated with having a better-quality diet¹⁶; while consuming protein (such as the protein found in eggs) for breakfast, can help with weight loss as it increases concentrations of branched chain amino acids and satiety hormones, which help control appetite.¹⁷
- Egg consumption impacts acute satiety and appetite responses, particularly in adults.¹⁸⁻²⁰ It has been demonstrated that eggs play a role in increasing levels of the satiety hormone cholecystokinin, delay gastric emptying, reduce glucose and insulin levels²¹ as well as decrease total energy intake post consumption.²²
- While different approaches to weight loss are suitable for different people, eggs, are likely to play a useful role in most approaches, given their versatility, protein content and nutrient density.



References 1. Zeisel, S.H., Klatt, K.C. & Caudill, M.A. Choline. *Adv Nutr* 9, 58-60 (2008). 2. Leermakers, E.T., et al. Effects of choline on health across the life course: a systematic review. *Nutr Rev* 73, 500-522 (2015). 3. Zeisel, S. & da Costa, K.A. Choline: An Essential Nutrient for Public Health. *Nutr Rev* November; 67(11): 615-623 (2009). 4. Jiang X., et al. A higher maternal choline intake among third-trimester pregnant women lowers placental and circulating concentrations of the antiangiogenic factor fms-like tyrosine kinase-1 (sFLT1). *FASEB J*; 27:1245-1253 (2013). 5. Zhang, J., et al. Phosphatidylethanolamine N-methyltransferase (PEMT) Gene Polymorphisms and Risk of Spina Bifida. *Am J Med Genet A*. April 1; 140(7): 785-789 (2006). 6. Shaw, G.M., et al. Choline and Risk of Neural Tube Defects in a Folate-fortified Population. *Epidemiology*; 20:714-719 (2009). 7. Jiang X., et al. Maternal choline intake alters the epigenetic state of fetal cortisol-regulating genes in humans. *FASEB J*. Aug 26(8):3563-74 (2012). 8. Caudill, M.A., et al. Maternal choline supplementation during the third trimester of pregnancy improves infant information processing speed: a randomized, double-blind, controlled feeding study. *FASEB J* [Epub ahead of print] (2018). 9. Institute of Medicine. Dietary Reference Intakes for Thiamin, Riboflavin, Niacin, Vitamin B6, Folate, Vitamin B12, Pantothenic Acid, Biotin, and Choline (1998). (National Academy of Sciences, Washington, 2001). 10. Diabetes Australia. What should I eat? (2016) Available: <https://www.diabetesaustralia.com.au/what-should-i-eat> [Accessed 24 April 2018]. 11. Fuller, N.R., et al. Effect of a high-egg diet on cardiometabolic risk factors in people with type 2 diabetes: the Diabetes and Egg (DIABEGG) Study—randomized weight-loss and follow-up phase. *Am J Clin Nutr* 107:1-11 (2018). 12. National Health and Medical Research Council. Australian Dietary Guidelines. ed. National Health and Medical Research Council (NHMRC, Canberra, ACT, Australia, 2013). 13. Pearce, K.L., Clifton, P.M. & Noakes, M. Egg consumption as part of an energy-restricted high-protein diet improves blood lipid and blood glucose profiles in individuals with type 2 diabetes. *Br J Nutr* 105, 584-592 (2011). 14. Heart Foundation of Australia. Eggs. Available at: <https://www.heartfoundation.org.au/healthy-eating/food-and-nutrition/protein-foods/eggs> [Accessed 18 April 2018]. 15. Xyris Software. Foodworks Version 9 (2017). 16. Hendrie G, B.D., Noakes M. Australians' usual egg consumption - analysis of the CSIRO Healthy Diet Score 2016. (CSIRO, 2016). 17. Noakes, M. Protein Balance: New Concepts for Protein in Weight Management; CSIRO, Australia (2018). 18. Ratliff, J., et al. Consuming eggs for breakfast influences plasma glucose and ghrelin, while reducing energy intake during the next 24 hours in adult men. *Nutr Res* 30, 96-103 (2010). 19. Fallaize, R., Wilson, L., Gray, J., Morgan, L.M. & Griffin, B.A. Variation in the effects of three different breakfast meals on subjective satiety and subsequent intake of energy at lunch and evening meal. *Eur J Nutr* [Epub ahead of print] (2012). 20. Rains, T.M., Leidy, H.J., Sanoshy, K.D., Lawless, A.L. & Maki, K.C. A randomized, controlled, crossover trial to assess the acute appetite and metabolic effects of sausage and egg-based convenience breakfast meals in overweight premenopausal women. *Nutr J* 14, 17 (2015). 21. Pelletier, X., et al. Effect of egg consumption in healthy volunteers: influence of yolk, white or whole-egg on gastric emptying and on glycemic and hormonal responses. *Ann Nutr Metab* 40, 109-115 (1996). 22. Vander Wal, J.S., Marth, J.M., Khosla, P., Jen, K.L. & Dhurandhar, N.V. Short-term effect of eggs on satiety in overweight and obese subjects. *J Am Coll Nutr* 24, 510-515 (2005).