



The dairy matrix

In recent years nutrition science has shifted from examining the benefits of individual nutrients, to recognising that we eat whole foods.

Foods are made up of nutrients which are housed in complex physical structures, and the way these nutrients interact within the food's physical matrix can determine its health properties. This is especially true of dairy foods. The effects of dairy foods extend beyond the benefits of the individual nutrients they contain^{1,2}.

Facts

Dairy foods provide a unique package of more than 10 essential nutrients, including vitamin A, B12, riboflavin, calcium, potassium, magnesium, zinc, phosphorus, carbohydrates and protein.

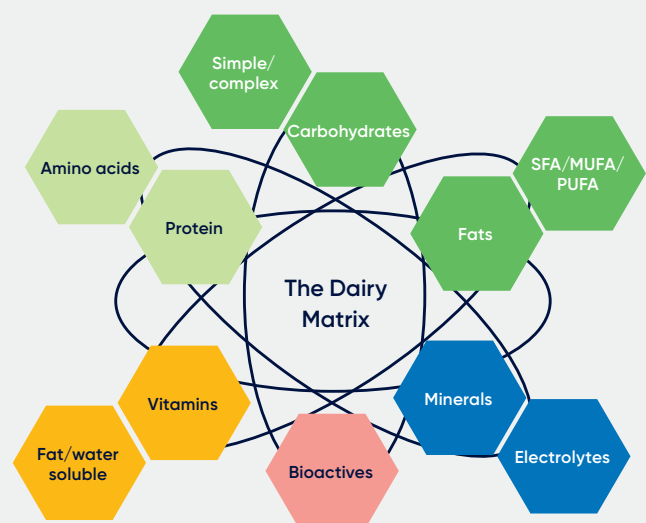
The Dairy Matrix takes into account the various macronutrients, micronutrients, vitamins and minerals (and their interactions) that make dairy foods a nutritional powerhouse. It's part of the reason why dairy foods reduce the risk of many health conditions and diseases such as stroke, hypertension, cardiovascular disease and weight gain³.

What is the Dairy Matrix?

Dairy foods are complex physical structures housing macronutrients like protein and carbohydrates, micronutrients (vitamins and minerals) and other beneficial components. Milk, cheese and yoghurt are best known as an excellent source of calcium, but also contain a unique package of nutrients including B vitamins, high-quality protein, iodine, and are also rich in magnesium, potassium, carbohydrate, various fatty acids and bioactive components.

Milk, cheese and yoghurt have distinct food matrices⁴. Their different physical structures can affect the bioavailability of nutrients, the way they are digested and absorbed by the body and consequent health effects after consumption⁵.

When it comes to dairy foods, it is this unique combination of nutrients, bioactive factors and how they interact within the food matrix that leads to their health benefits⁶.



Regular vs reduced-fat dairy

It's commonly thought that we should limit our consumption of regular-fat milk, in favour of reduced-fat milk due to concerns around saturated fat, heart health and weight. However, research shows that regular-fat milk is not associated with increased risk of heart and metabolic diseases and doesn't lead to weight gain⁷ so there is no reason to avoid enjoying regular-fat milk. The exact reasons for the benefits are still unclear but could be related to the complex fatty acid profile of milk, the milk fat globule membrane and the presence of calcium⁸.

Heart health

Despite its sodium and saturated fat content, several studies have consistently shown that cheese has a favourable or neutral effect on a variety of different health outcomes. For example, cheese consumption has been associated with a reduced risk of stroke, hypertension and cardiovascular disease^{1,9,10}.

This is likely due to the interactions between components of the cheese matrix, including calcium, phosphorus, the milk fat globule membrane, and starter cultures, which may work together to change how the body metabolises fat from cheese⁶.

Weight gain

Another common misconception is the link between dairy and weight gain. Numerous studies have shown that including at least three serves of dairy foods in an everyday diet is not linked to weight gain, compared to individuals eating less than 1-2 serves of dairy foods per day^{11,12}. In fact, dairy foods, such as milk, may have modest benefits in facilitating weight loss in short-term or energy-restricted diets¹⁰. This is likely due to milk's low glycaemic index and high protein content that assists satiety, while its high calcium content can stimulate fat breakdown and inhibit fat production as well as reduce the amount of dietary fat absorbed by the body^{13,14}.

Is dairy detrimental, neutral or favourable for these health outcomes?

	CVD	CHD	Stroke	Hypertension	Metabolic syndrome	Type-2 diabetes
Total dairy	Neutral	Neutral	Favourable	Favourable	Favourable	Favourable
Regular-fat	Uncertain	Neutral	Neutral	Neutral	Uncertain	Neutral
Reduced-fat	Uncertain	Neutral	Favourable	Favourable	Uncertain	Favourable
Milk	Uncertain	Neutral	Neutral	Favourable	Favourable	Neutral
Cheese	Neutral	Neutral	Favourable	Neutral	Uncertain	Favourable
Yoghurt	Neutral	Neutral	Neutral	Neutral	Uncertain	Favourable

Adapted from : Drouin-Chartier JP, Brassard D, Tessier-Grenier M, Côté JA, Labonté ME, Desroches S, Couture P, Lamarche B. Systematic review of the association between dairy product consumption and risk of cardiovascular-related clinical outcomes. *Adv Nutr.* 2016 Nov;7(6):1026-40.

- Mozaffarian D. Dairy foods, obesity, and metabolic health: The role of the food matrix compared with single nutrients. *Adv Nutr.* 2019 Sep; 10(5): 917S-923S.
- Mozaffarian D, Rosenberg I and Uauy R. History of Modern Nutrition Science-Implications for Current Research, Dietary Guidelines, and Food Policy. *BMJ*; 2018 13;361:k2392.doi: 10.1136/bmj.k2392.
- National Health and Medical Research Council. A Review of the Evidence to Address Targeted Questions to Inform the Revision of the Australian Dietary Guidelines (Evidence Report). Available: <https://www.eatforhealth.gov.au/file/review-evidence-address-targeted-questions-inform-revision-australian-dietary-guidelines>
- Thorning TK et al. Whole dairy matrix or single nutrients in assessment of health effects: current evidence and knowledge gaps. *Am J Clin Nutr* 2017;105:1-13.
- Fardet A et al. Influence of food structure on dairy protein, lipid and calcium bioavailability: A narrative review of evidence. *Crit Rev Food Sci Nutr.* 2019;59(13):1987-2010.
- Drouin-Chartier JP et al. Systematic review of the association between dairy product consumption and risk of cardiovascular-related clinical outcomes. *Adv Nutr.* 2016 Nov 15;7(6):1026-1040.
- Soerensen et al. Effect of dairy calcium from cheese and milk on fecal fat excretion, blood lipids and appetite in young men. *Am J Clin Nutr.* 2014;99:984-991.
- De Goede et al. Dairy consumption and risk of stroke: a systematic review and updated dose-response meta-analysis of prospective cohort studies. *J Am Heart Assoc.* 2016 May 20;5(5). pii:e002787.
- Chen GC et al. Cheese consumption and risk of cardiovascular disease: a metaanalysis of prospective studies. *Eur J Nutr.* 2017 Dec;56(8):2565-2575.
- Chen M, Pan A, Malik VS, Hu FB. Effects of dairy intake on body weight and fat: a meta-analysis of randomized controlled trials. *The Am J Clin Nutr.* 2012;96(4):735-747.
- Abargouei AS, Janghorbani M, Salehi-Marzjarani M, Esmailzadeh A. Effect of dairy consumption on weight and body composition in adults: a systematic review and meta-analysis of randomized controlled clinical trials. *Int J Obes.* 2012;36(12):1485-1493.
- Zemel MB. The role of dairy foods in weight management. *Journal of the American College of Nutrition.* 2005;24(6):537S-546S.
- Christensen R, Lorenzen JK, Svith CR, Bartels EM, Melanson EL, Saris WH, Tremblay A, Astrup A. Effect of calcium from dairy and dietary supplements on faecal fat excretion: a meta-analysis of randomized controlled trials. *Obes Rev.* 2009;10(4):475-486.

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