

# Resources on dairy's important role in health

Dairy and Bones  
Dairy Matrix  
Dairy and Sport  
Digestive Health



# Dairy and bones

Bones are the building blocks of our body. Healthy bones help us to move well, protect our organs and support the rest of our body.

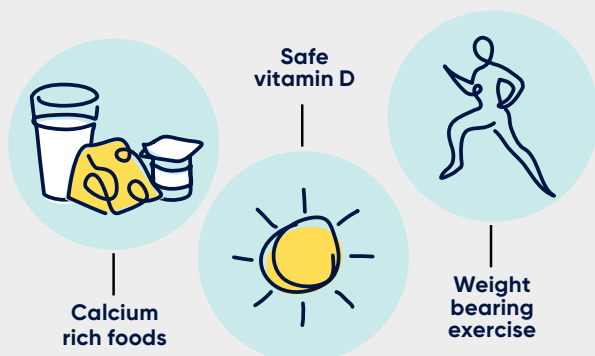
## So how do we build strong bones?

Genes and lifestyle impact how strong bones are<sup>1</sup>. While you can't change your genetics, you can adopt a 'bone-friendly' lifestyle.

The three simple actions you can take to build and maintain healthy bones include:

- 1 Increase daily serves of calcium through enjoying milk, cheese or yoghurt.
- 2 Enjoy regular weight-bearing exercise like walking or running.
- 3 Spend time outdoors to get more vitamin D.

## Three simple actions to support bone health



Thrive with  
**Australian  
Dairy**

## Facts

Consuming adequate dairy foods is associated with greater bone mineral density and a reduced risk of osteopenia and osteoporosis across the lifespan<sup>2,3</sup>.

Consuming 3.5 serves of dairy foods per day reduces risk of fractures, falls and malnutrition in older adults, while improving calcium and protein intake<sup>4,5</sup>.

## Calcium for bone strength

Calcium is essential for building strong bones as well as supporting muscle and nerve function<sup>6</sup>. Almost 99 per cent of the body's calcium is stored in our bones, where it gives strength and structure. We build the calcium 'bank' in our bones from childhood and we reach peak bone mineral density around our late twenties. If we don't get enough calcium in our diet, calcium is taken from our bones and used for other important functions in the body. This happens continually as we age, our bones lose density and can become brittle, sometimes resulting in osteopenia or osteoporosis.

## Dairy's package of nutrients for strong bones

Dairy foods such as milk, cheese and yoghurt are a good source of calcium. While many other foods such as leafy greens, sesame seeds and almonds contain calcium, you would need to eat a whole lot of them to deliver the same amount of calcium e.g. a head of broccoli, more than 2 cups of sesame seeds or 1 cup almonds to provide the same amount of calcium as 40g natural cheddar cheese, or a 200g tub of yoghurt or 250ml milk.

Dairy foods are also a good source of protein. Protein plays an important role in bone health as it helps build and repair bone tissue and muscles<sup>7</sup>. In fact, our bones are made up of about 50 per cent protein.

Not only this, dairy foods also naturally contain a package of other essential bone-building nutrients such as phosphorus and magnesium, which work together to assist in the absorption of calcium and build bone. This is why, it is difficult to replicate the benefits of dairy foods with supplements and alternatives.



You would need to eat a whole head of broccoli...

more than 2 cups of sesame seeds...



or 1 cup of almonds



to provide the same amount of calcium as 40g natural cheddar cheese, or a 200g tub of yoghurt or 250ml milk.

## Healthy bones for children

Childhood is a sensitive time for growth and development and requires careful consideration of diet to ensure adequate nutrients are consumed. Along with the rest of their bodies, children undergo a period of intense bone growth and childhood is the greatest window of opportunity to build bone strength. It is critical to ensure children and adolescents consume enough milk, cheese and yoghurt to achieve their greatest bone mass potential.

## Healthy bones for teenagers

The teenage years are a major growth period. Between the ages of 12-14 years for girls and 13-15 years for boys, teenage bodies build one-quarter of their adult bone mass. With this in mind, it is vital that teenagers have enough calcium-rich foods such as dairy foods. Research has shown that consuming dairy foods is associated with greater bone mineral content and density in adolescents.

## Healthy bones for adults

Peak bone mass is reached when you are in your late twenties. After this, it is vital to continue to consume adequate protein and calcium to maintain the bones that have been built. Evidence shows that dairy foods are important in establishing and maintaining peak bone mass which is a determinant of osteoporosis risk. In a cohort study, for every increase of one serving per week in yoghurt intake, there was a 31 per cent decreased risk in developing osteopenia and a 39 per cent decreased risk of being diagnosed with osteoporosis in females, as well as a 52 per cent decreased risk of osteoporosis in males.

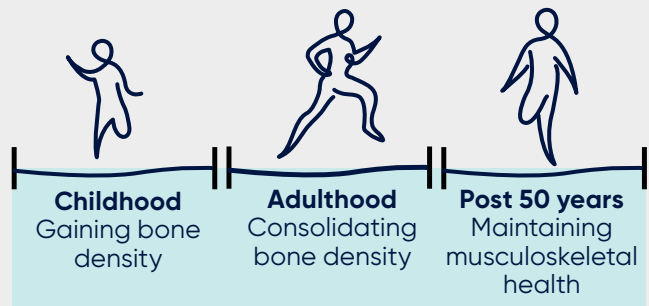
Dairy consumption is particularly important for menopausal women who experience hormone-related changes that accelerate bone loss.

## Healthy bones for older adults

As part of the ageing process, we start to lose more bone and muscle mass than we gain. Older adults need to pay particular attention to their diets to ensure they counteract age-related changes to rates of bone and muscle turnover. Dairy foods such as milk, cheese and yoghurt become even more important in older age, since they deliver important nutrients that can help optimise bone and muscle function.

Dairy food group requirements increase for men and women in older age. In Australia, women over 50 and men over 70 have increased requirements for dairy. Milk, cheese and yoghurt not only provide easy to absorb calcium for maintaining bone strength but also high quality protein for optimising muscle mass, both are essential for healthy ageing. As people become older, protein requirements increase to help maintain bone and muscle mass and reduce hip fractures.

In world first research, the University of Melbourne and Austin Health's Fractures Trial looked at how more dairy in the diet of elderly aged care residents improved their bone, heart and muscle health. This Australian research found that increasing serves of dairy – milk, cheese, yoghurt and skim milk powder – from an average of two to three and a half serves resulted in a 33 per cent reduction in all fractures, 46 per cent reduction in hip fractures, 11 per cent reduction in falls, reduced risk of malnutrition and improved calcium and protein intakes.



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enquiries@dairyaustralia.com.au  
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# 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<sup>1,2</sup>.

## 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.

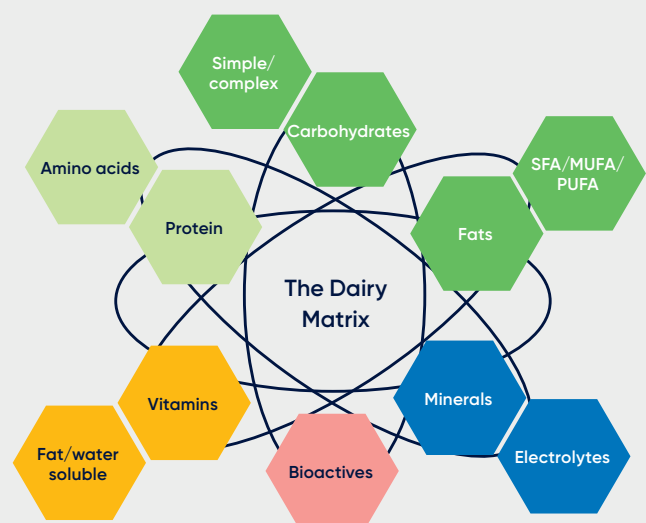
The Dairy Matrix takes into account the various macronutrients, micronutrients, vitamins and minerals (and their interactions) that make dairy foods a nutritional powerhouse. It's part of the reason why dairy foods reduce the risk of many health conditions and diseases such as stroke, hypertension, cardiovascular disease and weight gain<sup>3</sup>.

## 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 matrices<sup>4</sup>. 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 consumption<sup>5</sup>.

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 benefits<sup>6</sup>.



## 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 gain<sup>7</sup> 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 calcium<sup>8</sup>.

## 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<sup>1,9,10</sup>.

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 cheese<sup>6</sup>.

## 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<sup>11,12</sup>. In fact, dairy foods, such as milk, may have modest benefits in facilitating weight loss in short-term or energy-restricted diets<sup>10</sup>. 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<sup>13,14</sup>.

## 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 MÈ, 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.

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# Dairy and sport/exercise

Good nutrition is vital for sport performance and making the right nutrition choices can help active people achieve their fitness and performance goals.

Dairy foods provide many benefits to active individuals as a source of carbohydrates and electrolytes, as well as a high-quality protein source, containing all nine essential amino acids. Dairy foods are also an ideal pre- and post-workout snack or meal to help fuel active bodies, recover from exercise and build muscle.

## Facts

Milk has been shown to be as effective, if not more effective for rehydration than water or sports drinks, up to four hours post-exercise<sup>1</sup>.

Flavoured milk and yoghurts contain the right mix of carbohydrates and protein to restore muscle glycogen quickly after a workout, helping with recovery<sup>2</sup>.

## The benefits of dairy protein

Dairy foods contain two types of protein: casein (80 per cent) and whey (20 per cent). Casein is a slow-to-digest and slow-release protein which has been shown to reduce muscle breakdown. Whey is a fast-acting and quick-absorbing protein with a high concentration of leucine. Leucine specifically stimulates the building of new muscle tissue.

Dairy foods are considered a high-quality protein source as they contain all the nine essential amino acids and are superior to other protein sources in optimising muscle protein synthesis following resistance training<sup>3</sup>.

## Timing and amount of protein

Protein needs are highly individual, depending on a person's weight, as well as the type and amount of exercise they do. Most athletes need 1.2 to 2 grams of protein per kilogram of body weight. For a person weighing 70 kg, this equates to 84 – 140 grams of protein per day.

The timing of intake also affects how the body can utilise protein – since the body can only use and store limited amounts of protein at a time, it's best to consume 20 – 30 g of protein at a time, and regularly throughout the day – making sure one of these occasions is shortly after exercise. Dairy foods such as milk, cheese and yoghurt are a convenient way to consume protein after exercise.

### PRACTICAL RECOVERY CHOICES 20G PROTEIN =

600ml flavoured milk; or

200g tub fruit yoghurt and 30g nuts; or

Half a cup of low fat cottage cheese with crackers

## Protein supplements

While adequate amounts of protein can be acquired through a well-balanced and nutritious diet, protein supplements such as whey protein isolate offer an effective method for increasing protein consumption without significantly increasing energy intake. Twenty grams of whey protein isolate (WPI) with 250mL milk, provides approximately 30g of protein and 3g of leucine, making it an ideal way to meet post-exercise targets.

## Dairy as a source of carbohydrates

The body prefers to use carbohydrate as its main energy source during moderate-to-high intensity exercise as it's able to break the carbohydrate down quickly and efficiently for energy. Research recommends consuming a carbohydrate-rich snack 1-2 hours before exercise or a carbohydrate-rich meal 2-4 hours beforehand. Sweetened dairy foods like flavoured milk, yoghurt and dairy desserts provide extra carbohydrates and are low in fibre, helping to maximise gut comfort.

Following an exercise session, eating high carbohydrate foods will replenish the stores depleted during exercise, preventing fatigue and ensuring the body and brain continue to have enough energy to perform their functions. Research has shown people who drink milk straight after training are able to exercise longer in their next session than those who drink sports drinks or plain water<sup>4</sup>.

## Milk for hydration

Milk assists with rehydration after exercise by replacing fluid and electrolytes (sodium and potassium) in the right balance. Other nutrients in milk, like protein, help the body to retain fluid more effectively.

While sports drinks are a popular choice for rehydration following exercise, milk contains more sodium than a standard sports drink. By also containing protein and carbohydrate, milk has the additional benefit of providing all nutrients of importance for recovery following exercise.

Research has found that low-fat milk helped dehydrated cyclists replace sweat loss better than water or a sports drink. Four hours after exercise, cyclists who drank milk were better hydrated by an average 600ml compared with those who drank water or a sports drink<sup>1</sup>.

## Body composition

Protein from milk has been shown to have beneficial body composition effects in men and women. Male weightlifters who drank skim milk after a workout built approximately twice as much muscle as those who drank soy beverages<sup>5</sup>, while women who drank 500ml of skim milk an hour after resistance exercise gained more muscle and lost more fat than those who had a sugar-based energy drink.

## Gut discomfort and physical activity

Research has also shown there is no need to avoid dairy foods before exercise unless there are diagnosed underlying medical conditions. Dairy can be included in meals consumed before strenuous physical activity without impacting either gut comfort or performance<sup>7</sup>. Individuals who unnecessarily avoid dairy before exercise may be missing out on high quality protein and calcium, which has possible implications for sports performance, body composition changes and health overall.

## What about soy?

A research study comparing muscle synthesis between men participating in resistance training found that while milk and soy-based proteins both promote muscle synthesis when consumed after resistance training, milk-based proteins have a greater benefit<sup>6</sup>.

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# Digestive health

Growing research supports the role of gut health in overall health and wellbeing.

The gut microbiome (the collective term for microorganisms and their genetic material that live in the digestive system) plays an important role in how food is digested and how nutrients are absorbed and used in the body<sup>1</sup>.

## Facts

The foods we eat plays an essential role in maintaining the diversity and proper functioning of our gut<sup>2</sup>.

Research demonstrates the role of fermented foods, such as yoghurt, in promoting a healthy digestive system.

## Fermented foods

In recent years, the gut microbiome has been linked to the development of conditions such as obesity<sup>3</sup> and inflammatory bowel disease<sup>4</sup>. However, fermented foods including dairy foods with added probiotics (e.g. yoghurt, culture drinks and kefir) are some of the most common and easily available sources of probiotics that promote a healthy digestive system.

Probiotics are microbes that, when consumed in adequate amounts, provide a health benefit<sup>5</sup> and have the potential to maintain the natural balance of the gut microbiota.

Fermented dairy foods like yoghurt and kefir are a common vehicle for probiotics. To see a benefit on the gut microbiome, a key measure of its effectiveness is that the beneficial bacteria must be able to survive the transit through the gastrointestinal system. This protection is a crucial step as it means probiotics can reach the gut intact and exert their positive health benefits.

**Research shows probiotic bacteria have a better chance of surviving the harsh conditions of the gut when they're consumed in dairy products (e.g. yoghurt with added probiotics)<sup>6,7</sup>**

The protein and fat found in dairy foods protects probiotic species and helps the survival of probiotics in the digestive system (particularly the highly acidic environment of the stomach<sup>8</sup>).

Additionally, some studies have even shown that after eating yoghurt, some individuals experience a slight increase in the variety of helpful microbes in their digestive systems<sup>9</sup>. Certain types of beneficial gut bacteria, like Bifidobacteria and Lactobacilli have been found to increase with various probiotics.<sup>10</sup> Consuming yoghurt daily is also thought to reduce harmful bacteria in the gut<sup>11</sup>.

## Lactose maldigestion





One of the most scientifically recognised health benefits related to dairy and gut health is yoghurt's role in helping to manage lactose maldigestion. It appears yoghurt is better tolerated when compared with milk, most likely because of the live bacteria within the product. These bacteria break down lactose by using it as an energy source. In addition, the unique yoghurt matrix alters digestion by increasing digestion time compared to milk, therefore helping with the absorption of nutrients and reducing gastrointestinal upsets<sup>12</sup>.



## Lactose intolerance

For those with diagnosed lactose intolerance, research has found that 12g of lactose in a single dose can be tolerated by the majority of people with lactose intolerance – this is approximately the amount of lactose in one cup (250ml) of milk. Some research shows 18g over a full day (in divided doses), can be tolerated<sup>13,14,15</sup>. Lactose free milks are also widely available as an alternative option.

### Strategies for incorporating dairy into the diet

	<b>Up to 250ml of milk may be well tolerated if it's consumed with other foods or throughout the day</b>		<b>Yoghurt contains 'good' bacteria that help to digest lactose</b>
	<b>Most hard cheeses are virtually lactose-free</b>		<b>Lactose-free milks are available and contain similar nutrients to regular milk</b>

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