IMMUNITY AND THE IMPORTANCE OF NUTRITION.

Tirlán

Tirlán is an ingredient solutions partner to some of the world's leading companies and brands. At the forefront of ingredient technology, we offer a range of solutions to match the ever-changing demands of the food and nutrition industry and its consumers.

With quality dairy and grains sourced from 5,000 Irish family farms, combined with advanced market research and insights, our unique platform offers fully traceable and sustainably produced natural solutions to help our customers stay ahead of the curve.

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Tirlán

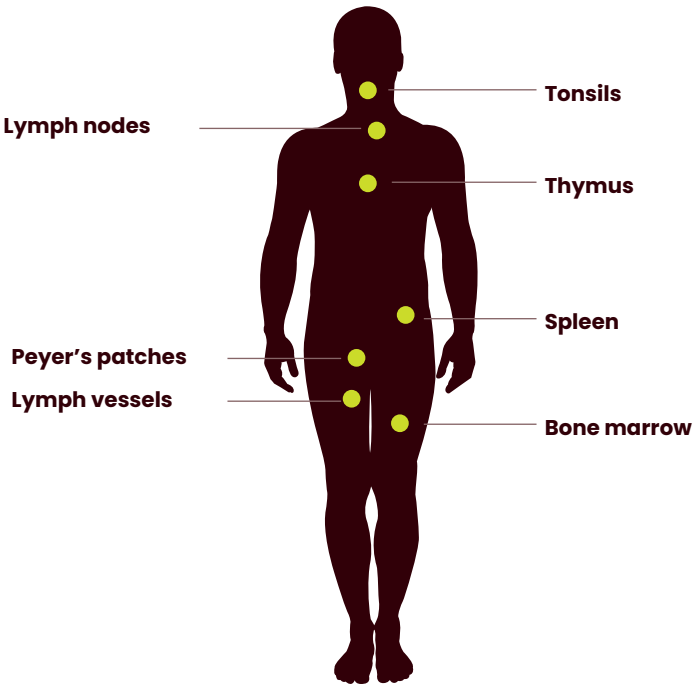
What is the immune system?[1]

Our immune system is our body's defence mechanism against infection and illness. The immune system enables the body to protect itself from invasion of pathogens and maintain balance.

The immune system is a complex collection of cells, tissues, organs and other substances that aim to protect us from infections.

Essentially our immune system functions by activating two individual yet intertwined systems: innate and adaptive immunity. Both systems are equally important in fending off infections, but they differ in many ways.

Innate immunity is the first response made by the body in reply to infection. It is rapid but not specific. The adaptive system is more specific. It has the ability to recognise and remember pathogens. It isn't able to respond instantly to infections, as it needs time to adapt and learn how to recognise them. Once it has learned, however, it is extremely effective, rapid, and accurate.

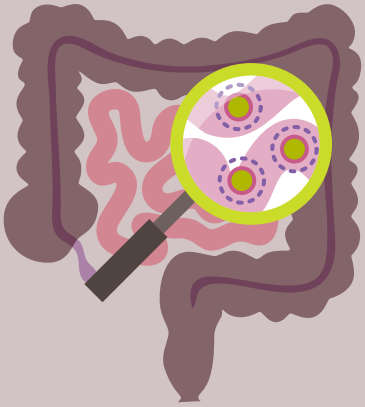


Immunity starts in the gut[2-4]

The gut microbiome is key to many aspects of human health. 70-80% of the body's immune cells and 100 trillion gut bacteria make up the gut microbiome.

The bacteria in the gut communicate with these cells, therefore the gut microbiome provides the most important stimulation source for developing immunity.

The immune system develops and adapts as we age, with certain life stages having a crucial impact on health and immune response.



The immune system as we age

Infant

Early life presents a unique window of opportunity to influence the development of the immune system. Reduced exposure to antigens in early life, and therefore a failure to educate the immune system appropriately, is a contributing factor to the rise in allergies globally.

Childhood

During childhood the immune system consists primarily of a well-developed innate immune response and a developing adaptive immune response.

Adulthood

Adulthood brings forth a fully developed immune system, but a wide range of physical and lifestyle stresses can impact its effectiveness.

Pregnancy

Like many systems in the body, the immune system adapts during and throughout pregnancy. Immune function is specifically altered to balance protecting the foetus from an immunological attack without disrupting protection against infection.

Aging

A life stage where many systems in the body may start to decline. The decline in the immune system is referred to as "immunosescene". This is may reduce some immune functions, lessening responsiveness and diminishing overall effectiveness.

- Protein
- Zinc
- Vitamin A
- Vitamin B6
- Vitamin B12
- Vitamin D
- Folate
- Lactoferrin
- Immunoglobulin
- α-lactalbumin
- ß-lactoglobulin

Immune fitness, fit for the future[1, 5]

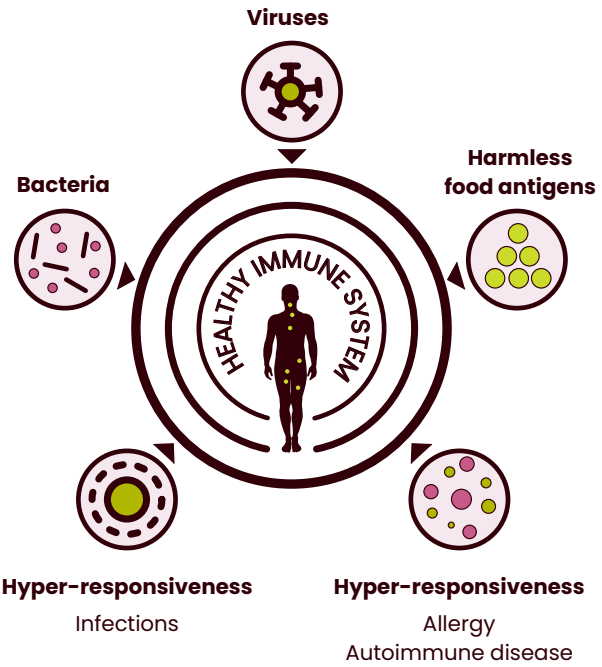
A number of external factors can challenge the development of the immune system.

These external factors include air pollution, viruses, overuse of antibiotics, which can cause gut microbiota dysbiosis.

Nutrition is one of the most important environmental factors that can positively influence gut microbiota composition and therefore the development of a healthy immune system, which in turn improves immune fitness and optimises future health.

Malnutrition, both over and under-nutrition, which is a global health concern impacts the immune response and leads people to being more susceptible to other diseases.

A wide range of nutrients play a role in immunity and this demonstrates the importance of a balanced and varied diet for maintaining a healthy immune system.



Macronutrients	Vitamin	Minerals	Bioactive proteins & peptides
Protein	Vitamin A	Copper	ß-lactoglobulin
Long-chain PUFAs	Vitamin B6	Iron	∂-lactalbumin
	Vitamin B12	Selenium	Immunoglobullin
	Folate	Zinc	Lactoferrin
	Vitamin C		
	Vitamin D		
	Vitamin E		

Dairy is a nutrient rich food group which has been championed for its role in bone, teeth and muscle health for decades. It is a unique blend of nutrients which may include calcium, phosphorus, iodine, Vitamin B2 and B12, fermented cultures (yoghurt and cheese) bioactive peptides and high-quality protein containing all of the essential amino acids.

'The Dairy Matrix' hypothesis suggests that the nutrients in dairy can interact with one another in ways that are beneficial for health. This also includes some of the nutrients that support the immune system, such as vitamin B12 and folate, found in milk, cheese and yogurt, and vitamin A and zinc specifically for hard cheeses like cheddar.

Fermented dairy products[6-8], such as cheese, yogurt and kefir, have long been recognised for their health benefits. They are produced by the microbial fermentation of milk and several hundred varieties exist depending on the initial substrate, the microorganisms present and the conditions employed. This gives rise to a variety of textures, flavours, bioactive compounds and an enhanced nutritional composition.

Most of the health benefits related to fermented dairy are mediated by modulating immune responses such as inflammation and pathogen defence, mainly through the gut microbiome. Consumption has been associated with numerous health benefits and may help in reductions in immune dysfunction and pro-inflammatory states. In addition, live yogurt cultures can improve digestion of lactose in yogurt, which helps those with lactose intolerance to enjoy the benefits of dairy.

Immune system

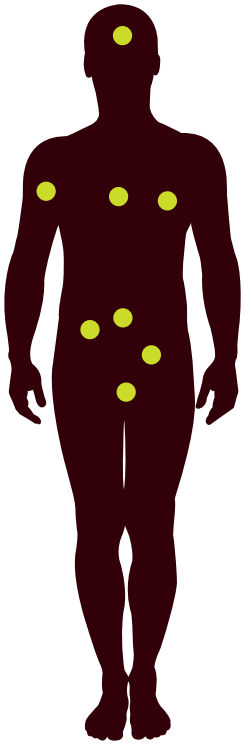
- B Vitamins
- Bacteriocins
- Exopolysaccharides
- Short-chain fatty acids (SCFA's)
- Bioactive peptides

Metabolism & glycaemic

- B Vitamins
- Oligosaccharides
- Octanic acid
- Bioactive peptides from milk
- Conjugated linoleic acid
- Short-chain fatty acids

Digestion & gastrointestinal health

- Antioxidants
- B vitamins
- Oligo & exopolysaccharides
- Bioactiveacids & peptides
- Conjugated linoleic acid
- Short-chain fatty acids



Brain health

- B Vitamins
- Iodine
- Gamma-aminobutyric acid
- Short-chain fatty acids
- Anti-inflammatory bioactives

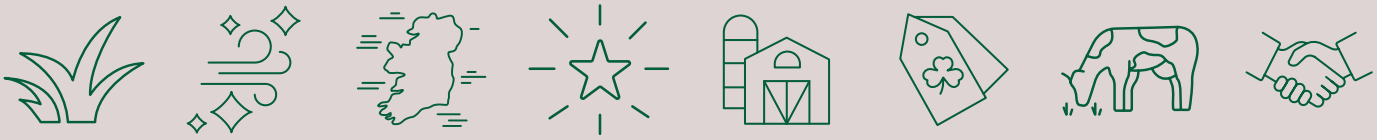
Cardiovascular health

- B Vitamins
- Gamma-aminobutyric acid
- Short-chain fatty acids
- Bioactive peptides

Summary

Due to its nutrient rich profile, dairy has played an integral role in the human diet for thousands of years and evidence continues to support its role as a part of a balanced, healthy diet. A wide variety of nutrients play a role in supporting the immune system and many of these nutrients are to be found in dairy. In addition to standard dairy, fermented dairy has been shown to have enhanced nutritional value which can modulate immune response. Dairy can help support a healthy immune system.

OUR UNIQUE DAIRY SYSTEM



Grass fed cows

Outdoor grazing on nutritious grass for most of the year

Cleanest air in Europe

Urban outdoor air pollution index

Island location

On the edge of the Atlantic Ocean with plentiful rain

Product quality

Multiple checkpoints from farm to factory

Food authenticity

Produced honestly by safe family farms

Clean label

Non-GMO, hormone-free, Kosher & Halal

Cow & milk traceability

From grassland to customer

Trusted Partner

Supporting leading global brands

OUR R&D FUNCTION

The Innovation Hub

Our Innovation Hub houses world class facilities enabling us to bring our concepts to life.

Leading the way in process and technology

Functionalising and developing ingredients whilst always maintaining nutritional integrity.

Our external ecosystem

Our extensive network of external partners ensures we are agile.

Developed by our experts

Our team of experts passionately researching the worlds of dairy and plant.

Providing superior nutrition

At Tirlán the foundations of nutrition are built on dairy and plant. Our ethos: "Good for You, Good for the Planet".

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Get in Touch

To find out more about how Tirlán can support you in developing your solutions, please contact us directly.

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