



# The responsive immune system



#### **INNATE IMMUNE SYSTEM**

The body's first line of defence involving barriers (e.g. the lining of the nose and throat) and immune cells that respond to pathogens non-specifically.



### ADAPTIVE IMMUNE SYSTEM Recognition of previously encountered pathogens, generating targeted responses for long-term immunity involving lymphocytes and antibodies.



**IMMUNOMODULATION** The regulation of the immune response to maintain an appropriate reaction to immune challenges.



## Importance of the microbiome

The microbiome contributes to immune system development, regulation, and defence via its influence over immune cell function and antimicrobial substance production.

Dysbiosis, a disruption to microbial balance, can impact healthy immune system function and lead to increased susceptibility to infections, autoimmune disorders, and allergies.

A healthy microbiome supports optimal immune function and overall wellbeing.

### Changing demands on the immune system across the lifespan

Only 1 in 15 Australian adults meet the recommended daily serves of vegetables. Adequate nutrition is crucial for healthy fertility.The majority of pregnant women in Australia do not meet their daily nutrient needs, including micronutrients such as zinc, which is in turn crucial for healthy fertility.96% of Australian children do not eat the recommended amount of vegetables, with many of these vegetables providing prebiotic benefits for gut health. The microbiota plays a key role in the training of function of the immune system.55.8% of the influenza patients hospitalised in Australia in 2022 were children. A child's immune system continues to mature until 8 years of age leading to increased susceptibility to infection throughout childhood.41% of the food consumed by teens is discretionary which can lead to nutrient deficiencies (e.g. vitamins A, C, and E). They also have up to a 120% increased need for zinc, an important for immune system.Ageing adults have an increased risk of inflammation and impaired with can lead to nutrient.Image: Delta to the food consumed by teens is discretionary which can lead to nutrient to increased need for zinc, an important for immune system.41% of the food consumed by teens is discretionary which can lead to nutrient edicicencies (e.g. vitamins A, C, and E). They also have up to a 120% increased need for zinc, an important for immune system.Ageing adults have an increased need for zinc, an important for inflammation and impaired inflammation.Image: Delta to the food consumed by teens is discretionary which is inturn crucial for healthy fertility.BefwAffection the inflammation and impaired inflammation and impaired <br< th=""><th>Fertility</th><th>Pregnancy</th><th>Early Years</th><th>Child</th><th>Teen</th><th>Adult-Ageing</th></br<>	Fertility	Pregnancy	Early Years	Child	Teen	Adult-Ageing
	Only 1 in 15 Australian adults meet the recommended daily serves of vegetables. Adequate nutrition is crucial for healthy immune system function, which is in turn crucial for healthy fertility.	The majority of pregnant women in Australia do not meet their daily nutrient needs, including micronutrients such as zinc, which is important for maintaining immune health.	96% of Australian children do not eat the recommended amount of vegetables, with many of these vegetables providing prebiotic benefits for gut health. The microbiota plays a key role in the training of function of the immune system.	55.8% of the influenza patients hospitalised in Australia in 2022 were children. A child's immune system continues to mature until 8 years of age leading to increased susceptibility to infection throughout childhood.	41% of the food consumed by teens is discretionary which can lead to nutrient deficiencies (e.g. vitamins A, C, and E). They also have up to a 120% increased need for zinc, an important immune system nutrient.	Ageing adults have an increased risk of inflammation and impaired immune function. Antioxidant nutrients are important for maintaining healthy immune function throughout adulthood.



**PRESCRIBING CONCEPTS** 

# Supporting immunity across the lifespan

	ACTION	PREGNANCY	CHILDHOOD	ADULT	NOTES
AP-Bio <sup>®</sup> Andrographis	Andrographis exhibits anti-inflammatory, antiviral, antimicrobial, and antioxidant effects and has a statistically significant effect on the symptoms of acute respiratory tract infections.	NO	NO – consider black elder instead	<b>YES –</b> 62.5 mg andrographalides/day	
Astragalus	Astragalus promotes an effective immune response by supporting T-cell numbers, lymphocyte activity, enhancing vitality, and supporting the body to adapt to stress.	NO	<b>NO –</b> consider black elder and echinacea	<b>YES –</b> 800 mg/day	
Echinacea	Echinacea modulates the immune response via immune cell activation and provides antiviral, antibacterial, antioxidant, and anti-inflammatory benefits.	NO – consider lactoferrin instead	<b>YES –</b> 300 mg/day	<b>YES –</b> 750 mg/day	
Prebiotics & Probiotics	Probiotics regulate both the innate and adaptive immune response via their ability to modulate dendritic cell, macrophage, and T and B lymphocyte action.	YES	YES	YES	
Quercetin	Quercetin is an antioxidant, anti-allergy, and anti-inflammatory agent with a broad range of antiviral and immunomodulatory activities including mast cell stabilisation. Quercetin also encourages the uptake of zinc into body cells.	NO	<b>YES –</b> 200 mg/day	<b>YES –</b> 1.8 g/day	
Vitamin A	Vitamin A is integral for strong immune barriers, as well as immune system regulation, and the adaptive immune response.	<b>CAUTION –</b> consider beta carotene*	YES – 150 micrograms/day	<b>YES –</b> 450 micrograms/day RE	
Vitamin C	Vitamin C is a well-known antioxidant which enhances multiple aspects of immune function. Vitamin C appears to be able to both prevent and treat respiratory and systemic infections.	<b>YES –</b> 500 mg/day	<b>YES –</b> 40–80 mg/day	<b>YES –</b> 2.2 g/day	
Vitamin D	Vitamin D is required for the expression, development, and proper functioning of multiple immune cells. Vitamin D deficiency has been linked to increased incidence of infectious disease.	<b>YES –</b> 1000 IU/day	<b>YES -</b> 400-1000 IU/day	<b>YES –</b> 1000 IU/day	
Wellmune®	Wellmune <sup>®</sup> is a yeast beta glucan derived from the cell wall of <i>Saccharomyces cerevisia</i> e that demonstrates immunomodulatory activity. Yeast beta glucans show promise as immune 'trainers' supporting the body to act effectively to invading pathogens.	NO – consider lactoferrin instead	<b>YES –</b> 100 mg/day	<b>YES –</b> 250 mg/day	
Zinc	Zinc can be used to both prevent and treat acute infections. Zinc strengthens the mucosal barriers of the respiratory tract, supports immune cell function, suppresses viral replication, and provides antioxidant benefits.	<b>YES –</b> 20 mg/day	<b>YES</b> – 5 mg/day	<b>YES</b> – 30 mg/day	

\*Caution required - when taken in excess of 3000 micrograms retinol equivalents (RE), vitamin A can cause birth defects.

To learn more on key ingredients associated with immune health, visit: www.bioceuticals.com.au/product/ingredient

#### **HAVE QUESTIONS?**

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