



Activated Probiotics'  
Clinical Update and  
Training Session:

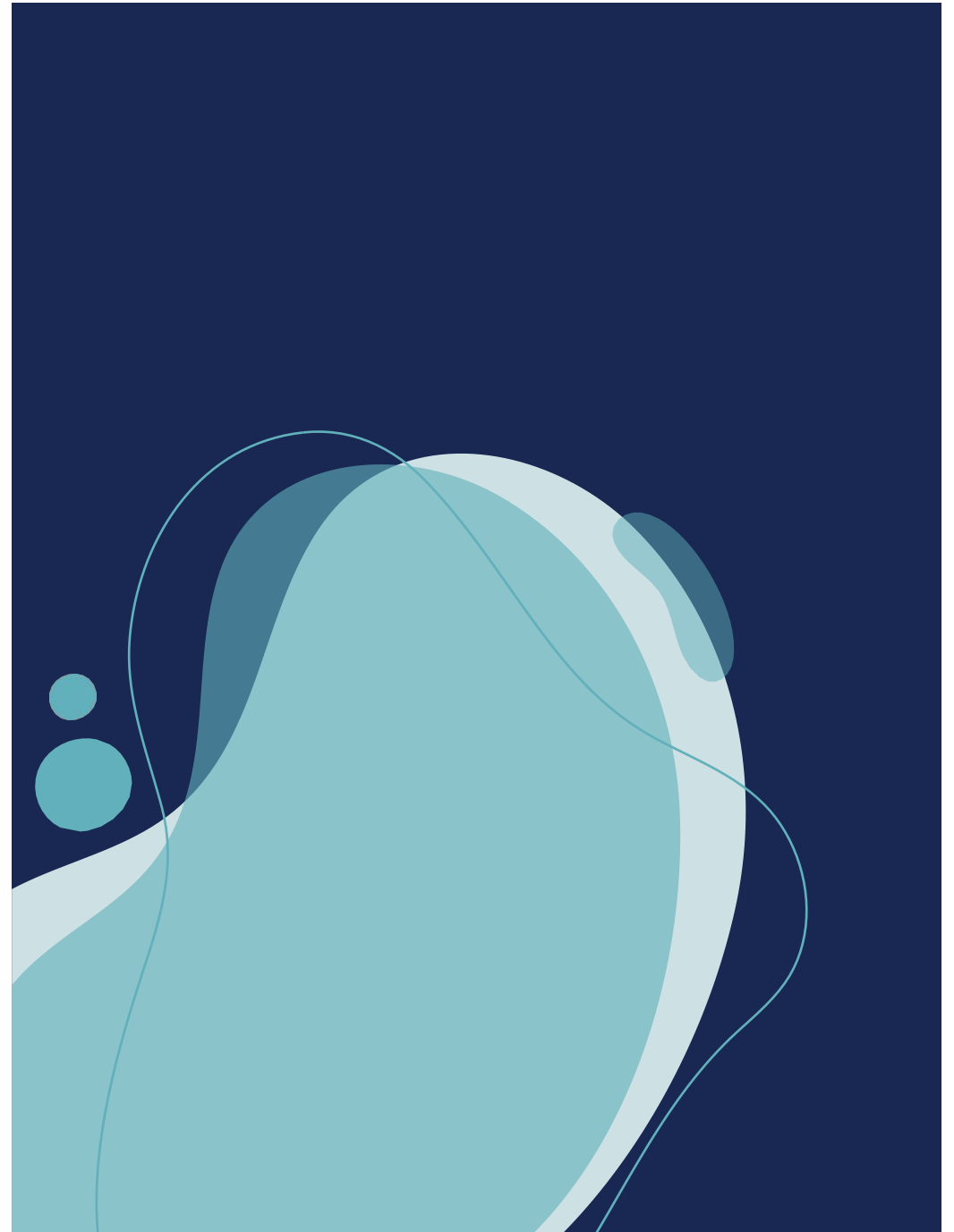
**Biome Daily™ Probiotic**  
To help enhance immune system function  
and promote healthy digestion

THURSDAY 19 MARCH 2020

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PRESENTERS: BLAIR NORFOLK & REBECCA EDWARDS

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# The Activated Probiotics® Difference



Key research partnerships



Microencapsulation



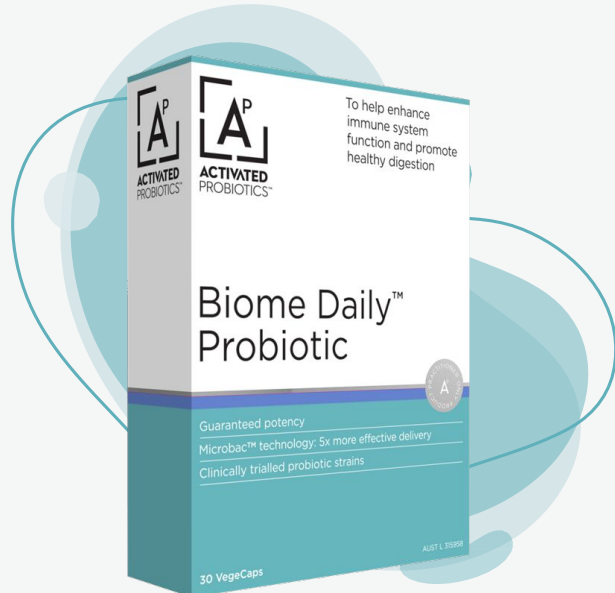
Strain selection and identification  
(DSM/ATCC)



Unique packaging to  
maintain product integrity

# Biome Daily™ Probiotic

To help enhance immune system function



To help enhance  
immune system  
function

## Acute respiratory tract infections and the immune system

5.97M

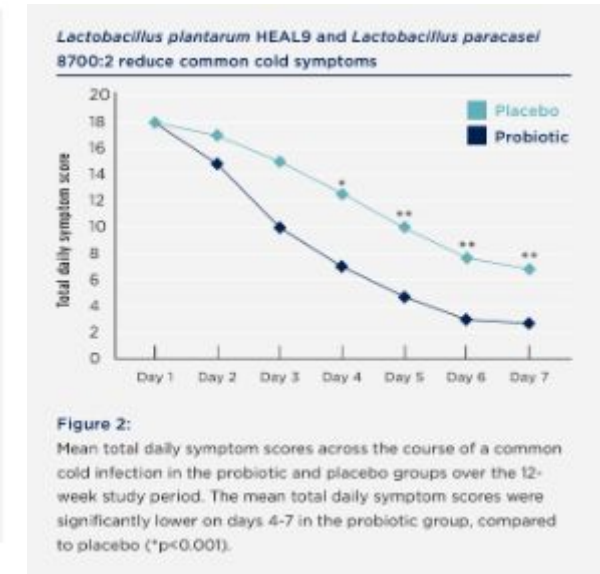
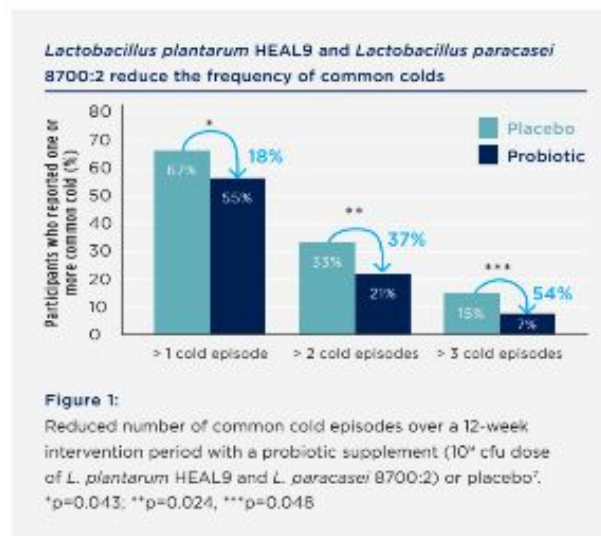
acute respiratory  
infections in Australia  
per year<sup>1</sup>

40%

of adults receive  
antibiotics for  
influenza-like illness<sup>2</sup>

\$40B

total annual cost of  
non-influenza-related  
viral respiratory tract  
infections in the US<sup>3</sup>

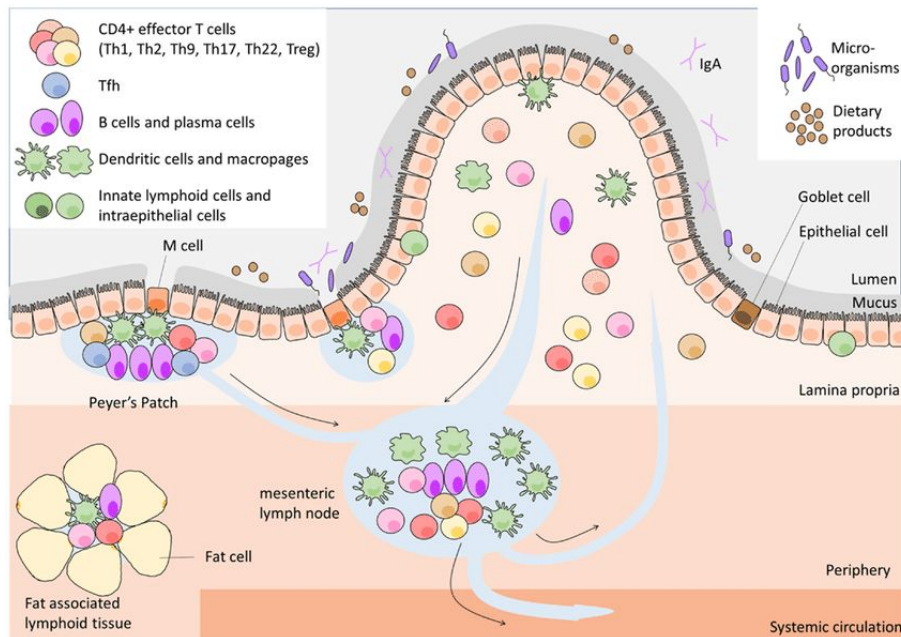


### REFERENCES:

1. McCullough AR, Pollack AJ, Plejdrup Hansen M, Glasziou PP, Looke DF, Britt HC, et al. Antibiotics for acute respiratory infections in general practice: comparison of prescribing rates with guideline recommendations. *Med J Aust* [Internet]. 2017 Jul 17;207(2):65–9.
2. Varghese BM, Dent E, Chilver M, Cameron S, Stocks NP. Epidemiology of viral respiratory infections in Australian working-age adults (20–64 years): 2010–2013. *Epidemiol Infect* [Internet]. 2018 Apr 21;146(5):619–26.
3. Berggren A, Lazou Åhrén I, Larsson N, Önnings G. Randomised, double-blind and placebo-controlled study using new probiotic lactobacilli for strengthening the body immune defence against viral infections. *Eur J Nutr* [Internet]. 2011 Apr 28;50(3):203–10.
4. Busch R, Gruenewald J, Dudek S. Randomized, double blind and placebo controlled study using a combination of two probiotic Lactobacilli to alleviate symptoms and frequency of common cold. *Food Nutr Sci* [Internet]. 2013;04(11):13–20

# Probiotics and enhanced immune system function

# Proposed Mechanism of Action



**Figure 1. Distribution of immune cells in the gut**

Brucklacher-Waldert, Verena & Carr, Edward & Linterman, Michelle & Veldhoen, Marc. (2014). Cellular Plasticity of CD4+ T Cells in the Intestine. *Frontiers in immunology*. 5. 488. 10.3389/fimmu.2014.00488.

**The gastrointestinal system is home to 70% of the body's immune cells**

The gut microbiota and its metabolites, particularly short chain fatty acids such as butyrate, interact with the intestinal epithelial cells and the underlying immune cells.

As a result, bacteria-derived metabolites are thought to trigger a cascade of changes in immune cell phenotypes and cytokine secretion which supports enhanced immune function.

A healthy gut microbiota and various strains of probiotics enhance immune system function via various different pathways, and have been observed to:

- Induce and activate dendritic cells and macrophages
- Directly activate natural killer T cells
- Increase IgA production by B-cells

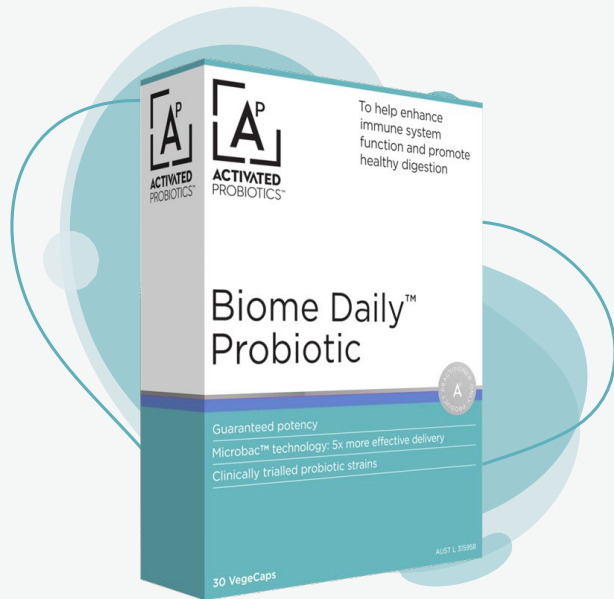
This influences the activity of both innate and adaptive immune cells in the gastrointestinal system.

This then alters systemic immune function when immune cells enter circulation and travel across the body.

1. Frei R, Akdis M, O'Mahony L. Prebiotics, probiotics, synbiotics, and the immune system. *Curr Opin Gastroenterol* [Internet]. 2015 Mar;31(2):153–8.

# Biome Daily™ Probiotic

To help promote healthy digestion



To help promote  
healthy digestion

## In Australia...

# 87%

of all deaths are associated with chronic disease<sup>1</sup>

# 47.3%

of all adults have one or more chronic diseases<sup>1</sup>

# \$320M

worth of avoidable hospital admissions is caused by poorly managed chronic disease<sup>2</sup>

## “All disease begins in the gut”

- Hippocrates

Chronic inflammatory diseases are the most important causes of mortality in the world today - and are on the rise.

These include cardiovascular disease, obesity, diabetes, asthma, and inflammatory bowel disease (IBD), among others.

Immune-driven inflammation is a common underlying theme between these diseases.

As the seat of the immune system, gut health and the microbiota is closely linked to systemic inflammation.

Many chronic inflammatory diseases are associated with significant shifts in the microbiota towards inflammation-driving communities<sup>3</sup>.

#### REFERENCES:

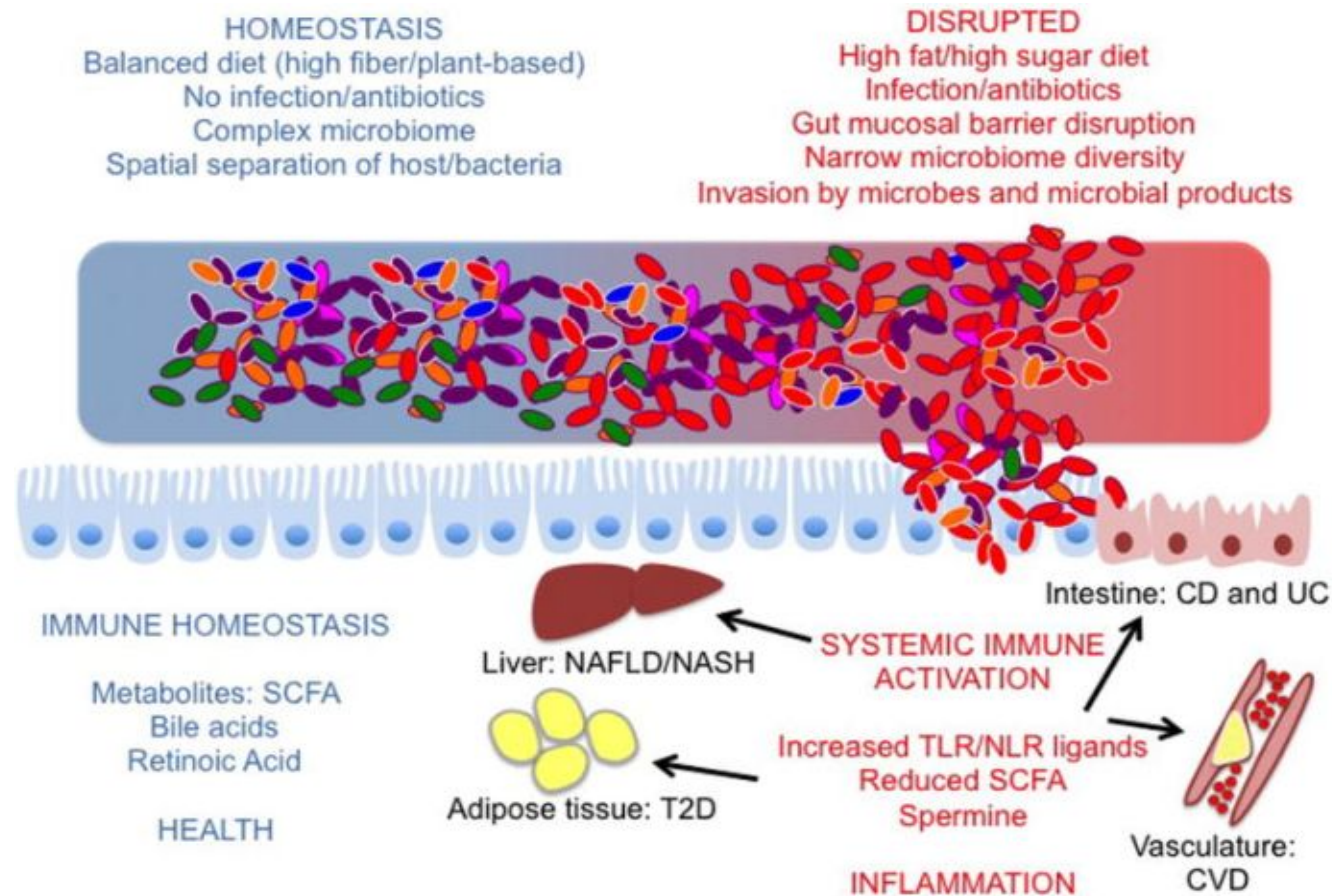
1 Australian Institute of Health and Welfare 2018. Australia's health 2018. Australia's health series no. 16. AUS 221. Canberra: AIHW.

2. Swerissen, H., Duckett, S., and Wright, J., 2016, Chronic failure in primary medical care, Grattan Institute

3. Hand TW, Vujkovic-Cvijin I, Ridaura VK, Belkaid Y. Linking the Microbiota, Chronic Disease, and the Immune System. Trends Endocrinol Metab [Internet]. 2016 Dec;27(12):831–43.

4. Maldonado Galdeano C, Cazorla SI, Lemme Dumit JM, Vélez E, Perdígón G. Beneficial Effects of Probiotic Consumption on the Immune System. Ann Nutr Metab [Internet]. 2019;74(2):115–24.

Poor gut health and intestinal dysbiosis may also lead to increased intestinal permeability and translocation of bacteria and endotoxins, furthering increasing systemic inflammation.



Hand TW, Vujkovic-Cvijin I, Ridaura VK, Belkaid Y. Linking the Microbiota, Chronic Disease, and the Immune System. Trends Endocrinol Metab [Internet]. 2016 Dec;27(12):831–43.



# Probiotics, gut barrier integrity, and regulating inflammation

## Proposed Mechanism of Action

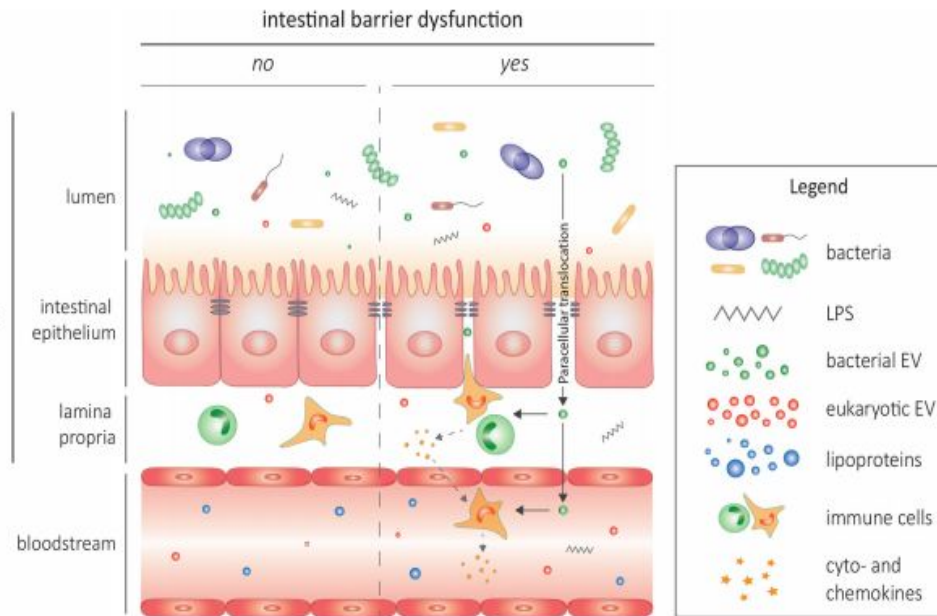


Figure 3. Demonstrating the effects of intestinal barrier dysfunction

1. Tulkens J, Vergauwen G, Van Deun J, Geeurickx E, Dhondt B, Lippens L, et al. Increased levels of systemic LPS-positive bacterial extracellular vesicles in patients with intestinal barrier dysfunction. Gut [Internet]. 2020 Jan;69(1):191–3

Intestinal epithelial cells are a single layer of cells lining the lumen of the gut which form a barrier against pathogenic microbes and prevent translocation of inflammatory substances such as food-based antigens and microbial endotoxins.

They provide this barrier via:

- Tight junctions between cells, which seal adjacent epithelial cells together and limit the passage of substances between cells
- Secreting mucins and antimicrobial peptides, which contributes to a thick layer of protective mucus

Probiotics have been observed to strengthen the intestinal barrier by:

- Increasing the number of goblet cells which secrete mucus to reinforce the thick mucus layer
- Increasing gene expression of tight junction signalling

Through maintaining gut barrier integrity, and impacting immune system function, probiotics can help to regulate appropriate inflammation levels.

Maldonado Galdeano C, Cazorla SI, Lemme Dumit JM, Vélez E, Perdígón G. Beneficial Effects of Probiotic Consumption on the Immune System. Ann Nutr Metab [Internet]. 2019;74(2):115–24.



Thank  
You

THURSDAY 20 FEBRUARY 2020

PRESENTERS: BLAIR NORFOLK & REBECCA EDWARDS

