



Biome Daily™ Probiotic

Mechanism of Action



MECHANISM OF ACTION

Colds and flu

Australian adults experience an average of two to four colds each year. Symptoms are usually mild, and most colds do not require any treatment or intervention. Colds are self-limiting, generally lasting less than a week. Influenza (flu) is caused by different strains of influenza virus. In Australia, the most common strains are A and B. Flu infections occur less commonly than cold infections, and typically cause more severe and long-lasting symptoms. More than 3000 deaths each year are attributed to complications of flu.

Cold and flu therapeutics

Cold symptoms can be treated via over-the-counter medicines such as paracetamol and ibuprofen. Occasionally, antibiotics are prescribed to people who experience a lingering cough and mucus discharge following a cold infection, but large studies have found this to be ineffective and unnecessary. Antibiotics have no effect on the cold and flu viruses. There are two antiviral drugs which can be prescribed to people with confirmed influenza - oseltamivir (Tamiflu) and zanamivir (Relenza) - which can decrease the duration of the illness by an average of one day if started within 48 hours of symptom onset.

Probiotics - proposed mechanism of action

Immunomodulation

The immune system is a complicated interplay between various cells in the body. Many of the cells involved in regulating the body's immune response are found in the gut, and these (most notably dendritic cells and epithelial cells) are often the first cells to come into contact with intestinal microbes and their metabolic products. Intestinal dendritic cells are located primarily in the GALT (gut-associated lymphoid tissue - an important concentration of immune cells in the lining of the intestinal tract). They act as 'sensors'. Bacteria-derived metabolites (substances produced by bacteria, including by probiotic bacteria) can activate these sensor dendritic cells, which then triggers a cascade of cytokine release. These cytokines are the chemicals the immune system produces to fight infection. In this way, some probiotic bacteria can influence the immune system to respond to pathogens. Further, short-chain fatty acids (SCFAs) produced by bacteria acting on fibres in the colon also induce immunomodulatory effects.

Enhancing intestinal barrier function

The mucus layer coating the lining of the digestive tract is an important part of the body's immune defence. Probiotics have been shown to promote mucin production, helping to maintain the integrity of this barrier.

Induction of Tregs

There is evidence probiotics can induce an increase in T regulatory (Treg) cells, a type of lymphocyte which helps to regulate immune response. Probiotics and their metabolites can also influence the activity of other lymphocytes (B lymphocytes and natural killer cells) to normalise their activity and optimise immune response.

In summary, probiotics and their metabolic products help to maintain the integrity of the intestinal mucosal epithelium and help to regulate the activity of immune cells. This supports optimal functioning of the immune system, reducing the frequency and duration of common colds.

REFERENCES

- Arroll B, Kenealy T. Are antibiotics effective for acute purulent rhinitis? Systematic review and meta-analysis of placebo controlled randomised trials. *BMJ: British Medical Journal* [Internet]. 2006 [cited 2019 Nov 7];333(7562):279. Available from: <http://search.ebscohost.com.ezproxy.utas.edu.au/login.aspx?direct=true&db=edsjrs&AN=edsjrs.40698892&site=eds-live>
- Frei R, Akdis M, O'Mahony L. Prebiotics, probiotics, synbiotics, and the immune system. *Current Opinion in Gastroenterology*. 2015;31(2):153-158. doi: 10.1097/MOG.0000000000000151. Health Direct <https://www.healthdirect.gov.au/colds-and-flu-statistics>
- Jefferson T, Demicheli V, Rivetti D, Jones M, Di Pietrantonj C, Rivetti A. Antivirals for influenza in healthy adults: systematic review [published correction appears in *Lancet*. 2006;367(9507):303-313]. *Lancet*. 2006;367(9507):303-313
- Treanor JJ, Hayden FG, Vrooman PS, et al.; US Oral Neuraminidase Study Group. Efficacy and safety of the oral neuraminidase inhibitor oseltamivir in treating acute influenza: a randomized controlled trial. *JAMA*. 2000;283(8):1016-1024