

THE LINK BETWEEN THE GUT AND THE BRAIN

BY: Nicola Wilken / DATE: May 2018

Recently there has been a lot of talk about the importance of gut health. Words that crop up may include “probiotics”, “prebiotics”, “fermented foods” and “fibre”. Now you start hearing that there is a link between gut health and your brain. This seems bizarre – how can this be possible? Well, a lot of research is now being aimed at answering this very question. The answer seems to lie in how the microbes and functional integrity of the gut influence depression and other mental health disorders¹.

WHAT IS THE GUT MICROBIOME?

Let’s start from the beginning. The gut microbiome refers to the bacteria that resides in our gastrointestinal (GI) tract. The gut microbiome consists of over 1000 bacterial species and their genetic material is 10 times that of human DNA². So, that means that most of the DNA found in our bodies does not even belong to us! Furthermore, the gut microbiota constitutes about 2kg of our body weight².

Although a core microbiome is shared by all humans, changes occur in the microbiota throughout the life span. This change is influenced by³:

- Diet
- Stress
- Infections
- Antibiotic use
- Clean environments

THE ROLE OF THE MICROBIOTA

The microbiota performs many different functions in the body including²:

- Protecting the intestinal barrier defence system
- Digesting our food
- Extracting nutrients that we need
- Synthesizing some nutrients we need e.g. Vitamin K



Figure 1: Infographic on how health begins in the gut ⁹.



WHAT ARE PROBIOTICS?

According to the World Health Organization, probiotics are defined as “living microorganisms, which when administered in adequate amounts, confer health benefits on the host”². So, basically probiotics are bacteria that have beneficial effects on health. However, once consumed one has to provide them with the right food to stay alive.

WHAT DO PROBIOTICS AND GUT MICROBIOTA FEED OFF?

The various microbiota prefer to consume different foods. Beneficial bacteria, such as *Bifidobacteria* and *Lactobacillus* prefer to eat non-digestible fibres, such as prebiotics. Bacteria that can promote ill-health prefer to consume fats and proteins. You can thus influence which bacteria proliferate and survive by eating specific foods⁴.

HOW IS THE GUT AND THE BRAIN LINKED?

The link between the brain and the gut involves neural, hormonal and immunological pathways². These pathways are found to be bi-directional, meaning that the gut influences the brain and the brain also influences the gut⁵.

The GI tract serves as a large mucosal surface that bridges the gap between ‘inside the body’ and ‘outside the body’. Normal microbial inhabitants of the GI tract reinforce the barrier of the intestinal lining, decreasing ‘translocation’ of bacteria or particles from the intestine into the blood stream⁶. Changes in the composition of the gut microbiome can lead to inflammation, which may affect the structural barrier of the gut. This leads to an increase in permeability of the gut and allows toxins into the blood stream. This is known as “leaky gut”. This results in the production of pro-inflammatory molecules which can impair the functioning of the central nervous system and influence stress, cognition, behaviour, and pain sensitivity⁷.

HOW DO PROBIOTICS HELP WITH MENTAL HEALTH?

There may be many ways in which probiotics help improve mental health. However, it is species *and* strain-specific. Furthermore, the dosage may be species- and strain-dependent⁸. Probiotics which have been shown to have beneficial effects for mental health include^{6,7}:

- *Lactobacillus helveticus*
- *Lactobacillus acidophilus*
- *Lactobacillus casei*
- *Bifidobacterium longum*
- *Bifidobacterium bifidum*



Psychobiotics is a new term used for probiotics that have been shown to be beneficial for mental health. They are defined as: “a live organism that, when ingested in adequate amounts, produces a health benefit in patients suffering from psychiatric illness”².

A meta-analysis of studies done on probiotics and mental health found: an improvement in mood symptoms, improved anxiety scores and positive effects on cognition. This is achieved through: regulation of inflammatory markers and neurotransmission of serotonin⁸.

CONCLUSION

Looking after your gut health can have many benefits, including improving mental wellbeing. If clinically diagnosed with a mental health disorder, one must still adhere to prescribed medication. Changing one’s diet and consuming appropriate probiotics can be used as an adjunctive therapy to this medication.

WHERE DOES FUTURELIFE® FIT IN?

FUTURELIFE® Bran Flakes with Probiotic Sachets comes with 10 sachets of HOWARU Premium Probiotics and contains a combination of *B.Lactis* and *L. acidophilus* strains. These two strains have been proven to help gut and immune health. As seen above, *L. acidophilus* has been shown to have some benefit for mental wellness. This is not in a very high dose and should rather be used for everyday maintenance as opposed to therapeutic use. The bran flakes themselves contain a natural prebiotic that the good bacteria can feed off of to support their function.

1. *Intestinal microbiota, probiotics and mental health: from Metchnikoff to modern advances: Part II – contemporary contextual research.* **Alison C Bsted, Alan C Logan and Eva M Selhub.** 3, s.l. : Gut Pathogens, 2013, Vol. 5.
2. *The Gut Microbiome: Potential Innovations for the Understanding and Treatment of Psychopathology.* **Matilda E. Nowakowski, Randi McCabe, Karen Rowa, and Joe Pellizzari.** 2, s.l. : Canadian Psychology, 2016, Vol. 57.
3. *The Emerging Field of Nutritional Mental Health: Inflammation, the Microbiome, Oxidative Stress, and Mitochondrial Function.* **Bonnie J. Kaplan, Julia J. Rucklidge, Amy Romijn, and Kevin McLeod.** 6, s.l. : Clinical Psychological Science, 2015, Vol. 3.
4. *More Than a Gut Feeling: The Implications of the Gut Microbiota in Psychiatry.* **DA, Ho P and Ross.** s.l. : Biological Psychiatry, 2017, Vol. 81.
5. *From gut dysbiosis to altered brain function and mental illness: mechanisms and pathways.* **Rogers GB, Keating DJ, Young RL, Wong ML, Licinio J and Wesselingh S.** s.l. : Molecular Psychiatry, 2016, Vol. 21.
6. *Probiotics and their fermented food products are beneficial for health.* **S. Parvez, K.A. Malik, S. Ah Kang and H.-Y. Kim.** s.l. : Journal of Applied Microbiology, 2006, Vol. 100.



7. *Fermented foods, microbiota, and mental health: ancient practice meets nutritional psychiatry.* **Selhub EM, Logan AC and Bested A.** 2, s.l. : Journal of Physiological Anthropology, 2014, Vol. 33.
8. *The effects of probiotics on depressive symptoms in humans: a systematic review.* **Milev, Caroline J. K. Wallace and Roumen.** 14, s.l. : Annals of General Psychiatry, 2017, Vol. 16.
9. [Online] <http://peaandthepodchiropractic.com/probiotics-and-overall-health/>.