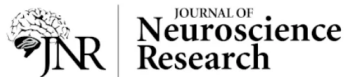


# PREBIOTICS AND THE ROLE OF INFLAMMATION IN DEPRESSION AND ANXIETY!

## Prebiotics and the role of inflammation in depression and anxiety!

Hey Uplifters,

We hope everyone is staying healthy! We know times right now are slightly stressful and uncertain, and it is super important that we all try our best to maintain a healthy body as well as mind. Which is why we are sharing a journal article from the [Journal of Neuroscience Research](#) on the role of inflammation and the gut microbiome in improving depression and anxiety!



REVIEW | [Free Access](#)

### The role of inflammation and the gut microbiome in depression and anxiety

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## Abstract

The study of the gut microbiome has increasingly revealed an important role in modulating brain function and mental health. In this review, we underscore specific pathways and mechanisms by which the gut microbiome can promote the development of mental disorders such as depression and anxiety. First, we review the involvement of the stress response and immune system activation in the development of depression and anxiety. Then, we examine germ-free murine models used to uncover the role of the gut microbiome in developing and modulating pertinent activity in the brain and the immune system. We also document multiple pathways by which stress-induced inflammation harms brain function and ultimately affects mental health, and review how probiotic and prebiotic treatments have shown to be beneficial. Lastly, we provide an overview of gut microbiome-derived compounds (short-chain fatty acids, tryptophan catabolites, microbial pattern recognition) and related mechanisms (vagal nerve activity and fecal microbiota transplants) involved in mediating the influence of the gut microbiome to mental health. Overall, a picture of the gut microbiome playing a facilitating role between stress response, inflammation, and depression, and anxiety is emerging. Future research is needed to firmly establish the microbiome's causal role, to further elucidate the mechanisms by which gut microbes influence brain function and mental health, and to possibly develop treatments that improve mental health through microbiotic targets.

The study starts with introducing the human gut microbiome as a collection of microorganisms that occupy the gastrointestinal (GI) tract. It then mentions how the gut microbiome appears to be linked to the nervous system through the gut-brain axis. This is why gut microbes can thereby have the potential to influence brain activity and thus mental health.

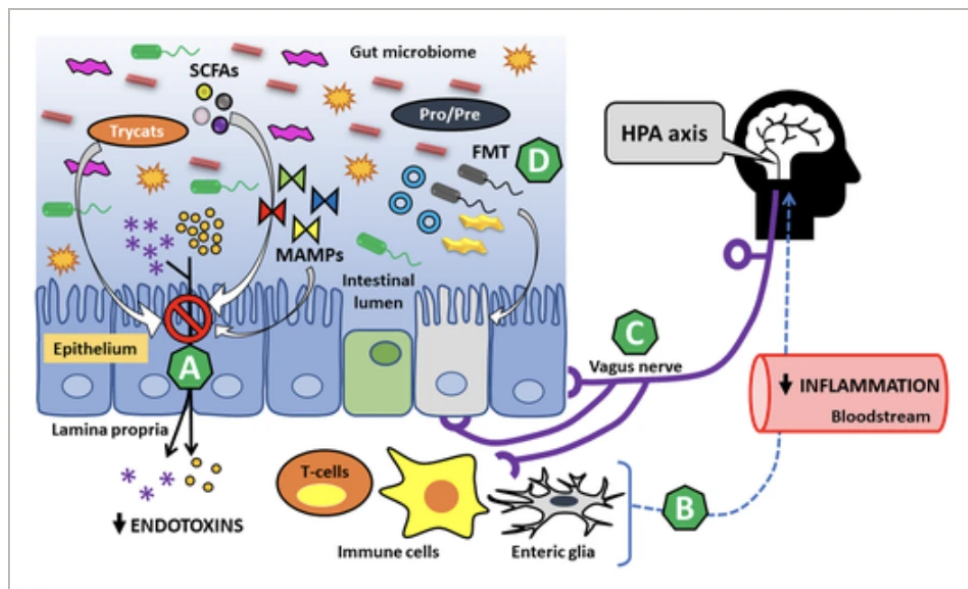
### 1.3 Gut microbiome influence on depression and anxiety

With the advent of improved molecular and metagenomic tools, human and animal studies have provided increasing evidence suggesting a strong link between the gut microbiome composition and the development of mental disorders such as depression and anxiety (Bastiaanssen, Cowan, Claesson, Dinan, & Cryan, [2019](#); Jiang et al., [2018](#); Rogers et al., [2016](#); Tognini, [2017](#)). First, it is known that a variety of bacterial phyla cohabit in the human gut, with over 1,000 distinct bacterial species (Human Microbiome Jumpstart Reference Strains Consortium et al., [2010](#)). More than 70% of the microbiome comes from the two most prominent phyla Firmicutes and Bacteroides, while Proteobacteria, Actinobacteria, Fusobacteria, and Verrucomicrobia are present in reduced numbers (Eckburg et al., [2005](#)). However, we are only starting to fully understand the implications of this microbial diversity for human health and disease. Regarding mental health specifically, a few studies are beginning to show interesting trends. For instance, patients diagnosed with major depression disorder (MDD) have a different fecal microbiome composition compared to healthy controls: MDD patients showed increased Bacteroidetes, Protobacteria, and Actinobacteria, and less Firmicutes. Further, among genus these patients showed increased Enterobacteriaceae and Allistipes, and less Faecalibacterium, the last of which inversely correlated with the severity of the depression (Jiang et al., [2015](#)). Interestingly, in this study, no differences were observed between the gut microbiome of female or male MDD patients although sex differences have been reported in healthy individuals (more on sex-dependent differences will be discussed on Section [33.2](#)).

The actual mechanisms that connect psychological stress to systemic and neural inflammation is uncovered in the diagram below. The communication between the gut microbiome and central nervous system can be affected by stress, which leads to a cascade of different reactions that trigger a release of endotoxins that

[https://upliftfood.com/blogs/news/prebiotics-and-the-role-of-inflammation-in-depression-and-anxiety?omnisendAttributionID=email\\_automation\\_6047d2...](https://upliftfood.com/blogs/news/prebiotics-and-the-role-of-inflammation-in-depression-and-anxiety?omnisendAttributionID=email_automation_6047d2...) 2/4

cause inflammation. The immune response then spreads to the central nervous system which can then compromise mental health.



The article then goes to explain how probiotics and prebiotics have the ability to improve mental health, in terms of dampening stress and anxiety, decreasing intestinal permeability and decreasing inflammation.

## 5 PROBIOTICS AND PREBIOTICS HAVE CAPACITY TO IMPROVE MENTAL HEALTH

Probiotics are consumable microbes intended to promote a healthier microbiome; prebiotics, on the other hand, are dietary fibers that nourish commensal gut microbes (Schrezenmeir & de Vrese, 2001). A great number of studies on both murines and humans have shown promise for probiotics and prebiotics to improve the stress response, the intestinal barrier, the immune response, and ultimately mental health.

The study of the gut microbiome–brain axis is revolutionizing our understanding of the mechanisms underlying nervous system disorders such as depression and anxiety. However, there are currently more open questions than answers. What is clear is that the gut microbiome's role in modulating mental health deserves increased attention from researchers and clinicians. Across the developed world, rates of depression and anxiety are increasing (Jorm et al., [2017](#)). At the same time, increased rates of urbanization are bringing about concerns over public health infrastructure and policies (Bloomfield et al., [2016](#)). These two trends make more sense when seen through the lens of the gut microbiome. Modern urban lifestyles often decrease exposure to microbes early in life and lead to an underdeveloped immune system prone to chronic inflammation later in life, possibly serving as a risk factor for mental disorders such as depression and anxiety (Rook, Raison, & Lowry, [2013](#)). Similarly, urban environments with decreased green space combined with heavily marketed fast foods can contribute to gut dysbiosis, particularly among lower socioeconomic classes (Logan, [2015](#)). Indeed, urbanization is associated with decreased gut microbiome complexity (Segata, [2015](#)), an indicator of poor microbiome health (Lloyd-Price, Abu-Ali, & Huttenhower, [2016](#)). Increased urbanization worldwide certainly demands increased interest in the ways the gut microbiome can contribute to mental health. Finally, the economic case for further study is incredibly viable: investments in treatments for mental conditions such as depression and anxiety are likely to bring very high rates of return through increases in productivity and quality of life (Chisholm et al., [2016](#)).

Overall, the study concluded that the gut microbiome's role in mental health deserves increased attention from researchers and clinicians as rates of depression and anxiety continue to increase. Though, studies have shown the benefits of using prebiotics and probiotics in mental-health patients.

As you can see from above, there is no harm in practicing a healthy diet with lots of prebiotic fiber to help improve your gut microbiome and possible help alleviate anxiety and depression symptoms.