

Gut feeling: Can looking after your gut improve symptoms of depression?

There is a universe inside us. For every cell that makes up our body there are 100 bacteria inside our gut. Together these bacteria make up a formidable village known as the 'microbiome', going about their individual business whilst collectively building and maintaining the foundations of how we function physically, think and feel.

The microbiome is so vast that scientists are still working to understand it. What they know is that it communicates directly with our brain about important things, such as whether we need to be fighting off a new germ, how to deal with stress, and even how to respond to our feelings. This communication happens via physical and chemical connections linking the gut and the brain, called the 'gut-brain axis'.

Probiotics are 'good' bacteria that live in the microbiome and can be found within natural bio yogurt and kefir, or supplements. There are hundreds of different probiotic types with different roles, some of which are related to our mental health, including symptoms of low mood or depression.

Depression is the one of the most common conditions worldwide, but still has relatively little research dedicated to understanding possible causes and best treatments. Depression can often be long-term, and can affect how people get on with daily life, sadly leading to 800,000 people taking their lives every year. Currently, depression is mostly treated with antidepressants which can take time to improve symptoms and sometimes come with unpleasant side-effects. Importantly, around 60% of people prescribed antidepressants see no improvement. Therefore, new treatment options are needed. Probiotics are one such option.

Microbiome research has grown, including looking into the relationship between gut bacteria and depression. Differences in types and concentration of gut bacteria have been found in people with depression compared to those without. These differences have been linked to symptom severity, as well as signs of the body's increased immune (or defence) system response to an irritant or infection, known as

‘inflammation’, but also stress. To show the strength of probiotics as a treatment for depression, more evidence from clinical trials with people who have depression is needed.

Following on from their earlier systematic review after they searched scientific databases in 2018 (see Glossary section for information about systematic reviews), showing that probiotics may improve symptoms of depression when taken with antidepressants, Dr. Viktoriya Nikolova from King’s College London and her colleagues updated their review after searching for new trials in 2020 to see what the possible benefits of taking probiotic supplements have on symptoms of depression.

Nikolova and her team only searched for randomised controlled trials (RCTs) (see Glossary) looking at the possible benefits of probiotics in people with a diagnosis of depression. This meant that trials where probiotics were given to treat other illnesses, such as Irritable Bowel Syndrome (IBS) where depressive symptoms were also measured, were not included. This was to be as sure as they could be that probiotics were responsible for directly improving symptoms of depression. All trials were checked for their overall quality to see if they were carried out to a high standard, and a calculation called a ‘meta-analysis’ (see Glossary) was used to combine all their results to give an overall picture.

They found seven mostly high-quality trials, making up 404 middle-aged people who received 6- 8 weeks of probiotic treatments. The review showed that probiotics alone do not appear to reduce depressive symptoms, but actually do well when given in combination with antidepressants.

The authors suggest two possible explanations: The first is what they call the ‘synergistic effect’, where the combination of antidepressants and probiotics is greater than on their own. They suggest that because antidepressants kill off some bacteria (‘antimicrobial effect’), the probiotics may restore balance allowing the antidepressants to be more effective. The second is the ‘additive effect’, where the probiotics provide something extra that antidepressants alone do not.

The team also looked at biological measures that are linked to changes in depressive symptoms to provide clues as to how the probiotics may be working (see original paper for details). The review found changes in C-reactive protein (CRP), an indicator of inflammation in the body, and Brain-Derived Neurotrophic Factor (BDNF) Proteins, which are important for keeping brain cells healthy, active, and growing, in those who had probiotics compared with those who didn't. These may be the underlying biological processes by which probiotics work with antidepressants, but further research is needed to confirm this.

The review had some weaknesses. First, the small number of trials included, with small number of people, highlights the lack of research done in this area. It also means that it wasn't possible to compare the findings of how the probiotics may be working across the trials. So, these findings should be viewed with some caution. Secondly, the different ways depression was assessed across the seven trials means there were likely differences between the type and severity of depressive symptoms in participants, which means that the probiotic treatment being tested may be working differently in each individual trial.

Overall, when probiotics are given as an 'add-on' treatment alongside antidepressants, depressive symptoms are reduced in people who took probiotics compared to those who took antidepressants only. When only probiotics were offered but no antidepressants were taken, probiotics didn't have any effect on depressive symptoms.

This study is important because it highlights the potential of this new treatment as an add-on to antidepressants but with the need for more research.

What does this review mean for someone living with depressive symptoms? Well, it supports a potential link between taking probiotics, our gut bacteria, and depressive symptoms, suggesting that including probiotics in our diet may be a positive step towards supporting our mental wellbeing and improving the lives of some 264 million people worldwide living with major depression.