

# The role of the gut microbiome in posttraumatic stress disorder: More than a gut feeling

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The bacteria in your gut could hold clues to whether or not you will develop posttraumatic stress disorder (PTSD) after experiencing a traumatic event.

PTSD is a serious psychiatric disorder that can develop after a person experiences a life-threatening trauma. However, not everyone exposed to a traumatic event will develop PTSD, and several factors influence an individual's susceptibility, including living conditions, childhood experiences and genetic makeup. Stellenbosch University researchers are now also adding [gut bacteria](#) to this list.

In recent years, scientists have become aware of the important role of microbes existing inside the [human gastrointestinal tract](#), called the [gut microbiome](#). These microbes perform important functions, such as metabolising food and medicine, and fighting infections. It is now believed that the gut [microbiome](#) also influences the brain and brain function by producing neurotransmitters/hormones, immune-regulating molecules and bacterial toxins.

In turn, stress and emotions can change the composition of the gut microbiome. Stress hormones can affect bacterial growth and compromise the integrity of the intestinal lining, which can result in bacteria and toxins entering the bloodstream. This can cause inflammation, which has been shown to play a role in several psychiatric

disorders.

"Our study compared the gut microbiomes of individuals with PTSD to that of people who also experienced significant trauma, but did not develop PTSD (trauma-exposed controls). We identified a combination of three bacteria (Actinobacteria, Lentisphaerae and Verrucomicrobia) that were different in people with PTSD," explains the lead researcher, Dr Stefanie Malan-Muller. She is a postdoctoral fellow in the Department of Psychiatry at the Faculty of Medicine and Health Sciences.

Individuals with PTSD had significantly lower levels of this trio of bacteria compared to trauma-exposed control groups. Individuals who experienced trauma during their childhood also had lower levels of two of these bacteria (Actinobacteria and Verrucomicrobia). "What makes this finding interesting, is that individuals who experience childhood trauma are at higher risk of developing PTSD later in life, and these changes in the gut microbiome possibly occurred early in life in response to [childhood trauma](#)," says Malan-Muller. She collaborated with researchers from the University of Colorado Boulder on the study.

One of the known functions of these bacteria is immune system regulation, and researchers have noted increased levels of inflammation and altered immune regulation in individuals with PTSD. "Changes in [immune regulation](#) and increased inflammation also impact the brain, brain functioning and behaviour. Levels of inflammatory markers measured in individuals shortly after a traumatic event, was shown to predict later development of PTSD.

"We therefore hypothesise that the low levels of those three bacteria may have resulted in immune dysregulation and heightened levels of inflammation in individuals with PTSD, which may have contributed to their disease symptoms," explains Malan-Muller.

However, researchers are unable to determine whether this bacterial deficit contributed to PTSD susceptibility, or whether it occurred as a consequence of PTSD.

"It does, however, bring us one step closer to understanding the factors that might play a role in PTSD. Factors influencing susceptibility and resilience to developing PTSD are not yet fully understood, and identifying and understanding all these contributing factors could in future contribute to better treatments, especially since the microbiome can easily be altered with the use of prebiotics (non-digestible food substances), probiotics (live, beneficial microorganisms), and synbiotics (a combination of probiotics and prebiotics), or dietary interventions."

Provided by Stellenbosch University

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