

Researchers discover associations among PTSD, diet, and the gut microbiome

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The human gut microbiome has a significant impact on our health. Research has shown that it can influence the development and response of emotions, but the relationship between post-traumatic stress disorder

(PTSD) and the gut microbiome has been unexplored.

PTSD is a fear-based mental health disorder that develops in some individuals who experience a disturbing and horrifying situation involving severe injury, actual or threat of death, or violence.

A new study by investigators from Brigham and Women's Hospital, a founding member of the Mass General Brigham health care system, and Harvard T.H. Chan School of Public Health systematically investigated the relationship between PTSD, diet, and the [gut microbiome](#). Their study found that participants who adhered to a Mediterranean diet experienced decreased PTSD symptoms. Their results are published in *Nature Mental Health*.

"There is a very intriguing relationship between the human gut microbiome and the brain," said co-corresponding author Yang-Yu Liu, Ph.D., of the Channing Division of Network Medicine within the Department of Medicine at Brigham and Women's Hospital. "Through our study, we examined how factors, like diet, are associated with PTSD symptoms. While further research is needed, we are closer to being able to provide dietary recommendations for PTSD prevention or amelioration."

The burden of PTSD often extends beyond the individual; family members, the health care industry and society are also affected by the [mental health disorder](#). In addition, individuals with PTSD have an increased risk of developing [chronic diseases](#) such as [coronary heart disease](#), stroke, diabetes, autoimmune diseases and premature death. Understanding the role of diet and the microbiome could improve recommendations and outcomes for patients with PTSD.

"Examining the gut-brain axis can provide insights on the interdependence of mental and physical health," said co-corresponding

author Karestan Koenen, Ph.D., of the Department of Epidemiology at Harvard T.H Chan School of Public Health.

"Our findings suggest the PTSD and [human gut microbiome](#) relationship is a promising area of research that may lead to recommendations for alleviating the down-stream negative health consequences of PTSD."

The team collected data from 191 participants in sub-studies of the Nurses' Health Study-II (NHS-II), which included the Mind-Body Study (MBS) and the PTSD Substudy. Participants were assigned to three groups: probable PTSD, exposed to trauma but no PTSD, and no trauma exposure.

All the participants submitted two sets of four [stool samples](#), once at the beginning of the study and again six months later. The samples were collected to provide microbial DNA information and to confirm that the participant's gut microbiome was stable over six months.

The team evaluated the associations between overall microbiome structure and host factors, including PTSD symptoms, age, body mass index (BMI) and dietary information. From this evaluation, the researchers found several host factors (BMI, depression, and antidepressants) associated with the microbiome structure.

Next, the researchers assessed the relationship between the available dietary information and PTSD symptoms. The team found that participants who adhered to a Mediterranean diet experienced fewer PTSD symptoms. In particular, they found that the consumption of red and processed meats was positively associated with PTSD symptoms, while the consumption of plant-based foods was negatively associated with PTSD symptoms.

Lastly, the team employed the generalized microbe–phenotype

triangulation (GMPT) method to examine the link between PTSD symptoms and the gut microbiome signatures, aiming to identify putative PTSD protective species. They identified *Eubacterium eligens* as the top PTSD putative protective species.

To test the consistency of this signature over time, the team found that the inverse association of *E. eligens* abundance with PTSD symptoms was highly consistent across all four time points. They further demonstrated that *E. eligens* was positively associated with the enriched components of the Mediterranean diet (such as vegetables, fruits, and fish) and that *E. eligens* was negatively associated with red/processed meat, which people following a Mediterranean diet limit or avoid.

The team notes limitations to their study, including using a short screening scale for PTSD (instead of a formal clinical diagnosis of PTSD). However, the results offer insights for future studies examining other mental health disorders and dietary interventions to improve recommendations to alleviate or prevent symptoms.

"It's exciting that our results imply that the Mediterranean diet may provide potential relief to individuals experiencing PTSD symptoms," said Liu. "We are eager to learn more about the relationship between PTSD, diet, and the gut [microbiome](#). In a future study, we will attempt to validate the efficacy of probiotics as a method to prevent PTSD."

More information: Ke, S. et al. Association of probable post-traumatic stress disorder with dietary pattern and gut microbiome in a cohort of women, *Nature Mental Health* (2023). [DOI: 10.1038/s44220-023-00145-6](https://doi.org/10.1038/s44220-023-00145-6)

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