

Major depressive disorder linked to interplay of gut microbiome and blood metabolome

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An international team of medical researchers has found a link between major depressive disorder (MDD) and an interplay between the gut microbiome and the blood metabolome. For their study, reported in the journal *JAMA Psychiatry*, the group analyzed data in the UK Biobank.

Some prior research has suggested there may be a link between MDD and conditions surrounding the gut biome, but little work has been done to prove a connection, and existing studies were too small to show any true connections. In this new effort, the researchers attempted to conduct a far more broad study of any such connections by studying data in the UK Biobank—a massive database of health and [genetic information](#) for nearly a half-million patients in the U.K.

The researchers conducted [regression analysis](#) to test for associations between data from NMR spectroscopy tests that measured [metabolite levels](#) and reported levels of depression in multiple models. They also regressed signatures of microbiota on metabolic signatures of those diagnosed with MDD. Such bidirectional testing allowed for associating the direction of association between MDD and measurements of metabolites. Patients with lifetime and recent MDD were compared with data from patients with no history of MDD.

In their analysis, the research team found that those patients diagnosed with lifelong MDD were relatively young and more likely to be female. They were also able to identify associations between 49 metabolites that are part of the tricarboxylic acid cycle and those diagnosed with MDD. And they also found fatty acid level differences between those with MDD and controls. They note that the microbes involved in such processes are also involved in maintaining levels of chemicals such as

butyrate, glutamate, serotonin, and gamma aminobutyric acid, which have all been associated with long-term depression.

The team suggests their findings show that some parts of the metabolic system associated with energy are disturbed in patients with MDD. They also note that the data showed that the interplay between blood metabolome and the [gut microbiome](#) may play a role in lipid metabolism in patients with MDD.

More information: Najaf Amin et al, Interplay of Metabolome and Gut Microbiome in Individuals With Major Depressive Disorder vs Control Individuals, *JAMA Psychiatry* (2023). [DOI: 10.1001/jamapsychiatry.2023.0685](#)

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