

**- Digestion**

# Gut microbes may play role in social anxiety disorder, say researchers

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While some people might relish the prospect of a new year party, for others socialising can trigger feelings of fear, anxiety and distress. Now researchers say microbes in the gut may play a role in causing social anxiety disorder, opening up fresh possibilities for therapies.



Scientists have previously found the gut microbiome – the collection of bacteria and other organisms that live in the gastrointestinal system – differs for people who have social anxiety disorder (SAD) compared with healthy individuals, while a growing body of research has revealed that microbes in the gut can influence the brain – and vice versa. Now researchers have found that when microbes from the guts of people with SAD are transplanted into mice, the animals have an increased response to social fear. The findings build on previous work showing similar results for conditions ranging from depression to irritable bowel syndrome.

Prof John Cryan, a co-author of the research from University College Cork, said that while it was known that genetics, the environment and other factors could also play a role in disorders including SAD, the new work highlighted the importance of our gut flora.

“The main point is we need to look after our microbes, especially throughout development and even in adulthood, to keep the social brain working appropriately,” he said.

Writing in the Proceedings of the National Academy of Sciences, Cryan and colleagues report how they took faecal samples from six healthy people and six people with SAD, with DNA analyses confirming that the gut microbiome differed considerably between the two groups.

The team transferred each sample into six laboratory mice, giving a total of 72 creatures, all of whom had previously been given antibiotics to kill off their natural gut microbes. The mice were subsequently presented with a series of tests to explore various aspects of their behaviour. To investigate social fear, the team gave the mice small electric shocks when they approached a new mouse, and then observed how the animals behaved around new mice when the shocks were no longer applied.

The results revealed that the mice who had received gut microbes from people with SAD had different levels of three bacterial species in their faeces than those who had received gut microbes from healthy people.

The team add that while behaviour of the mice did not differ for most of the experiments investigating anxiety and social behaviour, they did behave differently after the social fear experiment. While mice with gut microbes from healthy people quickly regained their curiosity towards strangers in the days that followed, those with microbes from people with SAD continued to be fearful of approaching other mice.

“They never fully recovered to be able to be social again,” said Cryan.

Further analysis suggested levels of certain hormones and aspects of the immune system also differed between the mice.

“Both oxytocin, a key hormone involved in bonding, and the immune system have previously been implicated in social behaviour, therefore it was good to see that changes in these occurred in animals that received the SAD microbiota,” said Cryan.

The team say the results suggest the gut microbiome can play a causal role in heightened social fear responses in social anxiety disorder, while the study also offers new avenues when it comes to developing therapeutics for people with SAD.

Cryan said that could include diets designed to alter the microbiome.

“Increasing the amount of fibres and fermented foods in the diet may have beneficial effects,” he said. “And that’s something that we’re quite interested in exploring.”