

# Gut-derived compound causes autism-like behavior in mice

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## Video Byte

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# Abstract

Over the past decade, research has linked autism spectrum disorder to a dysregulation of the relationship between the brain, the gut, and the trillions of microbes that reside in the gut. Alterations in this so-called “microbiota-gut-brain” axis can be detected as changes in small molecules produced by the microbiota in feces and urine. One of these molecules is p-cresol, a byproduct of bacterial fermentation of proteins. Studies have shown that p-cresol is more abundant in people with autism than in neurotypical individuals. To explore p-cresol’s possible role in autism, researchers fed the compound to mice and monitored their behavior. Mice exposed to p-cresol showed autistic-like behaviors that persisted after treatment was discontinued. Compared to control mice, treated mice showed reduced sociability, reduced social contact, and more frequent stereotypies such as head shakes and circlings. Abnormal social behavior was associated with decreased activity of dopamine neurons involved in the social reward circuit. Interestingly, these alterations in social behavior could be transferred to control mice through fecal microbiota transplantation. And in turn, transplanting the microbiota of control mice into mice fed p-cresol could rescue social interactions. Understanding how p-cresol and the microbiota modulate social behavior could help scientists develop interventions targeting the gut microbiota to treat patients with autism.