

# Anti-diarrhea medication may help treat core autism symptoms

September 12 2022

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There are currently no effective treatments for the core symptoms of autism spectrum disorder (ASD), such as difficulties with socializing and communicating. A new study uses a computer-based protein interaction network to identify whether existing drugs could provide a new treatment approach. The researchers discovered that a common anti-

diarrheal drug may have potential in treating the social difficulties associated with ASD.

Can you teach an old drug new tricks? Although [drug treatments](#) for the core symptoms of autism spectrum disorder (ASD) are not currently available, could an existing drug provide a new treatment, even if it previously had no association with ASD? This was the question asked by a new study in the journal *Frontiers in Pharmacology*. The researchers used a computer model that encompasses proteins involved in ASD and the way they interact.

By looking at how different drugs affected proteins in the system, they identified [potential candidates](#) to treat it. A commonly used antidiarrheal drug called loperamide was the most promising candidate, and the researchers have an interesting hypothesis about how it may work to treat ASD symptoms. Some of the most common symptoms in ASD involve difficulties with [social interaction](#) and communication.

"There are no medications currently approved for the treatment of social communication deficits, the main symptom in ASD," said Dr. Elise Koch of the University of Oslo, lead author on the study. "However, most adults and about half of children and adolescents with ASD are treated with [antipsychotic drugs](#), which have [serious side effects](#) or lack efficacy in ASD."

## **Repurposing drugs as new treatments**

In an effort to find a new way to treat ASD, the researchers turned to drug repurposing, which involves exploring existing drugs as potential treatments for a different condition. The approach has plenty of benefits, as there is often extensive knowledge about existing drugs in terms of their safety, [side-effects](#) and the [biological molecules](#) that they interact with in the body.

To identify new treatments for ASD, the researchers used a computer-based protein interaction network. Such networks encompass proteins and the complex interactions between them. It is important to account for this complexity when studying [biological systems](#), as affecting one protein can often have knock-on effects elsewhere.

The researchers constructed a protein interaction network that included proteins associated with ASD. By investigating existing drugs and their interaction with proteins in the network, the team identified several candidates that counteract biological process underlying ASD.

The most promising drug is called loperamide, which is commonly used for diarrhea. While it might seem strange that an anti-diarrheal drug could treat core ASD symptoms, the researchers have developed a hypothesis about how it may work.

## **From an upset gastrointestinal system to ASD**

Loperamide binds to and activates a protein called the  $\mu$ -opioid receptor, which is normally affected by opioid drugs, such as morphine. Along with the effects that you would normally expect from an opioid drug, such as [pain relief](#), the  $\mu$ -opioid receptor also affects [social behavior](#).

In previous studies, genetically engineered mice that lack the  $\mu$ -opioid receptor demonstrated social deficits similar to those seen in ASD. Interestingly, drugs that activate the  $\mu$ -opioid receptor helped to restore social behaviors.

These results in mice highlight the tantalizing possibility that loperamide, or other drugs that target the  $\mu$ -opioid receptor, may represent a new way to treat the social symptoms present in ASD, but further work is required to test this hypothesis. In any case, the current study demonstrates the power of assuming that old drugs may indeed learn new tricks.

**More information:** Elise Koch et al, Drug repurposing candidates to treat core symptoms in autism spectrum disorder, *Frontiers in Pharmacology* (2022). [DOI: 10.3389/fphar.2022.995439](https://doi.org/10.3389/fphar.2022.995439)

Provided by Frontiers

Citation: Anti-diarrhea medication may help treat core autism symptoms (2022, September 12) retrieved 21 January 2024 from <https://medicalxpress.com/news/2022-09-anti-diarrhea-medication-core-autism-symptoms.html>

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