# Largest-ever study ties over 100 genes to autism

January 23 2020, by Amy Norton, Healthday Reporter


More than 100 genes appear to be involved in autism spectrum disorders

(ASD), according to the largest genetic study of the condition to date.

The study, involving over 50 centers around the globe, identified 102 genes associated with ASD—including a few dozen that had not been recognized before.

Some of the genes are also associated with intellectual disabilities and developmental delays, the researchers said. But others are unique to ASD, and appear related to the social difficulties that mark the disorder.

Knowing the genes involved in ASD will help researchers better understand the causes and possibly develop new drug therapies for children with severe impairments, said senior researcher Joseph Buxbaum.

"Autism exists on a spectrum, and many people wouldn't need any new, targeted drug therapies because they're doing fine," said Buxbaum, who directs the Seaver Autism Center for Research and Treatment at Mount Sinai, in New York City.

But for children who are profoundly affected, he said, there could be promise in the "precision medicine" approach—treatments that are tailored to individuals based on their characteristics, like the genes they carry.

ASD is a brain disorder that affects social skills, communication and behavior control. In the United States, it affects one in 59 children, according to the U.S. Centers for Disease Control and Prevention.

The disorder is complex and varies widely from one person to the next. Some children have milder problems with socializing and communicating, while others are profoundly affected—speaking little, if at all, and getting wrapped up in repetitive, obsessive behaviors, for

example. Some children with ASD have intellectual disabilities, while others have average or above-average IQs.

Experts have long believed that a combination of genetic susceptibility and environmental exposures conspire to cause ASD—but genes are the bigger factor. A recent study, of about 2 million people, estimated that genes account for 80% of the risk of ASD.

But the precise genes will vary among individuals, experts say.

"We realize that large studies like this—as well as even larger ones—will be needed to truly understand why we say, 'If you have seen one person with autism, you have seen one person with autism,'" said Dean Hartley.

Hartley, who was not involved in the new study, is senior director of genomic discovery and translational science at the nonprofit Autism Speaks.

Previously, researchers had identified 65 genes associated with ASD. Buxbaum said his team was able to find more, in part, because of the study size: It involved over 35,000 people, including nearly 12,000 with ASD; the rest were their parents, unaffected siblings or other individuals without ASD.

Using newer analytic techniques, Buxbaum said, the researchers were able to zero in on 102 genes associated with ASD.

Some genes, he explained, are "high risk" and carry outright mutations. Most people with ASD—possibly 80%—would not harbor those, according to Buxbaum. Instead, they would carry "tiny, tiny changes across multiple genes," he said.

More research is needed to understand precisely what all these genes do.

But most risk genes are active early in brain development, and have roles in regulating the activity of other genes or communication among brain cells, the investigators found.

The risk genes are also active in both "excitatory" and "inhibitory" neurons (nerve cells). That, Buxbaum said, shows that autism is not only related to one major type of brain cell—but involves "many disruptions" in brain cell function.

The findings were published online Jan. 23 in the journal *Cell*.

Dr. Andrew Adesman is chief of developmental and behavioral pediatrics at Cohen Children's Medical Center, in New Hyde Park, N.Y. He said, "This study represents yet another major advance in our understanding of some of the underlying genetic causes for ASD."

At this point, though, he noted, it's not possible to root out the genetic cause in most children diagnosed with ASD.

Hartley agreed that the latest findings could eventually lead to new therapies. "This study importantly confirms previous biological pathways in autism, but has identified new biological processes possibly involved," he added. "These pathways are important for finding new targets for treatment and more personalized health care."

The hunt for ASD-related genes is not over, however. Buxbaum said he expects a "couple hundred more" will be found.

**More information:** The U.S. National Institute of Neurological Disorders and Stroke has more on autism spectrum disorder.