Causes of Autism Spectrum Disorder

B&K's Studio Research Center Department

Aaroh Deshpande

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Autism, also known as Autism Spectrum Disorder or ASD, is a diverse group of conditions related to the development of the brain which are characterized by some difficulty in social interactions and communication. Research from the past many decades has shown that there are many factors which make a child more likely to have autism. This includes environmental, genetic, and neurobiological factors. This paper goes over current evidence on the causes of ASD while looking into genetic factors, prenatal influences, and emerging insights into gene-environment interactions.

Is Autism a result of genetics? According to the meta analysis of 7 twin studies, the research tells us that 60%-90% of the risk for autism comes from your genome. What this means is that if you have a child with autism, you are more likely to have another autistic child. Any changes in certain genes or in your genome increases the risk that your child will develop autism. A majority of autism cases are linked to inherited genetic mutations that run in families. The genetic causes of autism are complicated however because there isn't a single, specific gene variation related to autism. This is what causes autism to be unique from other genetic conditions like down syndrome/trisomy 21. With down syndrome, providers can pinpoint a difference in the trisomy 21 gene through a karyotype analysis which visually shows an extra chromosome 21. Autism has multiple gene variations which can cause it but gene testing for your child may not reveal any genetic variations which are associated with autism. Because the locus of the main involved gene is the X Chromosome, there is an increased probability of X-fragile syndrome development in males especially. Research has shown that Autism is common in XFS individuals with numbers reaching 25-33%. While the

FMR1 protein can affect the expression of several genes involved in the development of autism, XFS is distinguishable by the presence of a specific biomarker which is the abnormal expansion of the CGG repeat in the X chromosome. In short, the genetic causes of autism aren't clear as of yet because there are multiple gene variations which can cause this neurodevelopmental disorder but it has been shown to be highly correlated with XFS.

Prenatal influences are also considered a big factor in the causes of Autism. This is because prenatal development plays a huge role in shaping the brain and disruptions during this process during pregnancy can increase the risk of autism. There are many different varieties in what these disruptions could be, such as medications and illnesses which can predispose children to autism and even other conditions like schizophrenia. Shared genetics likely explains why women who smoke are more likely to have children with ADHD which can also explain a link between a child's autism and exposure to many drugs which could be antidepressants. This link may be nothing more than a mother's genetic predisposition to depression. According to a cross-sectional study conducted in an autism center in Saudi Arabia, most autistic children have had a history of at least one or both maternal and/or paternal antenatal exposures. Almost 80% had a history of soft drink consumption while 35.1% were reported as smoking. 24.4% had a physical illness and 15.5% had a history of bleeding and air pollution exposure. These are statistically significant findings which suggest that prenatal influences have a huge impact on if the kid will have autism or not. The study, however, didn't find an association between the severity of ASD with the nutrition and lifestyle factors during pregnancy.

While genetics and prenatal influences are believed to play a heavy role in the development of autism, it is also believed that the environment in which children are exposed to will also influence the development of autism. Researchers have come up with environmental factors that have the most potential for causing autism. These include, exposure to air pollution, medical conditions, birth complications such as being born very early, and having older parents. These conditions are believed to be unlikely to cause autism by itself but the factors could increase a child's chance of developing autism if paired with certain genetic factors. Other environmental factors to watch out for though are, flame retardants(chemicals added to electronics, appliances, mattresses, carpets, and other home products to decrease the risk of a fire. Another factor is phthalates which are used in soaps, shampoos, plastics, and other products.

Does genetics cause autism? Or is it our environment? Researchers have been trying to figure out the answer to this question for decades. They have come up with a widely accepted explanation for what causes autism though. They believe that it is the interaction between genetic predispositions and environmental influences. For example, a fetus with a genetic predisposition could be more affected by prenatal influences and environmental influences than one without the genetic predisposition. It is important to note that there is little information and little evidence available to support the hypothesis that each of these GxE mechanisms are the determination of autism risk. Causality still remains a significant goal of ongoing research.

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