

Prenatal vitamins lower autism risk.

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Schmidt, RJ, RL Hansen, J Hartiala, H Allayee, LC Schmidt, DC Tracredi, F Tassone and I Hertz-Picciotto. 2011. **Prenatal vitamins, one-carbon metabolism gene variants and risk for autism.** *Epidemiology* <http://dx.doi.org/10.1097/EDE.0b013e31821d0e30>.

Synopsis by [Heather Volk](#) and [Wendy Hessler](#)

Taking prenatal vitamins around the time of conception decreased the risk of autism in the children by almost half, finds a study of mom/child pairs from California. Mothers with specific genetic variants that hinder the breakdown of nutrients important to early brain development – like folate – were further at risk if they didn't take prenatal vitamins.

The results – published in the journal *Epidemiology* – indicate that proper prenatal nutrition may be especially important for susceptible individuals and may help prevent autism overall.

Context

The autism spectrum disorders (ASDs) are a group of developmental disorders that include autism and pervasive developmental disorder. ASDs are characterized by deficits in social interaction and communication and are often accompanied by repetitive behaviors. The ASDs are commonly diagnosed before four years of age and have lasting impact on a child's ability to develop social relationships and express emotions.

Rates of all ASDs appear to be rising. In the United States, they may affect as many as 1 in 110 children. Experts believe a complex mix of genetic and environmental factors may trigger/cause the disorders.

[Autism](#) is one type of ASD that has a broad spectrum of symptoms. Many studies have examined the genetic risk for autism while other research studies continue to identify environmental aspects of the disorder.

Autism studies suggest that diet and metabolic problems – the inability to process, digest or use nutrients, vitamins, minerals or metals – may contribute to autism. One area of study examines a suite of genes that control carbon one metabolism. This type of metabolism is important in the breakdown of nutrients – like folate – that are important in early neurodevelopment.

Proper nutrition is a top concern for women who are or who are planning to become pregnant. In particular, health care providers recommend prenatal vitamins throughout pregnancy due to the important role of folate and other B vitamins in brain and nerve development. These vitamins are critical in the prevention of [neural tube defects](#) and are associated with averting other developmental and behavioral problems. In 1996, the FDA required folate be added into many foods including dry breakfast cereals.

To date, little research has examined factors that may help prevent the ASDs nor have studies explored individuals who might be genetically susceptible to particular risk factors for autism.

What did they do?

Researchers used data from the Childhood Autism Risks from Genetics and the Environment (CHARGE) study – a population-based case control study of preschool children from California. In CHARGE, children are considered "cases" if they had received services for an ASD from one of the state's regional centers of the California Department of Developmental Services.

Children aged two to five years old participated in the study. Autism was confirmed in the children based on results from two standardized clinical assessments. The controls were children without autism who were identified from state birth certificates. The controls were matched to the cases based on age, sex, and area of California where they lived.

Mothers were asked questions about their use of prenatal vitamins, multivitamins, other nutritional supplements and dry cereal to measure their intake of nutrients like folate that are important in early neurodevelopment.

Samples of DNA were collected from both the mothers and the children. The researchers examined 10 functional genetic variants – parts of genes that work to make proteins in the body – key to carbon one metabolism, which is primarily responsible for the breakdown and uptake of folate in the body.

The authors looked to see if moms and their children who had genes that did not work as well as other mom/child pairs to break down folate were at additional increased risk for autism if the mother did not take a prenatal vitamin or consume fortified foods to provide the vitamins important for brain and nerve development. They compared the risk of autism when taking prenatal vitamins before conception, later in pregnancy and regularly during pregnancy.

What did they find?

Mothers who took prenatal vitamins during the three months before and the first month of pregnancy – called the peri-conceptual period – had nearly half the risk of having a child with autism when compared to mothers who did not take prenatal vitamins during this pregnancy stage. Later in pregnancy, there was not a detectable difference in risk between mothers who did and did not take prenatal vitamins.

The mothers who took prenatal vitamins more regularly during pregnancy had a lower risk of having a child with autism than those who didn't. The researchers found that those who reported taking a prenatal vitamin daily or taking one at least four days a week were the least likely to have a child with autism.

No change in autism risk was found for standard multivitamin use. Prenatal vitamins typically contain more iron, vitamins B6 and B12 and twice as much folic acid – which are needed for proper brain and nerve development.

The results show genetic factors play a role as well. Mothers with gene variants that decreased their ability to metabolize nutrients were two to four times as likely to have a child with autism if they also did not take prenatal vitamins. One genetic variant identified in the child increased the risk of autism by seven times if the mother did not take prenatal vitamins.

What does it mean?

Prenatal vitamins may help prevent autism, particularly when women take the supplements up to three months prior to conception and during the first month of pregnancy. In particular, taking a daily prenatal vitamin may be most beneficial for women who are planning to become pregnant to help decrease the risk of autism.

The study is the first to look at the relationship between prenatal vitamins and the risk of autism, according to the authors. The findings show prenatal vitamins taken before conception and daily throughout pregnancy can reduce the risk of the disorder.

Use of these supplements may also be more important among genetically susceptible individuals who may not be as able to metabolize important nutrients like folate.

While the underlying causes of autism and the biology which makes the disorder occur have not been deciphered, studies such as this one are important steps to understanding prevention of autism.

Future research on maternal diet throughout pregnancy and mechanisms by which this may work – like epigenetic effects – may help understand the findings of this study. Replication in other samples is also needed to support these findings and address small samples present when looking for gene-environment interactions.