

Expectant mothers can prevent fetal brain problems caused by the flu, study finds

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Choline, an essential B vitamin nutrient, can prevent fetal brain developmental problems that often occur after prenatal maternal infections such as colds and influenza (flu).

The study, published today in the *Journal of Pediatrics*, is led by members of the University of Colorado School of Medicine faculty at the CU Anschutz Medical Campus. The findings are critical because viruses, such as the flu, in pregnant women, have been linked with [fetal brain](#) problems and mental illness like Attention Deficit Disorder and Schizophrenia later in life.

"Mothers want to give their babies the best possible start in life. Colds and flu are often unavoidable, even if the mother has had a flu shot. But colds and flu during pregnancy double the risk of future mental illnesses. More and more information show that choline helps the baby's [brain](#) develop properly," said Robert Freedman, MD, professor of psychiatry, University of Colorado School of Medicine. "We found that higher levels of choline prevent fetal brain problems from developing, even when the mother is infected. Choline supplements in pregnancy can have a lifelong benefit for the infant."

The study was conducted at the University of Colorado and Denver Health Medical Center's Prenatal Clinic, with prenatal assessments of maternal infection, C-Reactive Protein (CRP, a marker of maternal inflammation) and the mothers' choline levels. The baby's brain development before birth was assessed by measuring the baby's brain waves soon after birth. The harmful effects of maternal infections were seen in a reduction of the normal inhibition, also known as response inhibition, of newborns' brain waves to repeated sounds. Simply put, response inhibition is the ability to cease or delay an action and to be able to reflect rather than display impulsive behavior.

- Newborns' response inhibition decreased by 27 percent when

mothers had an infection, such as a cold or flu, during the first 16 weeks of pregnancy.

- This effect was prevented if the mother had higher choline levels in the first 16 weeks.

Parents completed reports of their child's behavior when the child was one year of age.

- Children whose mothers were infected, and had lower choline levels, had significantly decreased ability to pay attention, play quietly and cuddle with their parents. These effects did not occur if the mother had higher choline levels.
- These characteristics are summarized in a scale of Self Regulation, which was reduced 28 percent in children of women with infection and lower choline levels. Higher choline levels improved Self Regulation in the children of women with infection to normal levels.
- Five of 53 children whose mothers had an infection (9.4 percent) had Regulation levels in the lowest fifth percentile of a normal sample, compared to one of 83 children of mothers without an [infection](#). This effect did not occur if their mothers had choline levels greater than 7 micromolar during gestation. This level was achieved by only 25 percent of the women, despite encouragement to eat foods with more choline in their diet.

The body creates some choline on its own and it is also naturally present in certain foods, including liver, red meat and eggs. However, up to 75 percent of [pregnant women](#) consume less choline during pregnancy than recommended (450 mg of choline per day). Additionally, little or no amounts are present in prenatal vitamins. Supplements, available without a prescription and now recommended by the American Medical Association, can help [mothers](#) make sure they have high [choline](#) levels

that their babies need.

Provided by CU Anschutz Medical Campus

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