

# High-fructose diet during pregnancy may harm placenta, restrict fetal growth

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A new study in mice and women by researchers at Washington University School of Medicine in St. Louis found that a high-fructose diet during pregnancy may harm the placenta and restrict fetal growth. Additionally, researchers believe a commonly prescribed drug may mitigate the negative effects. Credit: THINKSTOCK

Consuming a high-fructose diet during pregnancy may cause defects in the placenta and restrict fetal growth, potentially increasing a baby's risk for metabolic health problems later in life, according to research in mice and people by a team at Washington University School of Medicine in St. Louis.

However, giving the mice allopurinol, a generic drug frequently prescribed to treat gout and kidney stones, appears to mitigate the negative maternal and fetal effects. The findings suggest it may be possible to devise a prenatal screening test and treatment plan for pregnant women with high fructose levels.

The study is available online in *Scientific Reports*, a journal affiliated with Nature Publishing Group.

Fructose, a sugar occurring naturally in fruits and

honey, has been popular for decades among food manufacturers who process it into high-fructose corn syrup used to sweeten food and beverages. In fact, researchers have reported that the refined sugar accounts for more than half of all sweeteners used in the U.S. food-supply chain. And in recent years, there's growing concern that fructose in processed foods and sugary drinks may be linked to diabetes and obesity.

"Since the early 1970s, we've been eating more fructose than we should," said Kelle H. Moley, MD, the School of Medicine's James P. Crane Professor of Obstetrics and Gynecology and the study's senior author. "It is becoming increasingly critical to understand how fructose consumption is impacting human health. This study shows potentially negative effects of a high-fructose diet during pregnancy."

Fructose is processed differently than other sugars such as glucose, which the body converts into energy. Instead, fructose is broken down by liver cells that turn the sugar into a form of fat known as triglycerides while also driving high levels of [uric acid](#), a normal waste product found in urine and stool. Too much uric acid can create metabolic mayhem resulting in obesity, type 2 diabetes and other health conditions.

Studying mice, the researchers found elevated uric acid and triglycerides in otherwise healthy mice who were fed a high-fructose diet during pregnancy. Additionally, the mice developed smaller fetuses and larger placentas than those fed standard rodent chow.

Genetically, Moley said, a small fetus may become wired to grow more after birth than a normal-sized fetus. "The body tries to compensate for the small growth in utero," Moley said. "These babies can become kids and then adults struggling with obesity and other health problems."

Maternal health also may suffer. Metabolic problems caused by high levels of uric acid and fat increase a woman's risk of developing pregnancy complications such as preeclampsia—a potentially serious condition in pregnancy often marked by high blood pressure, swelling and high protein levels in the urine—and gestational diabetes, Moley said.

Provided by Washington University in St. Louis

To assess the relevance of the mouse data in pregnant women, the researchers examined the association between fructose and placental uric acid levels in a small controlled group of 18 women who underwent scheduled cesarean sections. The women had no disorders that would have caused elevated uric acid. "We found a correlation suggesting similar maternal and fetal effects occur in humans," Moley said.

In the mouse model, researchers found that giving mice with high-fructose levels the common drug allopurinol - a prescription medication that reduces uric acid—reversed the refined sugar's negative maternal and fetal effects by reducing the levels of uric acid in the placenta.

"The negative effect of excess fructose in humans is likely to lead to an exacerbation of the problems seen in the mice," said Moley, who believes additional research may lead to a prenatal screening test for measuring fructose levels. This can be determined by simple blood work.

Besides advising pregnant women to limit fructose in their diets, treatment for those with high-fructose levels may include administering allopurinol, which crosses the placenta and generally is considered safe to take late in the second trimester or third trimester during pregnancy, Moley said.

"One of the best ways to ensure healthy maternal and fetal outcomes is by eating natural foods," she said. Future studies will test the effectiveness of giving allopurinol to [pregnant women](#) when there is concern about [fetal growth](#), Moley added.

**More information:** Zeenat A. Asghar et al, Maternal fructose drives placental uric acid production leading to adverse fetal outcomes, *Scientific Reports* (2016). [DOI: 10.1038/srep25091](https://doi.org/10.1038/srep25091)

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