

## Cutting food by a third in pregnancy led to fetal brain delays, according to animal study

**Scientists say even moderately less can hurt fetus' brain.**

By Don Finley

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In disturbing new findings, researchers in San Antonio and Germany found that a moderate reduction in food during the first half of pregnancy led to impaired brain development in the offspring of baboons.

A 30 percent reduction in food caused marked differences in how brain cells multiplied and connected with one another, with changes found in the frontal cortex, where higher functions controlling behavior and problem-solving are located, the researchers said.

And while doctors have long known that severe malnutrition in pregnancy can impair brain development, the researchers say a 30 percent reduction would not be unusual in the poor or in women trying to lose weight.

“Undernutrition is something that we as a society like to pretend doesn't affect us,” said Dr. [Peter Nathanielsz](#), a co-author of the researchers' report and director of the [Center for Pregnancy and Newborn Research](#) at the [University of Texas Health Science Center](#). “But if you look at the [USDA](#) reports, food insecurity is not unheard of in the lower socio-economic strata of our society.”

The study, to be published online this week in the Proceedings of the [National Academy of Sciences](#), found that although the reduced diet didn't alter the fetus' overall growth, it did lead to changes in brain growth, the production of growth factors needed for brain development and in the connections between cells.

The researchers “found dysregulation of hundreds of genes, many of which are known to be key regulators in cell growth and development, indicating that nutrition plays a major role during fetal development by regulating the basic cellular machinery,” said co-author [Laura Cox](#), a geneticist at the [Southwest Foundation for Biomedical Research](#). Other collaborators were from [Friedrich-Schiller University](#) in Jena, Germany.

Both animals and humans can compensate for a lack of food during pregnancy, a mechanism that allows the fetus to survive when food is scarce. But that ability appears to be limited, Nathanielsz said.

“In the scientific world, people have thought maternal nutrient restriction is not all that much of a problem because the mother has this capability to protect the fetus,” Nathanielsz said. “I think we have to revise that. The mother may try, but the fetus still takes a hit.”

Dr. Gail Harrison, an expert in maternal-fetal nutrition at the University of California, Los Angeles who wasn't involved in the study, praised the researchers for mapping out the changes in the brain down to the cellular level. But she cautioned that their findings had some limitations.

By examining the fetal brains halfway through pregnancy, the study can't say whether the animals would have stepped up brain development later in pregnancy or even after birth, she said, a point the researchers conceded.

In addition, said Harrison, director of the Center for Global and Immigrant Health at UCLA, simply reducing a balanced diet doesn't resemble what happens to people when food is scarce.

“In fact, dietary quality suffers well before total calorie availability suffers,” she added. “So you have specific nutrient deficiencies.”

“I absolutely do believe their findings,” said Dr. Robert Lane, chief of neonatology at the University of Utah, who does similar research but also didn't take part in the study. “I would also agree with the statement that there is a chance for compensation. There may be poor nutrition in early life, maybe one strike, but at least I have hope that one of the reasons we've survived as a species is that we have mechanisms to compensate in one way or another.”

Nathanielsz said he was also concerned about the findings given that older women and teenagers might have reduced ability to pass on nutrients to their unborn children, even when they have plenty to eat. Teenagers are still growing and competing with the fetus for nutrition. In older women, he added, “arteries are stiffer and blood supply to the uterus decreases inevitably, effecting nutrient delivery to the fetus.”

But for co-author Thomas McDonald, an associate professor of obstetrics at the health science center, the bottom line is that women should try to eat well and seek early prenatal care.

“Any woman who is pregnant or contemplating becoming pregnant should get really, really good prenatal care, and that includes diet information. It's much easier to go into this healthy with a good diet, rather than trying to play catch-up at some point in pregnancy.”

*As originally published, this story contained an error.*

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