

# Eating well during pregnancy reduces baby's obesity risk regardless of mom's size

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If you are overweight and pregnant, your baby isn't destined to a life of obesity after all, according to a new research report published online in *The FASEB Journal*. In the report, a team of U.S. scientists show that modifying fat intake during pregnancy to a moderate level is enough to benefit the child regardless of the mother's size. Specifically, they found that a protein called "SIRT1" rewrites a developing fetus' histone code, which affects his or her "epigenetic likelihood" of being overweight or obese throughout his or her lifetime.

"We are finding that the cycle of obesity likely begins in the womb, however, we are also finding that obesity does not necessarily beget obesity," said Kjersti M. Aagaard, M.D., Ph.D., study author from the Division of Maternal-Fetal Medicine and the Department of [Obstetrics and Gynecology](#) at Baylor College of Medicine in Houston, Texas. "A [diet](#) laden with fat changes the [molecular machinery](#) which chemically modifies the structure of the developing infant's [genetic material](#). These commonly called 'histone code' changes are rewritten—at least in part—by SIRT1, which in turn, alters key regulators of fat and [glucose metabolism](#) in the infant. It is our hope that these early steps will in turn break the cycle of obesity in the generations to come."

To make this discovery, Aagaard and colleagues used three groups of pregnant primates. The first group ate a healthy pregnancy diet (13 percent fat), while the second group ate a high fat diet (35 percent fat) and became obese. The third group was kept on a high fat diet for several years, became obese, and then was put on a healthy diet.

Researchers were able to tease apart the effects on the infant of being exposed during pregnancy to a healthy diet versus an unhealthy high fat diet. The sirtuins and the proteins, and the genes regulating glucose and fat metabolism were analyzed. Results suggest that the livers of infants exposed to the high fat diet, showed less SIRT1 and less sirtuin activity than in the control group. However, infants exposed to a healthy pregnancy diet in both lean and obese groups had restored sirtuin. To prove that SIRT1 was specifically chemically modifying the histone code, scientists created a dead enzyme version. Using high level mass spectrometry, it was discovered that while the live enzyme version of SIRT1 was very good at chemically modifying histone proteins (specifically "deacetylating" histone protein H3) the dead version was not.

"What this study shows once again is that eating a [healthy diet](#) while pregnant holds true, regardless of your size or shape," said Gerald Weissmann, M.D., Editor-in-Chief of *The FASEB Journal*. "Even if a woman isn't eating well before pregnancy, adopting good eating habits during pregnancy is still very good for the child and for her. This new report shows how diet affects offspring at the molecular level and points to new treatments for overweight people who were not fortunate enough to have mothers who ate well during [pregnancy](#)."

**More information:** Melissa A. Suter, Aishe Chen, Marie S. Burdine, Mahua Choudhury, R. Alan Harris, Robert H. Lane, Jacob E. Friedman, Kevin L. Grove, Alan J. Tackett, and Kjersti M. Aagaard. A maternal high-fat diet modulates fetal SIRT1 histone and protein deacetylase activity in nonhuman primates. *FASEB J.* [doi:10.1096/fj.12-212878](https://doi.org/10.1096/fj.12-212878)

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