

Losing body fat before pregnancy can be beneficial for the baby

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Obesity among women of childbearing age is increasing worldwide. Because babies of obese mothers are themselves predisposed to obesity, society can reasonably expect the epidemic of obese and overweight people to continue through future generations.

In the midst of this trend, UT Health Science Center San Antonio obstetrics researchers are studying the question: If mothers lose body fat before pregnancy, does it improve the lifelong health of their children? This could be one way to break the transgenerational cycle. A collaborative study between researchers with the Center for Pregnancy and Newborn Research at the Health Science Center and the National Institute of Nutrition in Mexico City showed that if obese mothers lose weight before pregnancy, it confers health benefits on their offspring.

Research in rat mothers

In the study, researchers induced maternal obesity by feeding a group of female rats a high-fat diet prior to mating. This group of females ate the fatty chow from weaning through adolescent life to breeding and remained on it through pregnancy and lactation. Meanwhile, females in a second group were switched to normal chow one month before mating.

Reversible metabolic effects

Only male offspring were studied. At weaning, triglycerides, leptin, insulin and [insulin resistance](#) were elevated in offspring of obese

mothers and all returned to normal if their mothers had received prepregnancy dietary intervention. Fat mass and fat cell size were increased in offspring of fat mothers and these changes were significantly reversed, though not completely abolished, by the dietary intervention. The authors said this is the first study showing reversibility of adverse metabolic effects of maternal obesity on offspring by a pre-pregnancy intervention. Outcomes and reversibility varied by tissue affected.

Good start in life

"Developmental programming sets the scene that influences one's health for the rest of life," Dr. Nathanielsz said. Some differences, such as heart disease and obesity, may not appear until much later in life.

"It is of interest that offspring of the obese mothers also showed high levels of leptin, a hormone that signals the brain to decrease appetite," he said. "This may mean they've developed a brain that is resistant to the signals that tell them they're getting fat, and they just go on eating and thus get fat as their mothers were. That is what we mean when we say that the effects are transgenerational. Leptin levels were normal in the offspring of the intervention group, showing that we can break this cycle."

Further directions

The experiment was novel in developmental programming - the first time a research team intervened to recuperate some animals from high-fat diets.

"We were able to see at least a 50 percent to 60 percent return," Dr. Nathanielsz said. "This is a first step. Perhaps we have to recuperate these rodents with a no-fat diet or add micronutrients to the diet. Or,

there may be negative aspects to trying to recuperate too quickly. We believe this sort of information is necessary to provide guidelines as to the type of [dietary intervention](#) for women during pregnancy. Much remains to be done."

Provided by University of Texas Health Science Center at San Antonio

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