Medical Xpress

Babies born after mom's gastrointestinal bypass surgery do better

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Obese mothers tend to have kids who become obese. Now provocative research suggests weight-loss surgery may help break that unhealthy cycle in an unexpected way—by affecting how their children's genes behave.

In a first-of-a-kind study, Canadian researchers tested children born to obese women, plus their brothers and sisters who were conceived after the mother had obesity surgery. Youngsters born after mom lost lots of weight were slimmer than their siblings. They also had fewer risk factors for diabetes or heart disease later in life.

More intriguing, the researchers discovered that numerous genes linked to obesity-related health problems worked differently in the younger siblings than in their older brothers and sisters.

Clearly diet and exercise play a huge role in how fit the younger siblings will continue to be, and it's a small study. But the findings suggest the children born after mom's surgery might have an advantage.

"The impact on the genes, you will see the impact for the rest of your life," predicted Dr. Marie-Claude Vohl of Laval University in Quebec City. She helped lead the work reported Monday in the journal *Proceedings of the National Academy of Sciences*.

Why would there be a difference? It's not that mom passed on different genes, but how those genes operate in her child's body. The idea: Factors

inside the womb seem to affect the dimmer switches that develop on a fetus' genes—chemical changes that make genes speed up or slow down or switch on and off. That in turn can greatly influence health.

The sibling study is "a very clever way of looking at this," said Dr. Susan Murphy of Duke University. She wasn't involved in the Canadian research but studies uterine effects on later health. She says it makes biological sense that the earliest nutritional environment could affect a developing metabolism, although she cautions that healthier family habits after mom's surgery may play a role, too.

It's the latest evidence that the environment—in this case the womb—can alter how our genes work.

And the research has implications far beyond the relatively few women who take the drastic step of gastric bypass surgery before having a baby. Increasingly, scientists are hunting other ways to tackle obesity before or during pregnancy in hopes of a lasting benefit for both mother and baby.

What's clear is that obesity is "not just impacting your life, it's impacting your child," Duke's Murphy said.

More than half of pregnant women are overweight or obese, according to the American College of Obstetricians and Gynecologists.

Monday's research findings may shed some new light. Consider: Overweight mothers have higher levels of sugar and fat in the bloodstream, which in turn makes it to the womb.

Fetuses are "marinated, and they're differently marinated" depending on mom's weight and health, said Dr. John Kral of New York's SUNY Downstate Medical Center, who co-authored the Canadian study.

That may do more than overstimulate fetal growth. Scientists know that certain molecules regulate gene activity, attaching like chemical tags. That's what Laval University lead researcher Dr. Frederic Guenard was looking for in blood tests. He took samples from children born to 20 women before and after complex surgery that shrank their stomachs and rerouted digestion so they absorb less fat and calories. On average, they lost about 100 pounds.

Guenard compared differences in those chemical tags in more than 5,600 genes between the younger and older siblings. He found significant differences in the activity of certain genes clustered in pathways known to affect blood sugar metabolism and heart disease risk.

Only time will tell if these youngsters born after mom's surgery really get lasting benefits, whatever the reason. Meanwhile, specialists urge women planning a pregnancy to talk with their doctors about their weight ahead of time. Besides having potential long-term consequences, extra weight can lead to a variety of immediate complications such as an increased risk of premature birth and cesarean sections.

More information: "Differential methylation in glucoregulatory genes of offspring born before vs. after maternal gastrointestinal bypass surgery," by Frédéric Guénard et al.
www.pnas.org/cgi/doi/10.1073/pnas.1216959110