

# 'Gut' bacteria may help put a kink in family obesity cycle

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University of Calgary researchers Raylene Reimer, professor in the Faculty of Kinesiology, and PhD student Heather Paul, in the Biochemistry and Molecular Biology graduate program in the Cumming School of Medicine, have published a new animal study that describes how a special type of dietary fibre known as prebiotic impacts the gut microbiota and may be one factor in reducing obesity in mom and baby. Credit: Riley Brandt, University of Calgary

Obesity is a global epidemic and the evidence is clear: if a mother is obese or gains too much weight during pregnancy chances are the child will be at higher risk of being obese throughout its life.

A new animal study, published in *Scientific Reports* on Feb. 12, reveals insight on how a special type of dietary fibre, known as prebiotic, impacts the mother's gut microbiota and may be one factor in curbing obesity in moms and their babies.

"Our goal was to use diet to change the bacteria in the moms and hopefully lessen the risk for babies in an attempt to break the intergenerational cycle of obesity. If we can identify key healthy ingredients to add to foods that feed the beneficial bacteria, it could counteract the negative effects of the fats and sugar that our food supply is rich in," says the study's lead author Raylene Reimer, PhD, in the Faculty of Kinesiology and a member of the university's Alberta Children's Hospital Research Institute.

The study was co-authored by Hans Vogel in the Faculty of Science and the Cumming School of Medicine; and PhD students Heather Paul, in the Biochemistry and Molecular Biology graduate program in the Cumming School of Medicine, and Marc Bomhof, in the Faculty of Kinesiology graduate program.

## **Transfer of healthy gut bacteria to babies**

People are most familiar with probiotics which are live bacteria that can be found in a variety of food, including yoghurt and sauerkraut, and they aid in digestive health. Prebiotics, not a household name, are used in this study. Prebiotics are a form of [dietary fibre](#), which are found naturally in garlic, onions, bananas and whole wheat. They are non-digestible food which pass into the [lower gastrointestinal tract](#) where they stimulate, actually feed, the growth of health-promoting bacteria.

For this study, a prebiotic supplement was given to rats on a high-fat and high-sugar diet during their three-week pregnancy and three-weeks post-birth, during lactation. The rats taking the supplement ate less, and both baby and mother had a lower percentage of body fat - 33 percent for mom and 30 per cent for newborn - compared to the rats that ate the same diet but with no supplement.

"We know from previous studies we have done in humans that [prebiotics](#) can reduce hunger and make you feel fuller. We determined this was because of an increase in two hormones which triggered satiety," says Reimer. "We saw these same 'fullness' hormones increase in our pregnant rats when they ate the prebiotic. What was most important was that by mom improving the bacteria profile in her gut, that healthy [gut microbiota](#) profile was transferred to the baby."

## **Not a cure for obesity**

The magnitude of the effect would be different in humans, Reimer cautions. "The prebiotics worked beautifully to reduce weight gain and lower-fat mass in the rats; however, a person is far more complex," says Reimer. "In the rat study we could very closely control their diet but in real life there are many other triggers that may contribute to obesity, including genetics, environment and mental health. Prebiotics are one tool to help with weight management but they are not a cure for obesity."

All parents want healthy babies. Reimer says there are some excellent resources to help mothers navigate what to do for a healthy pregnancy.

"The focus of healthy nutrition is shifting from just concentrating on getting nutrients to making sure we also feed the [healthy bacteria](#) in our gut," says Reimer.

Reimer and other scientists are hoping their research leads to more foods

containing these ingredients. In the future, Reimer hopes to study pregnant women who already have a history of eating probiotics and prebiotics and look at the health of their babies.

**More information:** Heather A. Paul et al. Diet-induced changes in maternal gut microbiota and metabolomic profiles influence programming of offspring obesity risk in rats, *Scientific Reports* (2016). DOI: [10.1038/srep20683](https://doi.org/10.1038/srep20683)

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