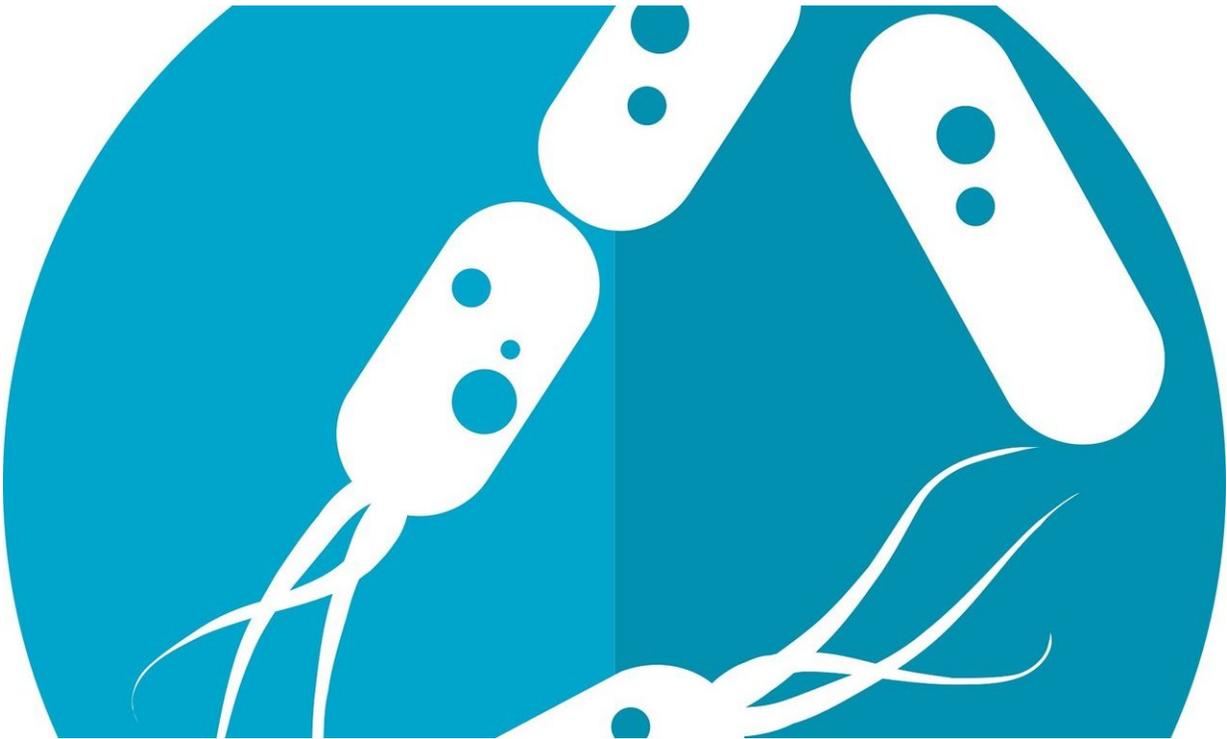


# New study links high-fat diet and gut bacteria to insulin resistance

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Researchers have discovered how our choice of diet can weaken our gut immune system and lead to the development of diabetes.

A growing body of research supports that during [obesity](#), our immune system is often responding to components of [bacteria](#) that "leak" through

the intestinal tissue and results in inflammation. In turn, inflammation can drive [insulin resistance](#), which predisposes people to diabetes.

In new research published in *Nature Communications* this week, Dr. Dan Winer, Scientist, Toronto General Hospital Research Institute and the Department of Pathology at University Health Network (UHN), and his team, including graduate students Helen Luck and Saad Khan, and co-lead author, Dr. Shawn Winer at St. Michael's Hospital, highlight how a high fat diet influences one component of the gut immune system called B cells, specifically those that produce a protein called IgA.

"We discovered that during obesity, there are lower levels of a type of B cell in the gut that make an antibody called IgA," says lead author Helen Luck.

"IgA is naturally produced by our bodies and is crucial to regulating the bacteria that live in our gut. It acts as a defense mechanism that helps neutralize potentially dangerous bacteria that take advantage of changes to the environment, such as when we consume an imbalanced or fatty diet."

In their experiments, they also observed that IgA deficient pre-clinical models, which lack protective IgA, had worsened blood sugar levels when fed a high fat diet. As well, transplantation of gut bacteria from these IgA deficient models into models that had no gut bacteria was able to transfer the disease, demonstrating that IgA can regulate the amounts of harmful bacteria in the gut during diet-related obesity.

In collaboration with a bariatric surgery research team at UHN led by Dr. Johane Allard and Dr. Herbert Gaisano, the team saw increased levels of IgA within the stool of patients soon after bariatric surgery, supporting the importance of IgA and the gut [immune system](#) in humans with obesity.

Overall, the research highlights a robust connection between high fat diets, obesity and the lack of gut IgA in promoting inflammation and insulin resistance. The knowledge that this class of antibodies regulate pathogenic bacteria, and protects against a "leaky gut," and additional complications of obesity, is a powerful tool in the fight against diabetes.

"If we can boost these IgA B cells or their products, then we may be able to control the type of bacteria in the gut," says Dr. Dan Winer.

"Especially the ones that are more likely to be linked to inflammation and ultimately insulin resistance. Going forward, this work could form the basis for new gut immune biomarkers or therapies for obesity and its complications, like insulin resistance and type 2 diabetes."

**More information:** Gut-associated IgA+ immune cells regulate obesity-related insulin resistance, *Nature Communications* (2019). [DOI: 10.1038/s41467-019-11370-y](https://doi.org/10.1038/s41467-019-11370-y)

Provided by University Health Network

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