

Researchers observe new mechanism for diabetes resolution

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Though existing research has shown gastric bypass surgery resolves type 2 diabetes, the reason has remained unclear. A research team, led by Nicholas Stylopoulos, MD, Boston Children's Hospital's Division of Endocrinology, has identified the small intestine—widely believed to be a passive organ—as the major contributor to the body's metabolism, based on a study in rats. The report will appear in *Science* on July 26, 2013.

Weight loss and improved diabetes often go hand-in-hand, but type 2 diabetes often gets resolved even before weight loss occurs after gastric bypass. To investigate why this happens, Stylopoulos and his team spent one year studying rats, and observed that after gastric bypass surgery, the small [intestine](#) changes the way it processes glucose. The team saw the intestine using and disposing of glucose; thereby regulating blood glucose levels in the rest of the body and helping to resolve type 2 diabetes.

"We have seen type 2 diabetes resolve in humans after gastric bypass, but have never known why," says Stylopoulos. "People have been focusing on hormones, fat and muscle, but we have shown in this study that the answer lies somewhere in the [small intestine](#) most of the time."

Gastric bypass surgery, a weight loss treatment typically reserved for severely [obese patients](#), reroutes food into the smaller pouch of the stomach and bypasses the rest of the stomach and [duodenum](#). Before gastric bypass, intestines typically do not contain a specific transporter

called GLUT-1, which is responsible for removing glucose from circulation and utilizing it within the organ. After gastric bypass, the researchers found that the intestine reprograms itself to contain GLUT-1, taking glucose from circulation and disposing of it, swiftly stabilizing [blood glucose levels](#) in the rest of the body.

"Previously, we had not considered the intestine as a major glucose-utilizing organ. We have found this process is exactly what happens after surgery," says Stylopoulos.

Based on their findings, Stylopoulos and his colleagues found type 2 diabetes was resolved in 100 percent of the rats that underwent gastric bypass. Sixty-four percent of [type 2 diabetes](#) was resolved by the intestine, and the researchers hypothesize that the other 36 percent may be due to weight loss or other factors.

These findings pave the way for future investigations of how to create a medical pathway to mimic the intestine's reprogramming without the surgery. "With further research, we may find ways to bypass the bypass," says Stylopoulos. "The results of our study are promising because, unlike the brain and other organs, intestines are easily accessible. Furthermore, since cells in the intestine have such a short lifespan, we can easily study and pharmacologically manipulate them to use glucose, without long-term problems."

More information: "Reprogramming of Intestinal Glucose Metabolism and Glycemic Control in Rats After Gastric Bypass", *Science* vol 341 26 July 2013

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