

# Why can surgical treatment improve type 2 diabetes mellitus?

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Roux-en-Y gastric bypass (RYGB) is a commonly used surgical treatment for patients with morbid obesity. It significantly and persistently decreases the levels of blood glucose and glycosylated hemoglobin in 80-100 percent of type 2 diabetes mellitus (T2DM) patients. A study group from China found the possible mechanism of treating T2DM with RYGB surgery. This study has provided new basis for surgery to treat T2DM and explained why the post-surgical nesidioblastosis occurs in RYGB patients.

Diabetes mellitus is a chronic [metabolic disease](#) resulted from, either decreased production of insulin or increased resistance to it from peripheral tissues or both factors combined together. While medical treatment remains the mainstay of treatment for [diabetes](#), some surgical procedures, such as Roux-en-Y [gastric bypass](#), have demonstrated some potential to be a treatment option for diabetes. Increased insulin activity is observed among the patients who underwent Roux-en-Y gastric bypass  $\rightarrow$  RYGB  $\rightarrow$  surgery and it is possibly associated with increased post-surgical expression of PDX-1 (Pancreatic duodenal homeobox-1) and regeneration of pancreatic  $\beta$ -cells. PDX-1 is an important transcription factor expressed during the embryonic development of the pancreas and  $\beta$ -cells are the insulin secreting cells found in the pancreatic islets.

A research group in China conducted a study using Goto-Kakizaki (GK) rats and developed the evidence based hypothesis to explain the mechanism of the effect of Roux-en-Y gastric bypass on diabetes mellitus. This paper will be published on May 14, 2010 in *World Journal*

*of Gastroenterology.*

Research was conducted by Li Z and his colleagues in Southern Medical University, Institute of Basic Medical Anatomy National Key Disciplines. The article further articulates the relationship of PDX-1 expression and pancreatic  $\beta$ -cells regeneration to the effect of RYGB surgery to treat T2DM. Findings of this study advanced a new basis for a surgical management to treat T2DM in human beings and explain mechanism of the post-surgical nesidioblastosis that occurs among RYGB patient.

Findings of the study also showed that the RYGB could significantly increase the post surgical expression of PDX-1 and promotes regeneration of  $\beta$ -Cells in GK rats. GK rat is a non-obese genetically diabetic animal model commonly used to simulate human diabetes in the laboratory. This study was conducted using three groups of GK rats, RYGB surgery groups and two control groups. Post-surgically, each group was subjected to quantitative analysis of PDX-1 and pancreatic  $\beta$ -cells and result showed significant increase in the expression of PDX-1 as well as regeneration of  $\beta$ -cells in the RYGB surgery group compared to control groups. These findings provided concrete evidence to explain that the increased expression of the PDX-1 and regeneration  $\beta$ -cells are the associated mechanisms of RYGB surgery to treat T2DM. This study could be a turning point and takes diabetic related studies to a new path to develop a curative treatment for diabetes.

**More information:** Li Z, Zhang HY, Lv LX, Li DF, Dai JX, Sha O, Li WQ, Bai Y, Yuan L. Roux-en-Y gastric bypass promotes expression of PDX-1 and regeneration of  $\beta$ -cells in Goto-Kakizaki rats. *World J Gastroenterol* 2010; 16(18): 2244-2251

[www.wjgnet.com/1007-9327/full/v16/i18/2244.htm](http://www.wjgnet.com/1007-9327/full/v16/i18/2244.htm)

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