

New discovery aims to correct cellular defects leading to diabetes

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A new research discovery published online in the *FASEB Journal* may change the perception and treatment of diabetes. That's because scientists have moved closer toward correcting the root cause of the disease rather than managing its symptoms. Specifically researchers identified a protein (G6PD protein) and its antioxidant product (NADPH) that both prevent the death and promote the growth of cells which produce and release insulin in the pancreas (beta cells).

"Abnormally high levels of oxidants are thought to be a major cause of [diabetes](#) and the complications of diabetes, as well as many other diseases," said Robert C. Stanton, M.D., co-author of the study, from Joslin Diabetes Center in Boston. "By understanding the specific defects in processes that either produce too many oxidants or not enough [antioxidants](#), a new era of highly specific, targeted treatments will emerge that very effectively treat or possibly prevent many of these diseases."

To make this discovery, Stanton and colleagues studied beta cells from humans and mice to determine the effects of increasing sugar on the cells, the G6PD protein, and NADPH antioxidant. Using biochemical and molecular biology techniques, researchers measured levels of various chemicals, proteins and markers of both cell growth and death. Results showed that increasing the level of sugar causes a decrease in NADPH and increased beta [cell death](#). Additionally, tweaking the level of NADPH higher prevented the negative effects of increased sugar. Increasing the activity of G6PD rescued the [beta cells](#) from cell death,

leading researchers to conclude that treatments that directly prevent G6PD decrease or promote G6PD increases could hold great promise in treating diabetes.

"Even before the 'omic revolution, the cause and cure of diabetes have long been sought," said Gerald Weissmann, M.D., Editor-in-Chief of the [FASEB Journal](#). "This research discovery, which identifies a key enzyme that regulates oxidation and pancreatic cell death, brings us closer than ever to getting at the root of diabetes."

More information: Zhaoyun Zhang, Chong Wee Liew, Diane E. Handy, Yingyi Zhang, Jane A. Leopold, Ji Hu, Lili Guo, Rohit N. Kulkarni, Joseph Loscalzo, and Robert C. Stanton. High glucose inhibits glucose-6-phosphate dehydrogenase, leading to increased oxidative stress and -cell apoptosis

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