

Study explains how low testosterone raises diabetes risk

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kbrannon@tulane.edu

Phone: 504-862-8789



Doctors have long known that men with low testosterone are at greater risk for developing type 2 diabetes. For the first time, researchers have identified how testosterone helps men regulate blood sugar by triggering key signaling mechanisms in islets, clusters of cells within the pancreas that produce insulin. The findings, co-authored by Tulane University researchers, are published in the journal [*Cell Metabolism*](#).

The [study](#) could help identify new treatments for type 2 diabetes in the large number of men with low testosterone due to age or prostate cancer therapies.

“We have found the cause — and a potential treatment pathway — for type 2 diabetes in testosterone-deficient men,” says senior author [Dr. Franck Mauvais-Jarvis](#), Price-Goldsmith professor in the Department of Medicine at Tulane University

School of Medicine. “Our study shows that testosterone is an anti-diabetic hormone in men. If we can modulate its action without side effects, it is a therapeutic avenue for type 2 diabetes.”

Researchers used specially bred male mice with pancreatic beta cells lacking the receptor to testosterone (the androgen receptor). They fed them a Western diet rich in fats and sugar and tested their response to glucose. The mice without androgen receptors all developed lower insulin secretion, leading to glucose intolerance compared with normal mice in the control group.

To better understand how testosterone interacted with insulin production within the pancreas, researchers administered testosterone and glucose directly to human islet cells treated with an androgen receptor inhibitor and islets cells harvested from mice without androgen receptors. In both cases the islet cells showed decreased insulin production compared to islet cells whose receptor to testosterone was not inhibited or missing.

Further experiments in cultured mouse and human islet cells showed the insulin-producing effect of testosterone could be abolished by inhibiting glucagon-like peptide-1 (GLP-1), a hormone the body produces after a meal. The study suggests that testosterone amplifies the islet impact of the hormone, which is currently used as a diabetes treatment.

The study is co-authored by Weiwei Xu of Tulane and researchers from Northwestern University, Vanderbilt University, University of Chicago, University of Illinois and Catholic University of Leuven in Belgium.