

Research reveals possible cause of diabetic cardiomyopathy

November 6 2013

Researchers from the University of Texas Medical Branch at Galveston have discovered one of the pathogenic components of diabetes in the heart, as published in the *Journal of Biological Chemistry*.

While both [heart](#) disease and diabetes are widely studied, how diabetic cardiomyopathy develops is not well understood, other than that it seemed to be linked to protein kinase C (PKC)—a family of enzymes that controls the functions of other proteins by using phosphates to turn them on and off.

Researchers at UTMB, led by assistant professor of biochemistry Dr. Muge Kuyumcu-Martinez, studied the effects of PKC signals in the hearts of [diabetic mice](#).

"We now know that the leading cause of diabetic cardiomyopathy can be attributed to PKC activation and its downstream effects on gene expression," said Kuyumcu-Martinez. "Knowing how cardiomyopathy manifests, further research can use these results to concentrate on the prevention and treatment of heart failure in diabetics."

Cardiomyopathy, a known symptom of diabetes, occurs when the muscles of the heart weaken, and the heart is no longer strong enough to pump blood and properly circulate it throughout the body. Adults with diabetes are two to four times more likely to die of [heart failure](#) than the rest of the population.

The researchers discovered that when PKC is over-activated, the cells of the adult heart revert to splicing methods used during the embryonic stages. Genes contain codes for certain processes and products, such as proteins, and they send signals to the body to complete these processes and products through messenger RNA. Alternative splicing occurs when one gene contains the codes for multiple proteins. The human genome contains 20,000 protein-coding genes, so using one gene to create more than one protein is an efficient process—when it's running correctly. But problems occur when the genetic information is abnormally spliced or mis-spliced to messenger RNA, giving it mutated instructions. As much as one-third of genetic disease and many cancers are attributed to splicing changes.

In the case of [diabetic cardiomyopathy](#), the research team used RNA sequencing technology to identify 22 specific alternative splicing events that occur, causing a developmental shift in the [gene expression](#). This shift causes mechanisms of the heart to behave as though it were still an embryo, which prevents the heart from functioning correctly in a full-grown adult fighting [diabetes](#).

Provided by University of Texas Medical Branch at Galveston

Citation: Research reveals possible cause of diabetic cardiomyopathy (2013, November 6) retrieved 15 February 2023 from <https://medicalxpress.com/news/2013-11-reveals-diabetic-cardiomyopathy.html>

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