

Biomarker discovery in diabetes: A network-based approach

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Type 2 diabetes (T2D) is characterized by chronically high blood glucose levels that can lead to serious complications such as cardiovascular disease, kidney failure and blindness. Current treatment strategies rely on a single biomarker: elevated blood glucose (or surrogate markers such as HbA1c) and glucose intolerance, which is elevated when the disease has often already progressed to a stage where beta cell damage has occurred. The hope is that in the future new biomarkers will be available to detect high-risk individuals earlier and adapt treatment strategies to provide better long-term management of the disease.

In this seminar I will describe a recent large European study seeking to bridge the gap between mouse models of T2D and human disease to try to find biomarkers for early disease detection. In this study, metabolically challenged mice were followed over time and various measurements including plasma lipidomics and islet gene expression were taken. A second study was subsequently performed aimed at trying to validate the main findings of the mouse experiment using two independent human cohorts. I will discuss the methodology and results from these studies from a network biology perspective. One of the outcomes of the studies was the discovery that a particular class of lipid was elevated in the plasma of individuals several years before T2D diagnosis. Lipids of this class may therefore represent prognostic biomarkers for early detection of T2D.