Novel treatment strategies for type 2 diabetes using integrated microfluidic model systems

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Type 2 diabetes (T2D) is a global health problem affecting 1 in 20 adults worldwide. Symptoms of T2D are insulin resistance, elevated blood sugar levels and death of cells in the pancreas. However, today's therapeutics focus only on disease management rather than regression or cure. Importantly, T2D is caused by faulty communication of multiple tissues and organs. Due to the complexity and species-specificity of these interactions, there is a lack of experimental tools that faithfully reflect human T2D, which impedes the development of new anti-diabetic medications.
Our research focuses on the development of systems that are capable of modelling human T2D. To achieve this goal, we establish human 3D tissue culture models of liver, pancreas, muscle and fat tissue using cells directly isolated from patients. We integrate these engineered tissue models in an interconnected microfluidic chip that allows us to investigate how these different tissues communicate with each other under healthy and diseased conditions. In addition, we utilize this system to screen for novel medications that can reconstitute healthy tissue interactions, thereby working towards the goal of revealing new therapeutic strategies to cure diabetes.

Link to research profile: : http://ki.se/en/fyfa/section-of-pharmacogenetics-lauschke-lab