Technische Universität Braunschweig

Bioinformatik & Biochemie

Impact of small molecule metabolites on adipocyte metabolism

Who are we?

The immuno-metabolism group (head: Prof. Karsten Hiller), located at the Braunschweig Integrated Centre of Systems Biology (BRICS), investigates cellular and mitochondrial metabolism of immune cells during bacterial infection, cancer, metabolic complications and neuro-degeneration. The team has developed a strong expertise in stable-isotope assisted metabolomics and metabolic flux analysis both on a whole cell as well as on a mitochondrial sub-compartment level.

Project background

Adipocytes are the formative cell type of adipose tissue, where they take up nutrients such as glucose or fatty acids and store them in the form of Fats (Triacylglycerols). Adipose tissue is also densely populated by macrophages, cells of the innate immune system. Adipose tissue macrophages contribute to tissue homeostatis and govern adipocyte metabolism. Under pathological or inflammatory conditions however they secrete protein mediators that limit fat storage by adipocytes. Aim of this project is to decipher whether metabolites that are generated by macrophages or elevated in the plasma of Type II diabetic or obese patients affect adipocyte metabolism, in particular fat storage.

Thesis content

You will work with a fibroblast cell line (3T3-L1), which can be differentiated to adipocytes by a growth factor cocktail. You will treat adipocytes with metabolites and analyze how their metabolism is affected.

Methodology:

- 3T3-L1 Cell culture & adipocyte differentiation
- Analysis of adipocyte metabolism by
  - Gene expression
  - Lipid staining
  - High resolution mass spectrometry (LC-MS, GC-MS)
  - Stable isotope assisted metabolomics

Interested?

Please send your application via Email with your preferred starting date.

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