



Elucidating the Mechanisms of T3 and Resveratrol-Induced Adipocyte Browning



Who are we?

The immuno-metabolism group (head: Prof. Karsten Hiller), located at the Braunschweig Integrated Centre of Systemsbiology (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

Obesity is a complex metabolic disorder characterized by an excessive accumulation of adipose tissue. White adipose tissue (WAT) primarily functions as an energy storage depot, storing excess energy as triglycerides. However, under certain conditions, WAT can undergo a process known as browning, where it acquires characteristics of brown adipose tissue (BAT). BAT is specialized in dissipating energy as heat through a process called thermogenesis.

The goal of this project is to investigate the potential of two compounds, T3 triiodothyronine and Resveratrol, to induce browning of white adipocytes. We aim to elucidate the underlying mechanisms by examining the effects of these treatments on intracellular metabolism and gene expression of key enzymes and proteins involved in the browning process.

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 different chemical compound and analyze how their metabolism is affected.

Methodology:

1. 3T3-L1 Cell culture & adipocyte differentiation
2. Analysis of adipocyte metabolism by
 - Gene expression
 - Lipid staining
 - Mass spectrometry (GC-MS)
 - Stable isotope assisted metabolomics

Interested?

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

- Bachelor or Master
- English or German

Contact:

Mohamad Alalloush
m.alalloush@tu-Braunschweig.de

Prof. Dr. Karsten Hiller
karsten.hiller@tu-bs.de