Technische Universität Braunschweig

Bioinformatik & Biochemie

To compare the metabolic signature of pro-inflammatory primary and immortalized macrophages

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

Macrophages are innate immune cells playing significant role in inflammatory processes. Inflammation is tightly controlled in order to destroy pathogens and repair damaged tissues in an efficient and fine-tuned manner. Improper action of macrophages leads to chronic inflammation as shown in various diseased states including chronic infection, autoimmune diseases, cancer, diabetes and neurodegenerative diseases. Cellular metabolism of macrophages is precisely coupled with macrophage function and activation, thereby to investigate macrophage metabolism will not only bring about scientific insight involved in macrophage activation, but also provide potential molecular targets to control many diseases.

Thesis content – utilized methods

Immortalized macrophage cell lines and primary macrophages are commonly used cell models for macrophage studies. This current study aims to compare their cellular metabolism under inflammatory stimulation and in turn to find out the underlying mechanism of the potential differences between the two models.

Methodolgy:
cell culture, metabolomics (gas chromatography–mass spectrometry and stable isotope labeling), Seahorse, YSI, gene expression.

Interested?

Students with strong interests in immunology and metabolism are particularly encouraged to apply.

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