Technische Universität Braunschweig

Bioinformatik & Biochemie

Inflammatory response in Parkinson‘s disease with PINK1/Parkin mutation

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

Parkinson‘s disease is one of the most prevalent neurological disorders affecting modern society. Its neuropathology includes a-synuclein-containing Lewy bodies and loss of dopaminergic neurons in the substantia nigra. The root cause of these pathological changes is unknown in most cases. Nonetheless, some genetic factors have been identified in a significant amount of patients. Furthermore, environmentla factors and progressing age are highly influental on the severity of the disease. The main focus of the project are the two mutations in mitochondrial PTEN (phosphatase and tensin homologue)-induced kinase1 (PINK1) and Parkinson juvenile disease protein 2 (Parkin). Both mutations have been established to play a major role in the development of Parkinson‘s disease and are related to mitochondria functionality. Our goal will be to analyse metabolic changes due to the different mutations and the occuring inflammatory response which is a prominent feature of PD.

Thesis content

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Methodology:
Cultivation of fibroblasts
Stable isotope-assisted metabolomics (GC/MS)
Inflammatory response study (qPCR/ELISA)
Analysis of oxidative stress (Seahorse)
Analysis of oxygen consumption rate (YSI)

Interested?

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

- Bachelor or Master
- English or German

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