PERSIMUNE

CENTRE OF EXCELLENCE FOR PERSONALISED MEDICINE OF INFECTIOUS COMPLICATIONS IN IMMUNE DEFICIENCY

Student Project

METABOLIC CHANGES FOLLOWING A STEM CELL TRANSPLANTATION

Main area: bioinformatics, systems biology, medicine, computational biology

Student's background: Bioinformatics student with interest in medical science / Medical student with interest in coding and data analysis

Type of project: BSc/MSc

Project description: An allogeneic stem cell transplantation is a severe medical procedure performed usually as a last resort treatment in patients with hematologic disease. The harsh pre-treatment conditioning as well as the implementation of a new donor-derived immune system cause major changes in the body. However, these changes have not yet been studied in a well-described human cohort at the metabolic level. We have collected two sequential blood samples from 59 stem cell transplant recipients and performed metabolomics and lipidomics analysis on the samples. This way, we can assess all the metabolic reactions occurring as well as how they change in the early period after transplantation and how they relate to various clinical parameters.

Methods used: The student will be responsible for the construction of an R Shiny app that allows for interactive exploration of the data using figures, tables and the option of adding on clinical variables. Further, the student will assess changes in metabolism and relate them to clinical variables and outcomes. The student will acquire knowledge about metabolic pathways, stem cell transplantations, data visualization and interpretation of clinical data. It is not a requirement to have previous experience with R Shiny or metabolomics data.

About PERSIMUNE: PERSIMUNE (www.persimune.dk) is a multidisciplinary centre of excellence embedded within CHIP and funded by the Danish National Research Foundation. PERSIMUNE works from the hypothesis that across patients with impaired immune function, there is a common pattern of un-discovered risk factors explaining the variation in risk of infectious complications. We aim at understanding the mechanisms explaining the variation in risk using a diverse set of methodologies, including pattern recognition from big data from routine clinical care, studies of host and microbial genetics, imaging, and immunological characterization. These data will be used to develop clinical algorithms aimed at improving the clinical outcomes in patients with various immune dysfunction.

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