

Human immunology and inborn errors of immunity

Our team seeks an ambitious and curious student to tackle a challenging project that will uncover novel insights into how the immune system functions and how it fails in patients with inborn errors of immunity that develop life-threatening viral infections or present with early-onset cancer. One position is available, with two projects to choose from that can be further adapted to the interest of the student.

Project 1 focuses on **natural killer (NK) cells**, which are lymphocytes that play a vital role in eliminating virally infected, cancerous or stressed cells. People with NK cell deficiencies suffer life-threatening disease from normally tolerated viral infections, and those that survive early childhood are predisposed to developing aggressive malignant tumours. We are interested in understanding how the human immune system maintains a diversity of different NK cells and the molecular pathways essential to allowing their development and function.

Project 2 examines **plasmacytoid dendritic cells (pDCs)** which are the major producers of potent antiviral type I interferons. The COVID-19 pandemic has brought to light how crucial these cells are for viral protection, with previously healthy individuals suffering from severe COVID-19 disease due to inborn errors of immunity affecting pDC function. We are leading investigations into understanding how these deficiencies affect pDCs in order to boost pDC function in health and disease.

Techniques developed in the project

Both projects will require sensitive and large-scale *in vitro* culture of primary human cells from peripheral blood, and high-dimensional flow cytometry acquisition and analysis. Depending on the capability of the student, additional techniques have the potential to include fluorescence-activated cell sorting (FACS), *in vitro* differentiation of human iPSC-derived hematopoietic progenitors, CRISPR/Cas9 genome editing, molecular cloning, and single cell RNA sequencing and bioinformatic analysis.

Position requirements

Students suited to the position will display a keen passion for understanding the human immune system, eagerness to develop proficiency in challenging techniques, and ability to develop independence in the lab and contributing to project directions. Prior experience in flow cytometry or molecular biology is favourable, as well as interest or competency in bioinformatics.

Both projects are suitable for 6+ month internships for master's students or similar.

Location

Our laboratory is based at the [Center for Hematology and Regenerative Medicine](#) (HERM) at Karolinska Institutet, Campus Flemingsberg.

Contact information

For expressions of interest and inquiries please contact Tessa Campbell tessa.campbell@ki.se

Information about our laboratory can be found at www.yenanbrycesonlab.com