

Laboratory of Experimental Hematology



At the Laboratory of Experimental Hematology (LEH; VAXINFECTIO, Faculty of Medicine and Health Sciences (FGGW)), we investigate novel concepts in **immunotherapy** and **stem cell biology**. We perform fundamental, preclinical, translational and clinical research favoring a bench-to-bedside practice aiming both at pre-clinical drug screening and personalized medicine. For its translational and clinical research, LEH collaborates very closely with the Center for Cell Therapy & Regenerative Medicine (CCRG) – Antwerp University Hospital (UZA). LEH is composed of 3 major subgroups, which each have different available Master thesis topics:

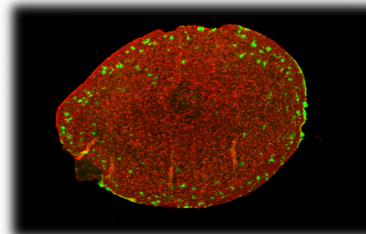
Neuroinflammation and Regeneration Group – Prof. Peter Ponsaerts

Available MSc projects: 1 (contact Peter.Ponsaerts@uantwerpen.be)

We study the **central role of inflammatory responses in disorders of the central nervous system (CNS)** using murine and human iPSC-derived brain organoids.

? How do astrocytes and microglia react during inflammatory events (traumatic & virus-induced) in brain organoids? In this master thesis project you will study immune activation in human iPSC-derived brain organoids following Varicella Zoster Virus (VZV) infection.

! hiPSC-derived brain organoid culture, flow cytometry, immunocytochemistry, ELISA, qRT-PCR, RNA-Seq



Human iPSC-derived brain organoid
Red: staining for Tuj1+ neurons
Green: staining for Iba1+ microglia

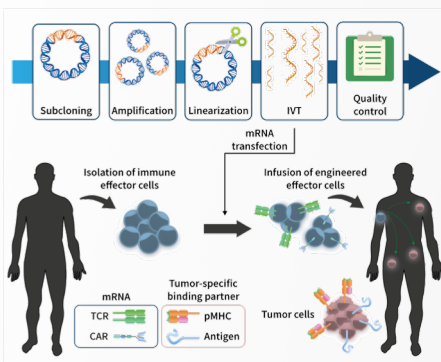
Tumor Immunology Group (TIGr) – Prof. Eva Lion & Prof. Sébastien Anguille

Available MSc projects: 1 (contact Eva.Lion@uantwerpen.be)

We investigate the **development of personalized cell-based cancer immunotherapy** approaches. Our two major lines of research are focused on dendritic cell vaccines and **gene-modified T cell therapies** for hematological malignancies, such as acute leukemia and multiple myeloma.

? How can we engineer T cells to redirect them towards hematological malignancies? Building new **chimeric antigen receptor T cells (CAR-T)**: Development of non-viral pipelines for the generation of CAR-T cells for future use in clinical trials.

! Mammalian cell cultures (e.g. cytotoxicity assay), **Non-viral engineering** (Transposons, CRISPR-Cas and RNA electroporation), **Flow cytometry, ELISA, molecular biology** (e.g. plasmid cloning, in vitro mRNA transcription)



Immune Regulation & Tolerance-Inducing Strategies Research Group (IRIS) – Prof. Nathalie Cools

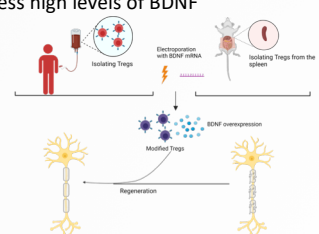
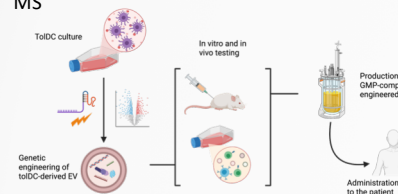
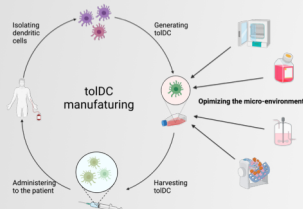
Available MSc projects: 3 (contact Nathalie.Cools@uantwerpen.be)

The main research interests of the IRIS team focus on **immunoregulation in the context of autoimmune diseases such as multiple sclerosis (MS)**. We employ and modulate human dendritic cells as well as regulatory T cells (Tregs) to suppress pathogenic immune responses.

? Project 1: Optimisation of tolDC manufacturing process and analysis of the impact of the micro-environment on phenotype and function

? Project 2: Identification of key tolerance targets to develop an engineered EV for the treatment of MS

? Project 3: Induction of (re)myelination by development of 'designer' Tregs engineered to express high levels of BDNF



! Mammalian primary cell cultures (human and mouse), **flow cytometry, ELISpot and ELISA, genetic engineering** (e.g. RNA electroporation, CRISPR-Cas, siRNA), **EAE mouse models**