

Engineering Macrophages for Cancer Immunotherapy

MSc Project

Background information

We have a very active program in experimental HIV medicine, in particular immunotherapy and gene engineering an HIV resistant immune system, and in gene-engineering monocytes/macrophages to fight cancer. We use all kinds of in vitro and in vivo methods. Ultimate goal is to translate our projects to application.

The laboratory of Dr. Speck is very well embedded in the research place of Zurich and benefits from its unique scientific richness. Notably, we have very active international collaborations for the gene engineering part (Prof. Michael Pepper, University of Pretoria (SA) and Prof. Karl-Heinz Krause, University of Geneva (CH)), for studying IFNs (Prof. Gideon Schreiber, Weizmann Institute of Science, Israel) and for immunotherapy (Prof. Giuseppe Pantaleo, University of Lausanne and Prof. Renata Stripecke, University of Hannover).

The laboratory is well financed by various foundations, among others by the Swiss National Science, Swiss Vaccine Institute, the VonTobel Foundation and the USZ Foundation.

Goal

We are looking for highly motivated person as MSc student for our project: "Engineering Macrophages for Cancer Immunotherapy".

The master thesis is focused mainly on the molecular biology part of the project e.g. generation chimeric receptors and production of lentiviral vectors to express the receptors stably in human macrophages via transduction and evaluating the gene-engineered macrophages in in vitro and in vivo experiments, the desired profile is listed below. The project is related to "Human chimeric antigen receptor macrophages for cancer immunotherapy" (M. Klichinsky et al., 2020), but is a more sophisticated approach.

You will learn state of the art cloning methods, how to produce lentiviral vectors for gene engineering and handling and transducing primary human cells. The methods for read out are using flow cytometry, microscopy, qPCR and Westernblot.

Please note, the project is a high risk, high gain project, which, when it is successful, will be translated to a clinical application.

The lab for the macrophage project is located at the USZ laboratories in Schlieren and you would be part of the macrophage team consisting of 4 people.

You will be directly supervised by a PostDoc and you will be able to take part in weekly group and project meetings, regular one-on-one discussions with supervisor, journal clubs and progress reports.

Requirements

We are looking for a motivated master student with good communication skills and interest in the fields of molecular cell biology, immunology, cancer biology and immunotherapy. Skills cloning and/or cell culture work with primary cells is a plus.

Minimum would be 9 months for the thesis, best 12 months and we are looking for somebody who can start latest till September 2022.

Contact

Please send the application to Dr. Simon Bredl (simon.bredl@usz.ch)

Responsible mentor: Prof. Dr. Roberto Speck (roberto.speck@usz.ch)

Project leader: Dr. Simon Bredl (simon.bredl@usz.ch)

Direct supervisor of the student: Dr. Sabrina Traxel (sabrina.traxel@usz.ch)