SFB1425 - Heterocellular Nature of Cardiac Lesions: Identities, Interactions, Implications

P08: PhD-Project

based at the

Department of Cardiology and Angiology I

The Impact of Heterogeneous Macrophage Origins on Ischaemic and Non-Ischaemic Cardiac Lesions

Background

Although macrophages (MΦ) account for only 5-10% of cells in the healthy heart, they importantly engage in immune defense and phagocytosis, the development of the coronary circulation, and electrical conduction. Derived from embryonic precursors, resident MΦ self-sustain into adulthood, but are complemented/ replaced by recruited monocytes over time and in particular following cardiac injury. While complete MΦ depletion is detrimental, reducing their numbers by limiting monocyte invasion improves infarct healing. This ambiguity apparently depends on cell ontogeny with resident MΦ providing cardioprotection and recruited MΦ promoting damage. Unraveling the underlying mechanisms is the focus of studies.

Project Description

Transgenic mouse models and human tissue samples will be used to decipher the spatio-temporal kinetics and intercellular relationships of resident and recruited MΦ when they accumulate side by side in the tissue, interacting with other cardiac cell types in ischaemic and non-ischaemic cardiac lesions. We will study differences in inflammation, phagocytosis, electrical coupling and further interactions of resident and recruited MΦ with other cardiac cell types. By decoding MΦ heterocellular crosstalk we aim at identifying potential therapeutic targets for immune-modulation of cardiac lesions.

Qualifications and Requirements

- High motivation to work in an interdisciplinary team mastering a wide range of techniques
- Solid background in immunology research
- Prior experience in the handling of experimental animals, especially mice, as well as in molecular biology techniques such as flow cytometry and PCR/RNA sequencing would be desirable
- English language proficiency at level B2 or higher

Research Areas

Immunology, Cardiac Physiology

Experimental Tasks

- Mouse models of cardiac injury and inducible Cre/lox system
- FACS, immunohistology, RNA sequencing, cell cultures
- In collaboration within the CRC whole heart/ single cell electrophysiology and electromechanic measurements.

Student Background

Biophysics, Biochemistry, Biology, (Molecular, Veterinary) Medicine

Starting Date

from 01/07-2020

PhD Advisor

Ingo Hilgendorf, Department of Cardiology and Angiology I, University of Freiburg
ingo.hilgendorf@universitaets-herzzentrum.de

Contact

info@sfb1425.uni-freiburg.de

Applications via

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