



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

P02: PhD-Project

based at the

Institute of Cardiovascular Physiology, Goethe-University Frankfurt

Functional Epigenetic Modulation of Cardiac Fibroblasts

Background

In heart disease, activation of fibroblasts (FB) is the key event for the development of pathological cardiac fibrosis. So far, the underlying transcriptional mechanisms of FB activation remain unresolved in the heart. The aim of this project is to identify and modulate regulatory elements crucial for FB activation using epigenetic methods and CRISPR interference (CRISPRi).

We offer an interdisciplinary and supportive research environment embedded in the SFB1425, the German Heart Center (DZHK) and the DFG Excellence Cluster (EXC2026) Cardiopulmonary Institute.

Project Description

We will combine chromatin state analysis (ChIP-seq, ATAC) with chromatin interaction analysis (Hi-C) to connect regulatory elements crucial for FB activation and scar formation. You will unravel the functional role these regulatory elements using CRISPR interference (CRISPRi/a) in combination with single cell technology. This approach will identify CRISPR-based methods, which allow you to steer the phenotype of FB and finally scar formation *in vivo*.

Qualifications and Requirements

- High motivation to apply, develop and combine state of the art epigenetic and molecular biology methods, NGS data analysis and *in vivo* methods
- Solid background in *in vivo* cardiac physiology and/or epigenetics
- Prior experience with bioinformatics (e.g. Galaxy platform, R, Python) would be desirable
- Excellent MSc in a field relevant for the proposed study
- English language proficiency at level B2 or higher

Research Areas

Epigenetics, Single Cell Analysis, Functional Genetics, Cardiovascular Physiology

Experimental Tasks

- Chromatin state and interaction analysis (ChIP-seq, Hi-C, RNA-seq) of FACS sorted cells/nuclei
- Single Cell RNA-seq and CRISPRi screens
- Fibroblast and scar phenotyping
- *In vivo* heart disease models

Student Background

Molecular biology or Medicine, Biotechnology, Biology (or related)

Starting Date

from 01/07-2020

PhD Advisor

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Applications via

[SGBM portal](#)

Submission window: 08-30/06-2020