



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

P13-1: PhD-Project

based at the

Institute for Experimental Cardiovascular Medicine

Optogenetic Control of Heterocellular Contributions to Cardiac Excitation and Arrhythmogenesis

Background

In the heart, impaired electrical activation and/or conduction, such as in and around cardiac lesions, can cause arrhythmias with clinical symptoms ranging from mild palpitations to severe outcomes including stroke and sudden cardiac death. Recent studies by teams from our CRC have shown direct structural and functional coupling between cardiac myocytes and non-myocytes in healthy and lesioned myocardium. Their contributions to normal excitation and arrhythmogenesis are at the heart of this project.

Project Description

Optogenetic experiments will be used to unravel the effects of different cardiac cell types on electrophysiological properties of healthy, injured and remodelled myocardium, with a focus on ventricular excitability and arrhythmogenic vulnerability. To this end, you will develop new approaches towards steering cardiac electrophysiology by locally and temporally defined activation of optically controlled ion conductances in cardiomyocytes and non-myocytes, which you will then apply to decipher heterocellular interactions in cardiac tissue *in situ*.

Qualifications and Requirements

- High motivation to work on a state-of-the-art research topic in a highly dynamic, interdisciplinary and supportive environment
- Solid background in cardiac and/or electro-physiology
- Prior experience in the handling of biological models, as well as in molecular and cellular engineering would be desirable
- Excellent MSc in a field relevant for the proposed study
- English language proficiency at level B2 or higher

Research Areas

Biophysics, Optogenetics

Experimental Tasks

- state-of-the-art optogenetic experiments on whole heart and tissue slices
- biophysical characterisation of different cell populations
- development of methods for targeted gene delivery

Student Background

Biophysics, Biochemistry, Biology, (Molecular) Medicine, Biomedical Engineering (or related)

Starting Date

from 01/07-2020

PhD Advisor

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Joint project with Barbara Di Ventura, Institute of Biology II

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