

MASTER THESIS IN CARDIAC BIOLOGY

Project Background and Applied Methods

The clinical syndrome of heart failure adversely affects the wellbeing of patients because it causes breathing difficulties, muscle weakness and muscle loss, as well as organ damage and organ dysfunction. Our group investigates molecular mechanisms of cardiac function and dysfunction, while aiming to develop novel strategies to prevent heart failure. We currently focus on the cardiac dysfunction that often develops in cancer patients, because anthracyclin therapy that stops tumor growth unfortunately also causes damage to cardiac muscle cells and blocks the regenerative potential of precursor cells. There is strong evidence that the cardiac neuregulin-1 β /ErbB4 system is activated in heart failure, exerting disease mitigating and regenerative effects. Together with our consortium partner in Antwerp, we aim to identify small molecule ErbB4 agonists with cardio-protective activity.

In this context, you will have the possibility to perform your master thesis focused on one of the following sub-projects.

- 1) analyse mechanisms whereby neuregulin-1 β and its ErbB receptors regulate hypertrophic and proliferative responses in cultured cardiac cells,
 - 2) analyse how neuregulin-1 β treatment changes the effects of doxorubicin in mouse hearts,
 - 3) investigate how ErbB-activation modifies pressure-overload-induced cardiac hypertrophy.
- The technologies that we use include: in vivo mouse models; echocardiography; primary cell cultures from rodent hearts; flow cytometry; immunofluorescence microscopy; immunohistology; protein and RNA purification; immunoblotting; quantitative rtPCR, bulk RNAsequencing and single cell RNA-sequencing.

The precise project content and technologies can be based on your personal interests.

Contact

If you are interested, feel free to contact me at marijke.brink@unibas.ch to set up a meeting.

Possible start of the master thesis:

January 2025; Earlier starting dates are possible as well.

Name of the research group: Cardiobiology

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