

## STudent REseArch Mobility Programme (STREAM) Project proposal



**Host University:**  
Utrecht University

**Field:**  
Health and welfare

**Specified field, subject:**  
Cardiology

**Research project title:**  
Cardiac regeneration: Ischemic heart disease

**Possible starting month(s):**

Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
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**Possible duration in months:**

1	2	3	4	5	6	7	8	9	10	11	12
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**Suitable for students in:**     Bachelor level     Master level

**Prerequisites:**

An interest in basic research is a pre-requisite and some background knowledge in cardiovascular (patho)physiology is needed to finish a project successfully.

For bachelor students, the internship should last a minimum of six months. For master students, the minimum is four months.

**Description:**

In my research group, we focus on stimulating cardiac regeneration, thereby using approaches that can lead to improved recovery of cardiac tissue upon injury and improve the diagnosis of acute myocardial damage. In recent years, we identified miRNAs that can push cell lineage specifications and how we could improve progenitor cell transplantation, specifically improving local delivery and cell retentions. This was in close collaborations with Domian (Harvard), Sussman (San Diego State University), and Mercola (Sanford Burnham Medical Research Institute). My group substantially improved cell delivery to the myocardium, from which we also realized that most of the injected cell action was due to the potential paracrine actions. My group has therefore started to study the use of secreted exosomes by these cells as a novel approach to induce cardiac repair and aim to create a potential of-the-shelf therapy.

We have also identified several microRNAs that could be used as a direct therapeutic after myocardial damage has occurred. Among them, miR-100 (Circulation 2011) and miR-214 for angiogenesis (CardioVascRes 2012), and miR-25 for heart failure (Nature 2014). These potent targets need smart delivery strategies to prevent side-effects; this directly lead me to initiate the BMM-LUST program that uses nano-medicine for targeted delivery. BMM-



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LUST made use of polymer-based delivery routes; the next leap in targeted delivery, I believe, lies in a natural carrier system. At this stage these polymer-based delivery routes are easily outperformed by the natural carrier system that transport biologicals between cells, called exosomes. My enthusiasm for introducing innovative molecular approaches and new therapeutic strategies, and my wide experiences in progenitor cell biology and preclinical animal model testing for cardiac injury will ensure that this research can go quickly from basic discoveries to preclinical testing in patient relevant animal models.

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**Faculty and/or Department:**  
Faculty of Medicine, Department of Cardiology

**Contact person, including position:**  
Charlotte Brand, coordinator Honours College

**Contact email:**  
honourscollege@uu.nl

**Deadline for nomination to reach host university:**  
ongoing

**Notification of admission given by the end of:**  
Three weeks after application



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