

# Focus of research group (I)



Heart Failure & Arrhythmias



Pulmonary Hypertension  
& Thrombosis



Atherosclerosis  
& Ischemic Syndromes



Diabetes & Metabolism



Microcirculation

**Staff members:** Coert Zuurbier (PI), Nina Hauck, Benedikt Preckel (PI), Markus Hollmann (PI)

**Location:** LEICA, Anesthesiologie, AMC

**Size of research group:** 2-3 PhD, 2 technicians, 2 senior researcher and 4-8 MSc/BSc students/year

## **Mission:**

Understanding + therapeutic treatment of **acute ischemic injury**

## **Vision:**

Mitochondrial damage (CM + EC) constitutes acute cardiac I/R injury

## **Aims:**

Unraveling molecular mechanism of mito-damage (mito-HKII, metabolism)  
Developing multimodal mito-I/R therapy in a clinical setting

Approach: studying drugs effects and mechanism at the level of:  
a) cardiomyocyte, b) different endothelium cell, b) intact heart,  
c) intact animal, d) human tissue

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## Current expertise

- Keeping hexokinase II at the mitochondria (mitoHKII) is the crucial event  
↑ mitoHK → ↓ cell death, metabolic remodelling (↑glycolysis ↓ OXPHOS)  
*Smeele Circ Res 2011; Smeele Circ Res 2011; Nederlof Circ Res 2013*
- *Therapy needs to be tested in presence of propofol, P2Y12 inhibitors, aged/diabetic status, opiates, duration of ischemia*
- *The role of Caveolin (1 and 3) in protection against IR injury in endothelial cells; interaction with hexokinase?*

## Current funding

- EU cardioprotection COST action (core member)
- Chinese Scholarship Council
- Alliance Vumc-AMC (OOTB)
- Chinese Scholar Council
- DAAD, German Academic Exchange Service

# Future plans



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## Short term (1-2 year) plan

- Discover the most strongest protective agents/therapies
- Check effectiveness in clinical conditions (anesthetics, anti-coagulants, co-morbidities, co-medications)
- Combine into multimodal therapie with strongest protection

Necessary infrastructure:

Isolated heart platforms, metabolomics  $^{13}\text{C}$  heart, in vivo mouse/rat heart function/metabolism (small animal MRI/PET), animal facility

## Long term (>2 year) plan

Plan: first clinical trials in CABG patients and AMI patients

Necessary infrastructure:

## Collaborations:

Clinical Anesthesiology, AMC (Preckel, Hollmann)

Exp. Cardiology, AMC (Baartscheer, Coronel)

Lab Gen Metab Dis, AMC (Houtkooper)

University California, San Diego (HH Patel)

Cardioprotection in Clinic

Ions in cardiomyocytes

$^{13}\text{C}$  metabolism intact heart

GGO mice Caveolin