Focus of research group (I)

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
Focus of research group (II)

Current expertise

- Keeping hexokinase II at the mitochondria (mitoHKII) is the crucial event
  ↑ mitoHK → ↓ cell death, metabolic remodelling (↑glycolysis ↓ OXPHOS)

- 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

**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 $^{13}$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
- $^{13}$C metabolism intact heart
- GGO mice Caveolin