Focus of research group (I)

Name PI: Pieter Koolwijk and Victor van Hinsbergh
Department of Physiology, Amsterdam UMC, location VUMC
Size of research group: 5

Current mission, vision and aims

To investigate the interaction of endothelial cells and tissue cells in de 3D microvessel flow system at physiological conditions.
Focus of research group (II)

Current expertise

- Vascular aspects of Tissue Engineering
  - Human microvascular endothelial cells
  - Angiogenesis models (in vitro)
  - 3D in vitro microvessel flow model
- (longterm) Hypoxia/normoxia/hyperoxia and metabolism
- Interaction cardiac MVEC and cardiomyocytes

Current funding

- **RECONNECT-CVON**: Effect of renal drivers on the microvasculature of the heart and the development of HFpEF.
But realize that culturing of cells at 20% O2 is HYPEROXIC and NONPHYSIOLOGIC.

All is relative …

For every cell you have to define what oxygen tension will be physiologic.

What is hypoxia, normoxia and hyperoxia?

This is hypoxia!
Study effect of hypoxia in endothelial cells
Focus of research group (II)

Current expertise

- Vascular aspects of Tissue Engineering
  - Human microvascular endothelial cells
  - Angiogenesis (in vitro)
  - 3D in vitro microvessel flow model
- (longterm) Hypoxia/normoxia/hyperoxia and metabolism
- Interaction cardiac MVEC and cardiomyocytes

Current funding

- **RECONNECT-CVON**: Effect of renal drivers on the microvasculature of the heart and the development of HFpEF.
Schematic representation of the proposed relation between renal dysfunction and HFpEF
Future plans

Short term (1-2 year) plan
Plan:
- unraffle mechanism(s) of the effect of endothelial cells on cardiomyocyte function(s) (RECONNECT)
- Further development of the 3D microvessel flow model

Necessary infrastructure:
- Present within the department of Physiology

Long term (>2 year) plan
Plan:
- Study the interaction between endothelial cells and tissue cells (SMC, cardiomyocytes, ....) in the 3D microvessel flow model.

Necessary infrastructure:
- 3D quantification system of the 3D microvessel flow model

Collaboration in ACS
- Mark Vervloet – Nephrology, VUMC (hypoxia and FGF-23 expression)
- Jolanda van der Velden / Walter Paulus – Physiology, VUMC (RECONNECT)
- Coert Zuurbier - Department Anesthesiology, AMC (RECONNECT)
- Elga de Vries / Ruud Fontijn – MCBI, VUMC (3D in vitro vessels)
- Rob Wüst - Biomedical Engineering and Physics, AMC (hypoxia and metabolism)
Heart Failure & Arrhythmias

Pulmonary Hypertension & Thrombosis

Atherosclerosis & Ischemic Syndromes

Diabetes & Metabolism

Microcirculation

Structures in collagen

Perfusion through vessels