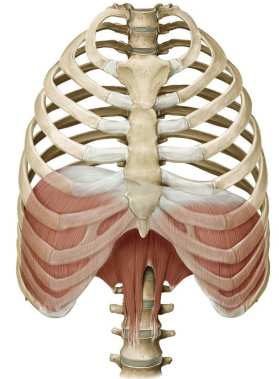# Focus of research group

Name PI: Leo Heunks
Dept: ICU, location VUmc
Research group: 6 PhDs,
                ±5 (inter)n'l students

Mission:
- To prevent and treat critical illness associated diaphragm dyfunction by

    understanding the mechanisms of disease

Vision:
- No patient ventilator-bound due to critical illness associated diaphragm weakness

0   Breathing effort   ∞

Aims:
- Develop & validate tools to monitor diaphragm effort
- Develop diaphragm protective ventilation strategy (prevention)
- Develop therapeutic interventions

Heart Failure & Arrhythmias

Pulmonary Hypertension & Thrombosis

Atherosclerosis & Ischemic Syndromes

Diabetes & Metabolism

Microcirculation

Focus of research group

Current expertise

- **Diaphragm muscle function in ICU patients**
  - Transdiaphragmatic pressure
  - Electromyography (esophagus and surface)
  - Ultrasound (conventional)
  - MRI, high spatial / temporal resolution (Tim Marcus)

- **International network**
  - Co-chair WEAN SAFE executive committee
  - Visiting professor Zhejiang University, School of Medicine, Hangzhou
  - Canada

Current funding
- ACS: PhD and out of the box grants
- European Respiratory Society: CRC grant
- Ventfree (USA)
- Orion pharma (Finland)
- Pulmotech (NL)

Heart Failure & Arrhythmias

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Future plans

Heart Failure & Arrhythmias

Pulmonary Hypertension & Thrombosis

Atherosclerosis & Ischemic Syndromes

Diabetes & Metabolism

Microcirculation

Short term (1-2 year) plan

- Ultrasound (tissue doppler imaging / speckle tracking)

- Dynamic MRI in ventilator ICU patients: PEEP

- Multicenter RCT levosimendan (?)

- Intensify collaboration with Chinese centers

Necessary infrastructure:
- Advanced ultrasound (expertise needed)

- Expertise in MRI image analysis (in progress)

- Animal facility (collaboration China?)

Long term (>2 year) plan

- Diaphragm expertise center (clinical/pre-clinical; **not limited** to critically ill)

Necessary infrastructure:
- Support from UMC board

- Imaging (ultrasound / MRI / PET tracers for perfusion/metabolism)

Collaboration in ACS

Vumc: Coen Ottenheijm; Tim Marcus

AMC: Janneke Horn & Marcus Schultz; Gustav Strijkers & Aart Nederveen; Jeroen Hutten