# Atrial Fibrillation

## GUIDE - Dept of Cardiology, Electrophysiology (Prof. dr. Isabelle C. van Gelder, Dr. Alexander H. Maass)

**Department of Cardiology**

The research program of the Department of Cardiology is aimed to gain new insights into the pathophysiology of heart failure (HF) and atrial fibrillation (AF) and to develop new treatment strategies for these diseases. The experimental section of Electrophysiology focuses on AF and the combination of AF and HF, via investigating cellular mechanisms of atrial remodeling.

## BACKGROUND

Atrial fibrillation (AF) is the most common cardiac arrhythmia. It is expected that by 2050 over 1 million people in The Netherlands will suffer from AF. AF poses an important clinical problem, being responsible for substantial economic costs, morbidity and mortality.

**Atrial changes**

Before the onset of AF, structural changes have taken place in the atria due to underlying diseases, such as hypertension and heart failure. This is called atrial remodeling. Atrial remodeling further deteriorates once AF develops. Atrial remodeling includes structural changes, changes in electrophysiology and changes in contractility

**Initiation of AF**

For AF to occur, triggers, e.g. premature atrial electrical activity, are needed besides (structural) remodeling. The combination of remodeling and triggers maintains AF.

**Consequence of AF**

AF can result in heart failure, tromboembolic complications (e.g. stroke), and doubles mortality.

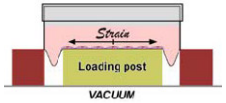
**Treatment**

AF is first targeted using so called rhythm control, i.e. prevention of AF. Outcome, however, is poor. Upstream therapy, targeting structural remodeling might be more effective in maintaining sinus rhythm.

## METHODS

**Stretch – *in vitro***

AF underlying diseases often induce stretch. We investigate the effects of stretch on atrial cardiomyocytes. In addition, we study the mechanisms of these effects and we try to inhibit stretch-induced effects.

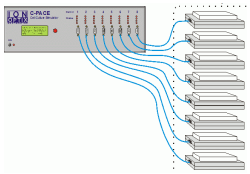


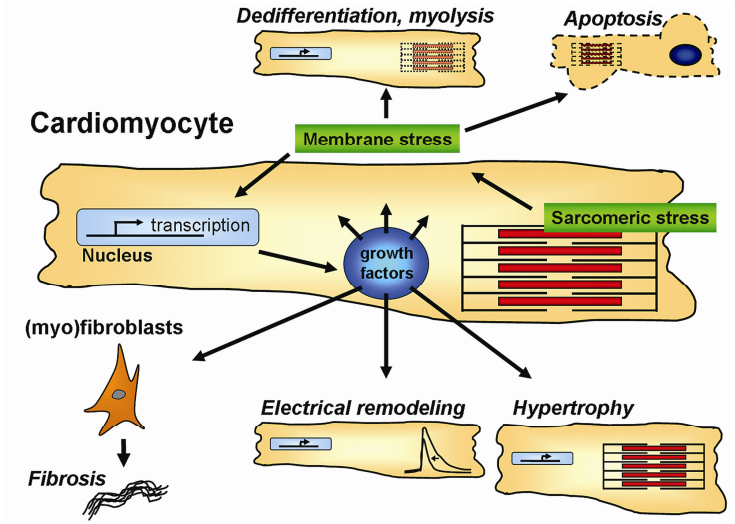

**Stretch – *in vivo***

In the near future a project will start in which mice are subjected to atrial and ventricular pressure overload. Atrial structural remodeling as well as AF vulnerability will be investigated in this *in vivo* model.

**Pacing**

The effects of electrical stimulation are explored, as well as the mechanisms and effects of known and new drugs.

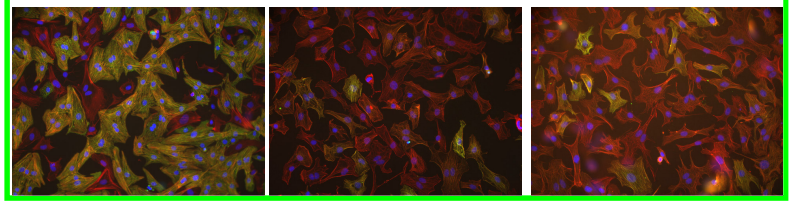



**Celltypes**

Atrial and ventricular cardiomyocytes and fibroblasts

Green: cardiomyocytes
Red: fibroblasts

Red: fibroblasts
Green: myofibroblast



Students can start off with a 'Try-Touch-Teach' project in one of the research topics shown above. The section of Electrophysiology also offers possibilities to expand these projects to 'Pilot' JSM projects and MDPhD-program.

## CONTACT

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