A new device for determination and the analysis of the coronary wall shear stress signal

**R&D tasks:** The aim of this piece of research is to understand better the activity of the circulatory system and to fight more efficiently against diseases such as arteriosclerosis. The main task was to design an in vitro test chamber system that aims to test endothelial cells submitted to haemodynamic blood conditions.

**Stages of the interdisciplinary R&D**

**In vivo data analysis**

**In vivo measurements of pressure and velocity**

**Medicine**

**Pharmacology**

**Engineering**

**Interdisciplinary R&D**

**Electronics & Automatics**

**Mathematical modelisation**

**Mechanics**

**Experimental in vitro system**

Test of the behaviour of a stent and of endothelial cells with an in vitro test chamber

**Determinations of the derived information:** above 3D velocity profiles, below shear stress

**Concept of the in vitro chamber in order to imitate haemodynamic pulsatile flows**

**Behaviour of the in vitro system and comparison with prescribed in vivo data**

**Conclusions:** The objective was to show the system that was built in order to imitate the flow rate close to realistic *in vivo* pulsatile conditions. Each part of the process is presented such as simulations, performance and measurements of in vivo data until the flow rate control. The presented system is currently working at the CHU Hospital in Charleroi.