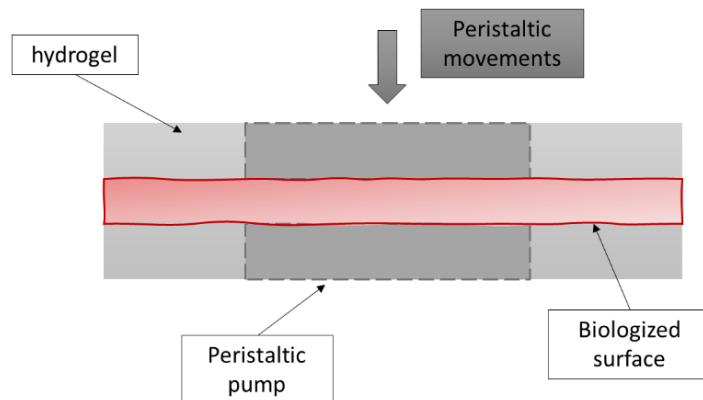


Development of a peristaltic hydrogel pump for integration in cardiovascular circulation model

Masters Thesis Announcement

Background

Prior to their clinical application implants for treating vascular diseases are investigated regarding their mechanical and fluid-dynamic behavior. For this purpose, vascular models are connected to a circuit that can simulate physiological flow and pressure conditions. Usually, roller pumps are used to drive the blood. However, these pumps deliver relatively high volumes and can damage the erythrocytes due to the pressure. In addition, the blood along the tubing is in contact with a material that does not mimic the physiological properties of internal vessel walls. Consequently, the BMT is striving to develop a pump that avoids these disadvantages.



Aim

The aim of this work is to develop a peristaltic pump with minimized blood contact surface. The pump should be made of hydrogel, due to its high biocompatibility. Firstly, the technical and biological requirements are to be defined after an extensive literature research and discussions with the biology team. Different pump concepts are to be designed and then evaluated. The flow behavior within the pump is to be investigated by means of simulations. It should be ensured that the pump can be controlled and monitored via LabView. The validation of the pump is then to be carried out by means of ultrasonic measurements.

Literature research → Design → Evaluation → Simulation →
Manufacturing → Commissioning → Validation → Written thesis

Start:
immediately

Supervisors:

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