ProMatLeben Polymere

GEFÖRDERT VOM Bundesministerium für Bildung und Forschung

FACTSHEET

The Research Consortium PolyKARD

Synthesis of a Biomimetic Pericardial Polymer for Cardiac Applications

Project Details

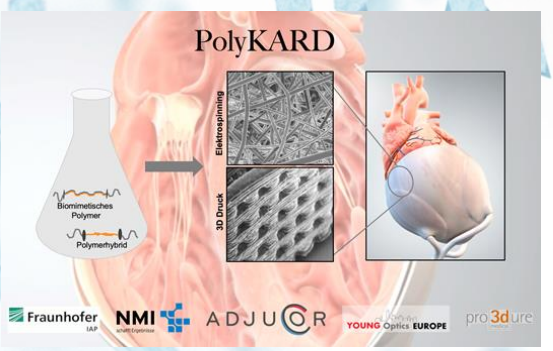

Figure: Representation of an artificial pericardium for the cardiac support system. (Source: AdjuCor GmbH)

Project Focus

Heart, polymers, electrospinning, biocompatibility, GMP

Coordination

Prof. Dr. Stephen Wildhirt,
AdjuCor GmbH

Project Duration

01.03.2019 - 28.02.2022

Project Description

The heart sac, also called the pericardium, surrounds the heart and is made of an elastic yet mechanically extremely stable material. Due to its unique properties, endogenous or **prepared pericardium of animal origin** has long served as a reinforcing and sealing material in heart surgery. In long-term use, **calcification and hardening of the material** can be observed. This explains, for example, the **limited durability** of biological heart valve prostheses.

The aim of this project is to research a material (more precisely: polymer) that is able **to mimic** the demanding mechanical properties of the **natural pericardium as closely as possible**, is equally biocompatible and has **unlimited biostability** in long-term application.

To achieve this, two different polymer approaches and two different manufacturing processes are being investigated. In all cases, **GMP-compliant** manufacturability is ensured at an early stage. A first preclinical application of these new materials planned in this project will be the **surface of an extravascular** (i.e. no intervention in the blood vessel system is necessary) **cardiac support system**. The novel **hybrid pericardial materials** to be researched in this project could also be used in many other medical areas, for example in the construction of heart valves, blood vessel prostheses or as a replacement for meninges in neurosurgery.

Partners of the Research Consortium and Project Tasks

AdjuCor GmbH (FKZ: 13XP5087A)
Construction of heart support system, preclinical tests.

Pro3dure (FKZ: 13XP5087B)
Polymer resin synthesis and GMP compliant upscaling.

Young Optics Europe (FKZ: 13XP5087C)
3D printing system for biocompatible materials.

Naturwissenschaftliches und Medizinisches Institut (FKZ: 13XP5087D)
Electrospinning of carrier substrates and polymer characterization.

Fraunhofer IAP (FKZ: 13XP5087E)
Research into a biomimetic or hybrid polymer material.