

Biocompatible and resorbable polylactic acid (PLA) based elastomers for 3D-printing of medical devices

Technology offer - POD reference: TOFR20220303002

Short summary

A French academic laboratory has developed an innovation that finds applications in the health field, especially in medical devices. The proof of concept of a bioresorbable material with elastomer properties has been made (TRL3). This polylactic acid (PLA) based material can be processed by 3D-printing or electrospinning to build the desired shape. Companies in the device medical sector are sought to co-develop an innovative bioresorbable device to make their new product a success on the market.

Full description

Elastomers (thermoplastic or thermoset) are largely present in modern medical devices. Thermoset elastomers are limited in use as they are:

- not degradable
- produced by curing low molecular weight pre-polymers which limits the range of achievable mechanical properties
- shaped before curing which limits their applicability for 3D-printing

A French academic laboratory has developed a solution to produce a new polymer which belongs to a family of polyesters based crosslinkable star-shaped copolymers. This innovation yields resorbable elastomers and is applicable to classical and 3D-printing shaping process.

The project is supported by a French Technology Transfer Office (TTO) dedicated to speeding up the transfer of technologies from academics to companies. Consequently, the TTO brings funds to the laboratory besides the company to bear the risk of such innovative development.

The research team is seeking manufacturers of medical devices to co-develop the products based on this new material. As the team has the expertise and know-how on the material, the partner brings his competences to develop the device.

Advantages and innovation

Benefits are :

- Versatility : copolymer composition can be tuned to needs to meet the required degradation times and/or mechanical properties.
- Crosslinking efficiency: the star-shape topology offers higher functionality and enhanced crosslinking efficiencies.
- Enlarged process compatibility: the star-shape topology allows the use of high molecular-weight pre-polymers that are compatible with 3D-printing (FDM, SLA, DLP) and electrospinning process.
- Degradable and cytocompatible elastomers.

Stage of development

Under development

IPR status

IPR granted

Sustainable Development Goals

Goal 17: Partnerships to achieve the Goal

Goal 12: Responsible Consumption and Production

Goal 3: Good Health and Well-being

Partner sought

Partner sought are medical devices manufacturers. The partner is expected to bring technical needs for the development of medical devices that could benefit from the specific properties of this polymer. Since the laboratory has expertise in the material, the next step is the development of a medical device that could be processed by standard engineering including electrospinning or by 3D-printing. The co-development of a product means the partner to be involved in every stage of the project by sharing expertise for industrial development, testing characteristics of the device according to the regulation, hosting some experiments, etc... There is, however, some flexibility in the way the cooperation is set up.

The company must be interested by the commercial exploitation of the product as the purpose is to license the patent to the company.

This collaboration is an opportunity for the company to benefit from an exclusive exploitation of an innovative biopolymer in a competitive sector.

Type of Partnership

Research and development cooperation agreement

Type and size of the partner

SME 11-49

Big company

SME 50 - 249

Dissemination

Market keywords - (up to 5)

05003003 - Surgical implants

08001009 - Speciality/performance materials: producers and fabricators

08001018 - Polymer (plastics) materials

Technology keywords - (up to 5)

02007014 - Plastics, Polymers

02007020 - Biobased materials

06001013 - Medical Technology / Biomedical Engineering

06001024 - Medical Biomaterials

06006004 - Biopolymers

Targeted countries

All countries