# Supramolecular polymers—a possible biomaterial for artificial human parts

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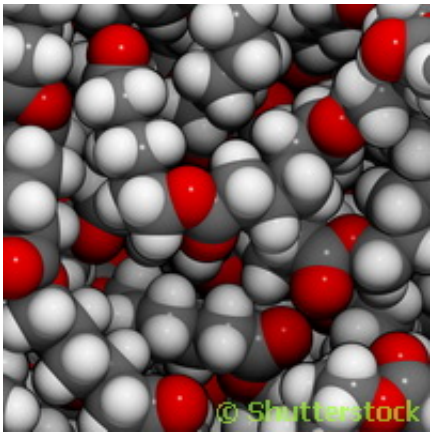


EU researchers are on the way to making parts of a bioartificial kidney out of a novel polymer - which could reduce the risk of transplants being rejected by the human body.

Biomaterials can be inserted in the human body to replace or support a biological function, allowing patients to live longer. However, their use is still limited because they fail to fully integrate with living cells and tissues - leading to possible rejection.

The EU project SUPOCOSYS ('From supramolecular polymers to compartmentalized systems') is attempting to solve the problem by investigating a novel material that can be used to design, synthesise and

self-assembly biomaterials that dynamically adapt their properties to human cells. Using these adaptable materials, parts of a bioartificial kidney will be made to demonstrate the material's properties.

Other medical applications could include improving dialysis treatment, reducing transplant rejection or applying as innovative sutures.

Led by Dr Egbart Willem Meijer, a researcher at the Technische Universiteit Eindhoven in the Netherlands who received a European Research Council (ERC) grant in 2009, the project's team is focusing on the formation of supramolecular polymers - systems comprised of macro-molecules, joined by specific bonds, which control their assembly and behaviour.

Supramolecular polymers are random or entangled coils, with plastics and elastomers as mechanical properties. They have the ability to process, recycle and self-heal, and are created through self-assembly.

They are also unique in that they can be processed at low temperatures and then manipulated without difficulty. Meijer is exploiting these assets to further enhance the materials and introduce more complex functionalities to supramolecular systems.

Over the course of the five-year project, scheduled to end in March 2015, the researchers are designing, synthesising and self-assembling materials of the supramolecular polymers, whose properties are adapted by external stimuli.

In cooperation with Dr Patricia Dankers, also of Technische Universiteit Eindhoven and who received an ERC Starting grant in 2012, Dr Meijer's team will produce parts of a prototype bioartificial kidney, which could result in improved dialysis techniques or a portable dialysis apparatus. Their work also has the potential to improve the success rate of

transplants by reducing the risk of rejection.

By introducing this new class of materials, Meijer succeeded in showing how polymers have good and unique materials properties despite being linked by weaker interactions instead of long chains.

SUPOCOSYS is funded under the European Research Council's Ideas Programme, with a EUR 1.95 million advanced grant designed for scientifically independent researchers with a profile that identifies them as leaders in their respective research fields.

In 2011 the project also received a grant, worth up to EUR 150 000, designed to help ERC-funded blue sky research bridge the gap between their research and the earliest stage of a marketable innovation. The project aims at analysing the commercialisation of the technology on the market.

**More information:** cordis.europa.eu/projects/rcn/93962_en.html

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