Developing human organs and body parts in the lab

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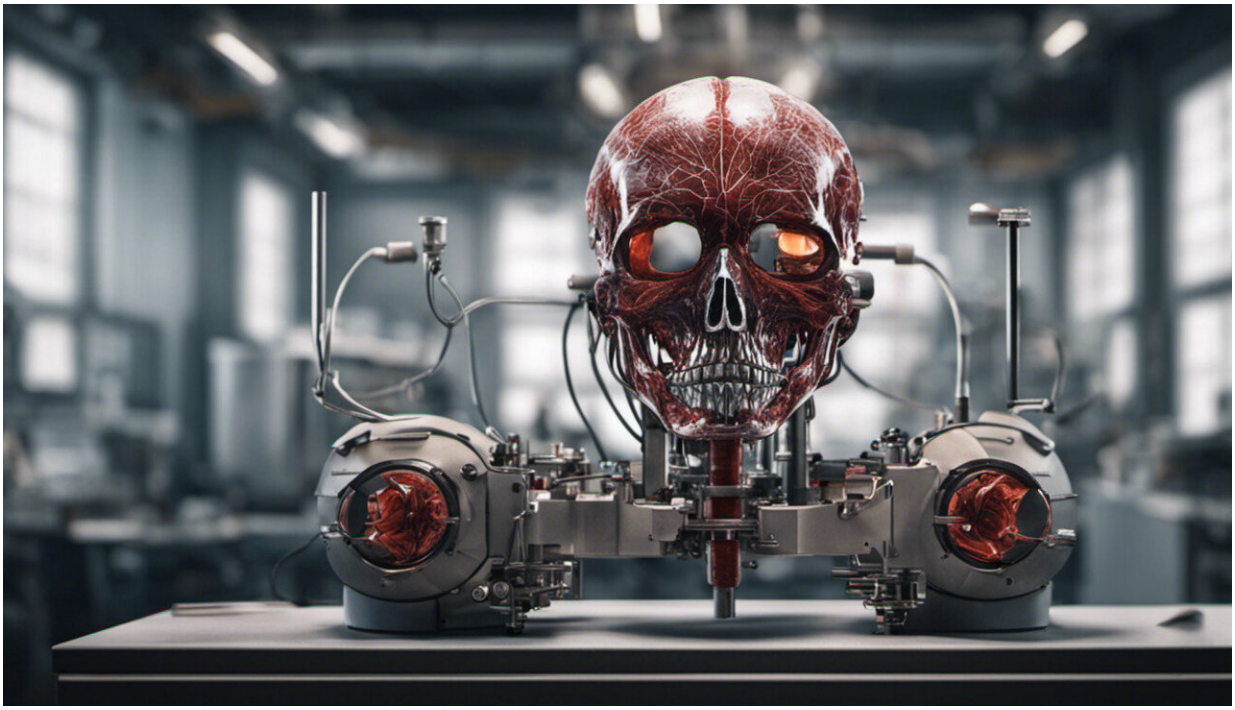

Credit: AI-generated image (disclaimer)

Tissue engineering is making a huge impact in the world of science with artificial scaffold structures, in which new cells are encouraged to grow. This means that the nanostructure of tissues in the body can be mimicked, so that human organs and body parts can be developed in the laboratory.

Leading this research is Professor Molly Stevens from the Imperial College, London, who has previously been voted one of the world's top 100 scientific innovators under the age of 35. Her area of expertise lies in nanomaterials and biological systems and seeing how they converge, in particular how replacement bones can be grown by using smart polymer systems.

To do this Professor Stevens has assembled a multidisciplinary team - encompassing engineering, biology, chemistry and physics for the NATURALE project ('Bio-inspired Materials for Sensing and Regenerative Medicine'), with support from a European Research Council (ERC) starting grant of EUR 1.6 million.

The team's innovative approach to tissue engineering has proved successful in engineering large quantities of human mature bone for autologous transplantation, as well as other vital organs such as liver and pancreas, which have proven elusive with other approaches.

This has led to moves to bring the idea closer to the market with additional 'Proof of Concept' funding from the ERC and the setting-up of clinical trials for bone regeneration in humans. The team have also developed synthetic versions of nanostructures and are making progress with improving cell growth for tissue regeneration. There have also been significant advances in improving bio-sensing technologies for the monitoring of enzymes and other bio-chemicals.

Furthermore their developments are believed to have an impact on many clinical applications, particularly in the early detection of diseases ranging from cancer to HIV. Tests have been done using human samples from HIV positive patients, which offers a much simpler naked eye based read-out as it is ten times more sensitive than any identification used to date. This could be commercialised in the near future. The results of the project have been published in *Nature Nanotechnology*.

Professor Stevens believes that her research group's success lies in a focus on high quality innovative work and the group's multidisciplinary nature, resulting in a number of new exciting ideas, which are emerging all the time. She is particularly excited about seeing a number of therapies she is working on, which will help patients in the future.

Provided by CORDIS