

Researchers discover first fully synthetic substrate with potential to grow billions of stem cells

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If you experience a major heart attack the damage could cost you around five billion heart cells. Future stem cell treatments will require this number and more to ensure those cells are replaced and improve your chances of survival.

Experts at The University of Nottingham have discovered the first fully synthetic substrate with potential to grow billions of stem cells. The research, published in the academic journal *Advanced Materials*, could forge the way for the creation of 'stem cell factories' - the mass production of human embryonic (pluripotent) stem cells.

The £2.3m research project, 'Discovery of a Novel Polymer for Human Pluripotent Stem Cell Expansion and Multilineage Differentiation', was led by Morgan Alexander, Professor of Biomedical Surfaces in the School of Pharmacy and Chris Denning, Professor of Stem Cell Biology in the School of Medicine and funded by the Engineering and Physical Sciences Research Council (EPSRC). The material could provide an off-the-shelf product for clinical use in the treatment of the heart, liver and brain.

Professor Alexander, Director of the Interface and Surface Analysis Centre, and his team have been searching for polymers on which human pluripotent stem cells can be grown and differentiated in vast numbers - billions at a time.

Professor Alexander said: "The possibilities for regenerative medicine are still being researched in the form of clinical trials. What we are doing here is paving the way for the manufacture of stem cells in large numbers when those therapies are proved to be safe and effective."

Billions of stem cells are needed as trials move into second phase

Using a high throughput materials discovery approach the research team has found this man-made material, free from possible contamination and batch variability.

Professor Denning, whose field is in cardiac stem cell research, said: "The field of regenerative medicine has snowballed in the last five years and over the coming five years a lot more patients will be receiving stem cell treatments. Clinical trials are still in the very early stages. However, with this kind of product, if we can get it commercialised and validated by the regulators it could be helping patients in two to three years."

Conditions of the heart, liver and brain are all under investigation as possible new stem cell treatments. People are already receiving stem cells derived eye cells for eye disorders.

These new materials have shown great promise in the laboratory. The research team now needs a commercial partner to test this lab based discovery on an industrial scale.

Source:

University of Nottingham
