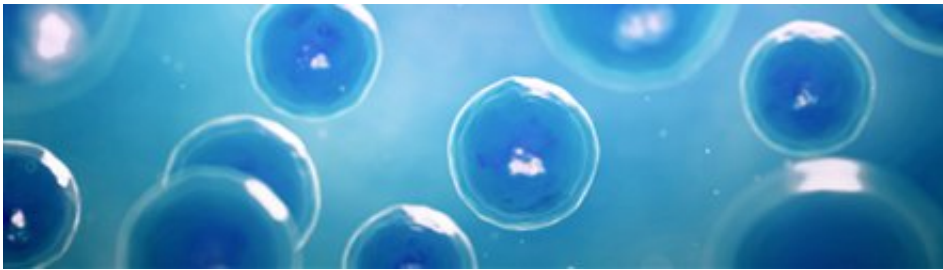


Major breakthrough in stem cell manufacturing technology

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Scientists at The University of Nottingham have developed a new substance which could simplify the manufacture of cell therapy in the pioneering world of regenerative medicine.

Cell therapy is an exciting and rapidly developing area of medicine in which [stem cells](#) have the potential to repair human tissue and maintain organ function in chronic disease and age-related illnesses. But a major problem with translating current successful research into actual products and treatments is how to mass-produce such a complex living material.

There are two distinct phases in the production of stem cell products; proliferation (making enough cells to form large tissue) and differentiation (turning the basic stem cells into functional cells). The material environment required for these two phases are different and up to now a single substance that does both jobs has not been available.

Now a multi-disciplinary team of researchers at Nottingham has created a new stem cell micro-environment which they have found has allowed both the self-renewal of cells and then their evolution into cardiomyocyte (heart) cells. The material is a hydrogel containing two polymers—an alginate-rich environment which allows proliferation of cells with a simple chemical switch to render the environment collagen-rich when the cell population is large enough. This change triggers the next stage of cell growth when [cells](#) develop a specific purpose.

Professor of Advanced Drug Delivery and Tissue Engineering, Kevin Shakesheff, said:

"Our new combination of hydrogels is a first. It allows dense [tissue](#) structures to be produced from human [pluripotent stem cells](#) (HPSC) in a single step process never achieved before. The discovery has important implications for the future of manufacturing in [regenerative medicine](#). This field of healthcare is a major priority for the UK and we are seeing increasing investment in future manufacturing processes to ensure we are ready to deliver real treatments to patients when HPSC products and treatments go to trial and become standard."

More information: The research, Combined hydrogels that switch human pluripotent stem cells from self-renewal to differentiation, is published in the *Proceedings of the National Academy of Sciences* (PNAS). www.pnas.org/content/early/2014/03/26/1319685111

Provided by University of Nottingham

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