Can micro-scaffolding help stem cells rebuild the brain after stroke?

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Inserting tiny scaffolding into the brain could dramatically reduce damage caused by strokes the UK National Stem Cell Network Annual Science Meeting will hear today. With funding from the Biotechnology and Biological Sciences Research Council (BBSRC) neurobiologists from the Institute of Psychiatry and tissue engineers from The University of Nottingham have joined forces to tackle the challenge of tissue loss as a result of stroke.

Speaking at the conference in Edinburgh, Dr Mike Modo from the Institute of Psychiatry will explain how combining scaffold microparticles with neural stem cells (NSCs) could regenerate lost brain tissue.

Strokes cause temporary loss of blood supply to the brain which results in areas of brain tissue dying — causing loss of bodily functions such as speech and movement. Neural Stem Cells offer exciting possibilities for tissue regeneration, but there are currently major limitations in delivering these cells to the brain. And while NSC transplantation has been proven to improve functional outcomes in rats with stroke damage little reduction in lesion volume has been observed.

The research is being carried out by Dr Mike Modo and Professor Jack Price from the Institute of Psychiatry and Professor Kevin Shakesheff from The University of Nottingham.

Their findings are being presented at the UK National Stem Cell

Network Inaugural Science Meeting at the Edinburgh Conference Centre on 10 April 2008. The conference is a showcase of the best and latest UK stem cell science across all stem cell disciplines.

Working with rats, Dr Modo and his team are developing cell-scaffold combinations that could be injected into the brain to provide a framework inside the cavities caused by stroke so that the cells are held there until they can work their way to connect with surrounding healthy tissue.

Dr Modo explains: "We propose that using scaffold particles could support NSCs in the cavity to re-form the lost tissue and provide a more complete functional repair. The ultimate aim is to establish if this approach can provide a more efficient and effective repair process in stroke."

Kevin Shakesheff, Director of The University of Nottingham's new £25m Centre for Biomolecular Sciences and Professor of Tissue Engineering in the School of Pharmacy, said: “Within the body our cells function within tightly controlled 3D architectures. Our scaffolds can recreate some of the architectural features and thereby protect the cells and help them to integrate and function."

The team hope their work will pave the way for NSCs to be successfully used in clinical settings to re-develop parts of the brain damaged by stroke and neurodegenerative diseases.

Source: University of Nottingham

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