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Stem cells could repair brain damage



Brain tissues were studied following post mortem

Immature cells from bone marrow are able to travel to the brain and become fully functioning brain cells, scientists have found.

They believe the findings could eventually inspire novel treatments for brain trauma and diseases such as Alzheimer's and Parkinson's.

“Adult stem cells could some day be used to replace neural elements lost to neurodegenerative diseases, stroke, or trauma.”

Dr Eva Mezey

A team from the US National Institute of Neurological Diseases and Stroke examined post mortem samples from female patients who had received bone marrow transplants from male donors.

Scientists searched brain tissue for cells containing the Y-chromosome which is only found in male cells, and therefore must have come from the donor.

Cell clumps

Each of the patients examined was found to have many brain cells containing the Y-chromosome.

The Y-positive cells were found in clumps, suggesting that the original donor cells had continued to multiply after differentiating into brain cells.

Previous research has suggested that donor bone marrow stem cells can migrate throughout the body in the bloodstream, differentiating into various cell types - but this work was carried out on animals.

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Repairs

The researchers suggest that developing a way to direct these stem cells into areas where neurons are damaged or diseased could help repair the brain.

Lead researcher Dr Eva Mezey told BBC News Online: "We have had trouble convincing some members of the scientific community that this could happen, and as I see it, accepting this idea is the first step towards accepting the suggestion that adult stem cells could some day be used to replace neural elements lost to neurodegenerative diseases, stroke, or trauma.

"For now, there seems to be more enthusiasm for studying embryonal than adult stem cells, but the former could be hard to obtain in the numbers needed for clinical applications.

"Adult stem cells, on the other hand, could be harvested from patients themselves."

Dr Mezey admitted that at present there was no evidence that bone marrow cells can repair damage in the human brain.

"We need to determine how cells in the blood enter the brain, how to induce them to enter the brain in larger numbers, how to promote their differentiation into neurons and how to target them to areas of need."

She also said there was a possibility that introducing new cells into the brain ran a risk of also introducing harmful elements such as viruses at the same time.

It was also possible that the cells would trigger a harmful immune reaction.

Dr John Yu, an expert in stem cell technology at the Cedars-Sinai Maxine Dunitz Neurosurgical Institute in Los Angeles, told BBC News Online that his team had already shown that brain cells could be made in the laboratory from bone marrow cells.

"By making neural cells in a petri dish, we may provide bone marrow cell with the environment to be made into neurons more efficiently, thereby allowing us to treat diseases such as stroke, Alzheimer's and brain tumours.

"This paper shows that what we were able to do in an artificial setting already appears to be

utilized in nature. This gives us more encouragement that bone marrow derived neural stem cells may be made into a viable therapy."

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