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Stem cell transplant boost



Research was carried out into stem cells

Scientists have found a particular type of stem cell which may be more suitable for transplantation into humans.

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Stem cells are the body's "master cells" - and doctors hope to use them to create a wide variety of tissue for transplantation.

However, transplanting stem cells or stem cell derived tissue from one individual to another is problematic because of the likelihood of rejection.

However, transplanting this type of cell, to the surprise of the researchers, did not create this effect.

In animal experiments, even transplants between different species did not cause a problem.

The findings could mean stem cells could be transplanted between adult humans without the worry of rejection.

The cells involved in the research by Osiris Therapeutics in Baltimore, America, and the Dana Farber Cancer Institute in Boston are mesenchymal stem cells (MSCs), which have the potential develop into muscle, cartilage, bone and several other tissues.

Even the researchers were surprised at the findings, which are reported in the New Scientist magazine.

“

What's being proposed is both plausible and exciting

”

Annemarie Moseley,
chief executive of Osiris

**Professor Nick Fisk,
Imperial College**

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Therapeutics in Baltimore, said: "It does go against our common understanding of the immune system."

The discovery could mean hospitals could have MSC 'banks', ready to transplant into patients.

Although people have their own reserves of these cells, the number reduces with age.

It is estimated enough can be grown from a single bone marrow donation to treat 10,000 people or more.

Reactions

The fear that the immune system will react to implanted stem cells is a major problem.

Some scientists are attempting to engineer stem cells which do not have the genes for the proteins on the cell surface that the immune system recognises and attacks.

But Osiris researchers say their work could mean other research is unnecessary.

They found MSCs from the bone marrow of adults do not carry the markers on their surface that lead to rejection.

A crucial point is that this is still true after the cells differentiate into specialised tissues such as bone or fat.

The company gave 100 people MSCs donated by members of their family, some of whom were poor matches

Some were cancer patients who needed new bone marrow to replace that destroyed by treatment. Cells are also being used in some to regenerate bone in the jaw.

The transplants have not been rejected, despite some being carried out as long as four years ago.

Even when researcher Ray Chiu of McGill University in Montreal transplanted the cells from pigs to rats, no reaction was triggered, according to unpublished research.

He has also shown that the MSCs seem to target the affected area.

Human trials

Tests in rats showed the cells went directly to the bone marrow.

But within hours of a heart injury, they went into the bloodstream and could later be found in the rat's hearts.

Dr Chiu said they turned into heart muscle blood vessels and fibrous tissue.

Osiris has found similar results in tests on pigs.

Human trials in patients who have had heart injuries could begin as early as next year.

MSCs could be used alongside, but not replace embryonic stem cells, say researchers.

However, there are concerns embryonic stem cells can turn into cancerous masses, something some studies have shown does not happen with MSCs.

Despite the emotional and ethical debate about using stem cells from embryos, MSCs may not be as versatile, and so research should continue into the use of both, say scientists.

'Confirmation'

Ravinder Maini, professor of rheumatology at Imperial College's Kennedy Institute, told BBC News Online: "These results are not an argument against working on all types of stem cells so we can increase our knowledge base."

Professor Nick Fisk, an expert in stem cells at Imperial College said Osiris were known for pushing back the boundaries in mesenchymal stem cell research.

"What's being proposed is both plausible and exciting."

He said the work did confirm scientists' belief MSCs may be unlikely to cause an immune reaction.

"What's more exciting is that even after these cells have turned into the bone, and different kinds of mature tissues, they still don't have these markers which can lead to rejection."

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