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Stem cells therapy 'may grow tissue'

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Cells were taken from fat deposits behind the kneecap

Scientists have developed a process using adult stem cells which could be used to grow replacement tissue for use in reconstructive surgery.

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The US team took small deposits of fat from behind the kneecap and "reprogrammed" them into functioning cartilage, bone and fat cells.

This approach may gain support because it offers an alternative to using controversial human embryonic stem cells for medical treatments.

Quinn Wickham, who co-ordinated the project, said: "In scientific terms, we have found a new source of adult stem cells that can be changed into different cells and tissues.

"On the clinical side, for example, it would be relatively easy for a knee surgeon to obtain some of these fat cells using a minimally invasive approach.

“
It is a new development and there will be a lot of cases for this kind of surgery in the future
”

Shanmuga Maheswaran, orthopaedic surgeon

"We could then grow cartilage custom-made for the individual to repair an injury in the knee with the patient's own tissue."

The fat pad is a dense structure behind the patella or kneecap that is unlike typical fat tissue found throughout the body, the researchers said.

Its function is not well understood but

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researchers know that it is metabolised much more slowly than subcutaneous fat.

Farshid Guilak, director of orthopaedic research at the Duke University Medical Center, which carried out the research, said this was an important development.

Clinical potential

He said: "This is another demonstration that adult stem cells are not necessarily locked into their current fate and furthermore, we can re-programme them into becoming other cell types.

"It is unlikely that one source of stem cells can be used to treat the wide variety of medical problems and diseases, but different clinical problems could be addressed by using adult cells taken from different spots throughout the body, without the same ethical concerns associated with embryonic stem cells."

The team took fat pads from patients whose knee joints were removed during total joint replacement surgery.

The samples were treated with a series of enzymes and centrifuged; the separated stromal cells were treated with a biochemical cocktail of different steroids and growth factors.

Orthopaedic surgeon at the North Tees and Hartlepool NHS Trust Shanmuga Maheswaran said this project opened up interesting possibilities.

He said: "It is a new development and there will be a lot of cases for this kind of surgery in the future.

"At the moment it is still experimental, but it will gradually become more and more common.

"The potential is there."

The success rate for cartilage surgery is about 50-60% using cartilage from another part of the knee to replace the damaged area.

"Transplanting a cultured cell should have a higher success rate," said Mr Maheswaran.

Mr Guilak suggests it may be five years before this approach becomes a clinical reality.

The research team is presenting its findings at

the annual meeting of the Orthopaedic Research Society in Dallas.

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