MEDIA RELEASE

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Handheld surgical 'biopen' repairs damaged cartilage in sheep

In a promising pilot study, researchers have shown that a handheld 3D printing pen can successfully print living cells in surgery to repair cartilage defects in sheep.

ARC Centre of Excellence for Electromaterials Science (ACES) Director Prof Gordon Wallace said the study is the culmination of four years of work in the laboratory for his multidisciplinary team and orthopaedic surgeons from St Vincent's Hospital, Melbourne.

"To our knowledge, this is the first time a handheld bioprinter has been used in surgery and the results are very promising, and bring us a step closer to human clinical trials" he said.

The device, the brainchild of orthopaedic surgeon Prof Peter Choong from St Vincent's Hospital, Melbourne, was designed to offer a solution for people at risk of developing osteoarthritis, a painful condition which occurs when there is damage to joint cartilage.

The biopen will allow a surgeon to make a bespoke implant to fit the exact size of the defect during surgery, using the patient's own cells to encourage cartilage regeneration.

It is less invasive and potentially more effective than current treatments.

The study involved operating on eight sheep, with one knee on each sheep repaired with the Biopen and another using a conventional method already used in humans.

"The results were exceptional, certainly better than expected. We found that the biopen performed markedly better in terms of quality and characteristics of new cartilage formation." said Orthopaedic surgeon Claudia di Bella, who ran the study.

"The main goal of the study was to test the translation ability of this technique and its applicability in the surgical field, and this was certainly achieved."

The biopen will become a valuable treatment option for patients with cartilage injuries, not only for pain relief, but also for a biological reconstitution of their joint, which would prevent or delay the onset of arthritis.

This type of work represents the perfect example where scientists and clinicians combine to provide bioengineering solutions for human disease.

The next step for the team is to look at the long term efficacy of the treatment in animal models.

The study was published in the journal of Tissue Engineering and Regenerative Medicine.

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