Researchers seek to improve techniques for joint defect treatment

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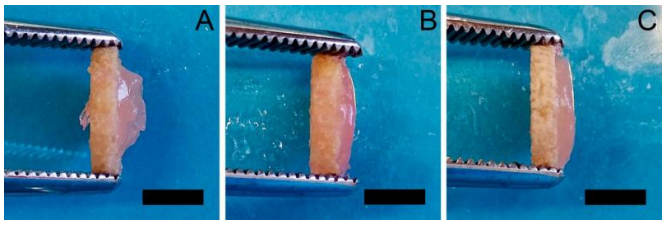

Laboratory grown cartilage tissue without mechanical stimulation (A), with one centrifugation per day (B) and three centrifugations per day (C). Credit: Juha Prittinen

Different surface topographies and materials provide interesting ways to study cell behaviour and potentially provide novel solutions for treating joint defects. Tissue engineering methods that simulate native cartilage could prove useful to create cartilage implants in the laboratory, according to a doctoral dissertation from Umeå University.

Together with research colleagues at the Department for Integrative Medical Biology, doctoral student Juha Prittinen has been investigating a tissue engineering method for replacing damaged cartilage.

"Our studies are not meant to be straight away applicable in the clinic, but rather to explore new tools and solutions to the problems involved in artificial joint integration, cartilage cell expansion and cartilage tissue engineering," says Juha Prittinen.

With the method, the hope is that artificial joints could be coated with substances that improve the cell's attachment to the bone while the core of the implant can be designed as a supporting structure. However, small defects do not require artificial joints as they can be treated with cell-based methods. One of the most successful methods used today takes advantage the patient's own cartilage cells that are freed from the joint, grown for a while in a cell culture laboratory and then re-implanted. However, there is a risk that this method leads to mechanically poor repair tissue as the grown cells might not maintain their phenotype.

According to Juha Prittinen, tissue engineered cartilage could become an alternative to re-implanting cells grown in a laboratory. The aim is a method for growing entire cell-based implants in the cell culture laboratory that, once fully developed, could replace the damaged cartilage and result in a relatively short recovery period for the patient.

"My hope is to see these kinds of methods being developed further and combined into successful treatments that would surpass current treatments in reliability and longevity," says Juha Prittinen, doctoral student at the Department for Integrative Medical Biology.

Provided by Umea University