

Scientists 'grow' new cartilage with help of 3-D printing technology

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Professor Gordon Wallace (right) and Dr Johnson Chung inspect 3D printed biomaterials used to create implantable scaffolds for nerve and tissue regeneration as part of ACES' bionics research program. Credit: Mark Newsham

A partnership between scientists at the University of Wollongong and St Vincent's Hospital Melbourne has led to a breakthrough in tissue engineering, with researchers growing cartilage from stem cells to treat cancers, osteoarthritis and traumatic injury.



In work led by Associate Professor Damian Myers of St Vincent's Hospital Melbourne – a node of the UOW-headquartered Australian Research Council Centre of Excellence for Electromaterials Science (ACES) – scaffolds fabricated on 3D printing equipment were used to grow <u>cartilage</u> over a 28-day period from stem cells that were extracted from tissue under the knee cap.

Professor Myers said this was the first time true cartilage had been grown, as compared to "fibrocartilage", which does not work long-term.

"We are trying to create a tissue environment that can 'self-repair' over many years, meaning the repaired site will not deteriorate," he said.

"It's very exciting work, and we've done the hard yards to show that what we have cultured is what we want for use in surgery for <u>cartilage repair</u>."

ACES Director Professor Gordon Wallace and his team developed customised fabrication equipment to deliver live cells inside a printed 3D structure. This <u>cutting edge technology</u> was utilised to deliver 3D printed scaffolds on which the cartilage was grown.

"ACES has established a biomedical 3D printing lab at St Vincent's Hospital Melbourne in April this year. This has greatly accelerated progress by bringing clinicians and <u>materials scientists</u> face to face on a daily basis," Professor Wallace said.

This research, which will soon move to pre-clinical trials to demonstrate repair of cartilage, is part of a wider <u>limb regeneration</u> project, involving Professor Wallace, Professor Mark Cook and Professor Peter Choong through the Aikenhead Centre for Medical Discovery. The aim is to eventually use a patient's own stem cells to grow muscles, fat, bone and tendons.



Professor Wallace and his team are also working to develop <u>custom-</u> <u>made 3D printed human organs</u>.

"By 2025, it is feasible that we will be able to fabricate complete functional organs, tailored for an individual patient," he said.

Professor Wallace will give a free public lecture on UOW's research into 3D printing with <u>stem cells</u> on Thursday 15 August at the <u>2013 Bill</u> <u>Wheeler Symposium</u>.

Provided by University of Wollongong

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