MedicalXpress

3-D 'bioprinted' stem-cell tissue to be used to develop new ways to treat kidney disease

May 31 2019

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3-D bioprinted stem-cell tissue could one day be used to treat end-stage

kidney disease—the Murdoch Children's Research Institute (MCRI) and the Royal Children's Hospital have announced that they will collaborate with a San Diego biotech company to create the bioprinted tissue.

Melissa Little is a world leader in modelling human kidney In 2015, Prof Little and her team grew the first kidney organoid in a petri dish.

"No larger than the tip of your finger, the lab-grown mini-kidneys have the hallmarks of a regular- sized kidney, including the tiny tubes and blood vessels that form nephrons, the organ's filtering structures," Prof Little said.

"The mini-kidneys are already being used to better understand how kidneys develop and how kidney disease occurs. This new program hopes to develop new treatments."

Prof Little and Ton Rabelink from Leiden University in The Netherlands will now team up with Organovo to create a 3-D bio-printed stem cell-based therapeutic tissue for treating end-stage renal disease.

Prof Little said the 3-D bioprinter uses a computer-guided pipette to layer living cells, referred to as bio-ink, on top of one another to create artificial living tissue in a laboratory.

"Kidney disease is called a silent disease as there are often few or no symptoms," she said. "More than 4,000 Australians are diagnosed with chronic kidney disease each year. A number that is increasing by about 6 percent every year."

"No new treatments have become available in the past 60 years, making this an urgent healthcare issue."

Stem Cells Australia Deputy Program Leader Professor Christine Wells

said this outstanding project exemplifies how linking experts in bioengineering, stem cell biology and clinical research can accelerate the development of new therapeutic options in areas of critical unmet need.

The partnership was made possible through funding from CSL Limited and Stem Cells Australia, through the Accelerated Research Program of the Australian Government's Medical Research Future Fund.

Organovo Chief Executive Taylor Crouch said the multi-organisational effort combines its leading bioprinting platform with MCRI's advanced stem cell technology and Leiden University's clinical expertise.

"Partnerships with world-class institutions can accelerate ground-breaking work in finding cures for critical unmet disease needs and the development of implantable therapeutic tissues," he said.

Organovo is a developing 3-D bioprinted tissues to address serious unmet medical needs, initially focusing on liver disease.

Provided by Murdoch Children's Research Institute

Citation: 3-D 'bioprinted' stem-cell tissue to be used to develop new ways to treat kidney disease (2019, May 31) retrieved 24 April 2024 from https://medicalxpress.com/news/2019-05-d-bioprinted-stem-cell-tissue-ways.html

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