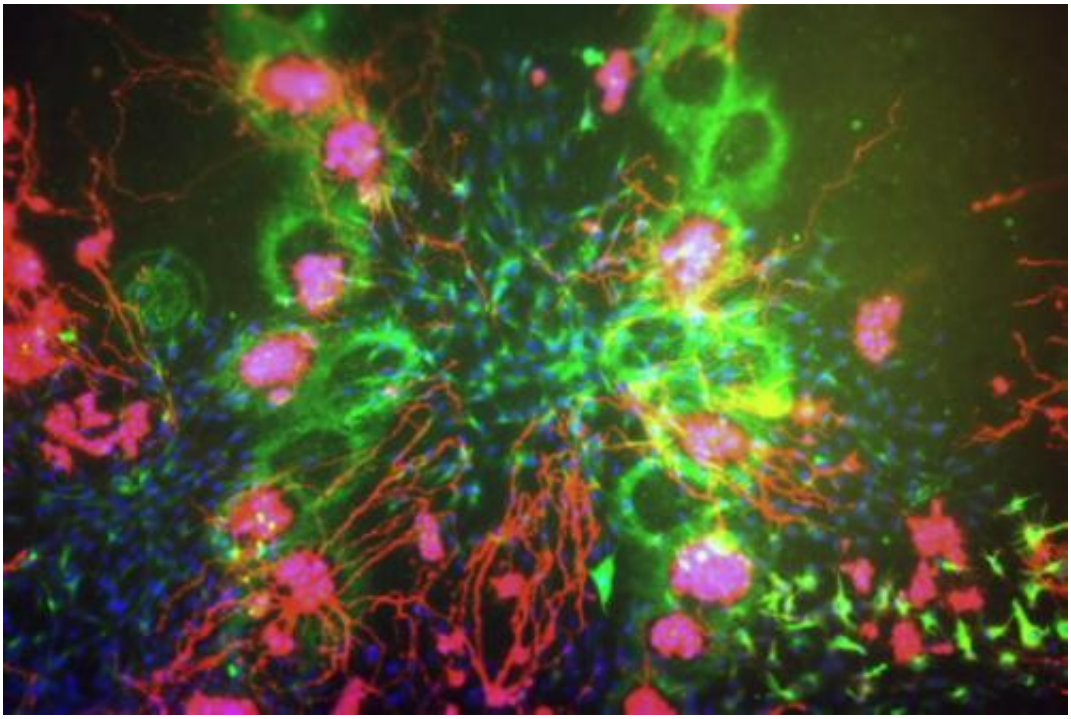
New ink formulated to print living human tissue

November 16 2012



The image shows muscle (green) and nerve (red) cells suspended in the bio-ink and inkjet printed on to a collagen hydrogel bio-paper.

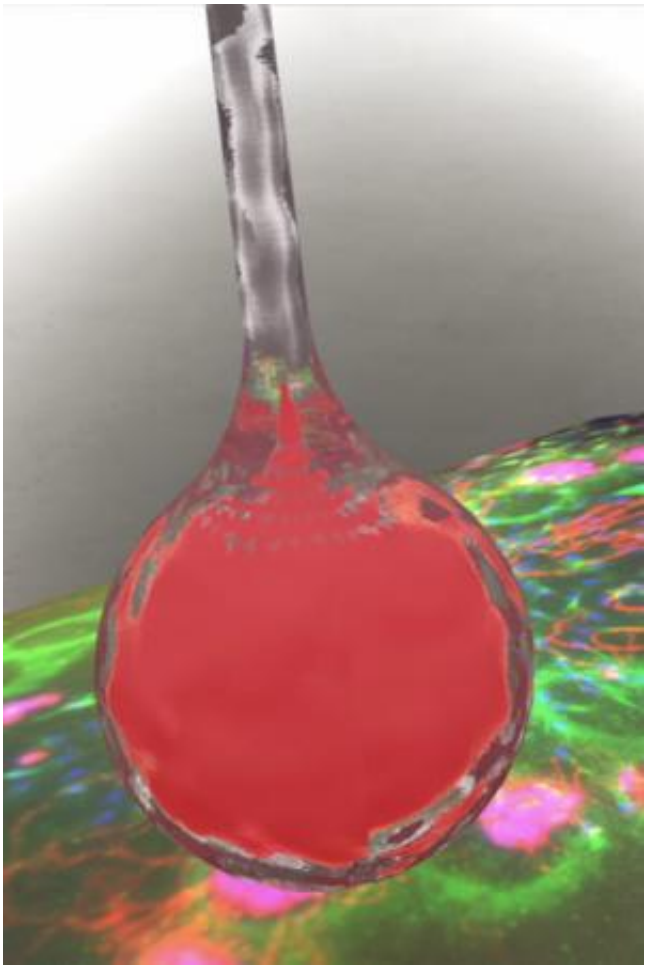
(Phys.org)—Scientists are one step closer to being able to print tissue replacements for diseased or damaged body parts using inkjet printers, thanks to the development of a specialised ink formulation.

Researchers have been aware for some time of the potential for using

commercially available inkjet printer heads to print living human cells into 3D structures, but design of the actual ink capable of carrying cells through the printer has been a challenge.

The ARC Centre of Excellence for Electromaterials Science at UOW has led a team of scientists including Cameron Ferris, Dr Kerry Gilmore, Dr Stephen Beirne, Dr Donald McCallum, Professor Gordon Wallace and Associate Professor Marc in het Panhuis to develop a new bio-ink that improves the viability of living cells and allows better control of cell positioning through the printing process.

"To date, none of the available inks has been optimised in terms of both printability and cell suspending ability," according to ACES Associate Researcher Cameron Ferris.



This image is the same as above just rendered into an artistic representation with a cell-containing printed droplet in the foreground.

"Our new bio-ink is printable and cell-friendly, preventing cell settling and allowing controlled deposition of cells."

The 2D structures being printed with the bio-ink enables exquisite control over cell distribution and this already presents exciting opportunities to improve drug screening and toxicology testing processes. Building on this, 3D bio-printing, with which patient-specific tissue replacements could be fabricated, is within the grasp of researchers.

"The development of chemistries that enable fabrication protocols not only takes us closer to practical devices but gives us experimental protocols that allows previously unexplored areas of fundamental science to be explored," ACES Director Professor Gordon Wallace said.

Results of the research have been published in *Biomaterials Science* and highlighted in *Chemistry*.

The announcement of this breakthrough could not be more timely in light of this weekend's Stumping Serious Diseases 20-20 cricket double header.

The University of Wollongong is committed to improving the health of all people in the Illawarra and beyond through extensive research into the causes and treatment of serious diseases.

Funds raised by Stumping Serious Diseases 2012 will assist vital health and medical research at UOW, in particular local children's health.

"These advances in biofabrication provide a platform to address diseases previously thought 'unstumpable'—soon we can watch them walk the walk," Professor Wallace said.

More information: pubs.rsc.org/en/content/articl … g/2013/bm/c2bm00114d
www.rsc.org/chemistryworld/201 … k-print-living-cells

Provided by University of Wollongong