Printers to produce life-saving organs

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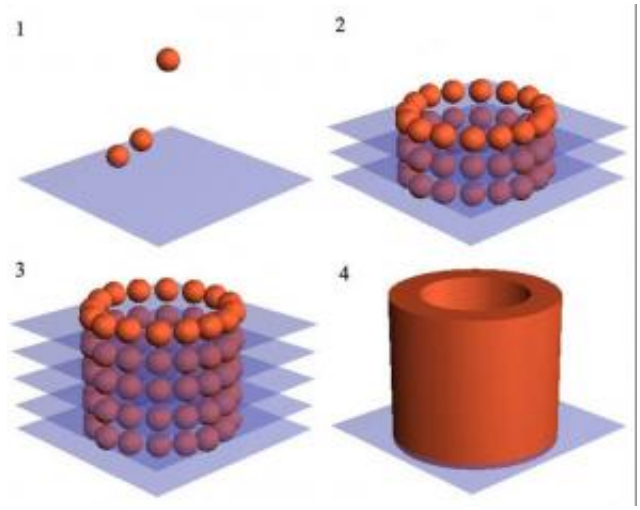

A team of American scientists is studying the potential of printers being developed to produce life-saving organs, reports Wired.com. They believe that any organ, a skin graft, a new trachea or a heart patch for example, can be created using special printers. The team has already discovered the required ink and paper for the project.

Image: Schematics of building a tubular organ module by bioprinting. The blue sheets represent the biopaper or scaffold gel. The gel and the histotypical spherical bioink particles are deposited/printed layer-by-layer. Credit: University of Missouri

The research team is led by professor Gabor Forgacs, a biological

physics researcher from the University of Missouri-Columbia. Having received a grant of $5 million from the National Science Foundation, the team of researchers from three universities has developed the bio-ink and bio-paper, a step that could soon lead to organ printing. The team has also developed tubes that simulate human blood vessels as well as sheets of heart muscle cells that can be printed by the concept organ printer.

Professor Glenn D. Prestwich of University of Utah, who developed the bio-paper admits that while some organs would be difficult to print, others such as livers and kidneys would be easier to create. The professor estimates that mass organ printing could be common within the next ten, or maybe even five, years.

To print the organs, a customized milling machine first prints a small sheet of bio-paper. The bio-paper is a variable gel of modified gelatin and hyaluronan, a sugar-rich material. Bio-ink blots - small balls of cellular material a few hundred microns in diameter - are then printed onto the paper. The process is repeated as necessary with the sheets stacking on top of each other. When they reach the required thickness, say 2cm, with a ring of blots and a tube similar to blood vessels, the printing process is complete. The stack is then incubated inside a bioreactor to fuse the cells together. The paper acts a support and nurtures the cells. While the printing process takes just a couple of minutes, it can take up to a week for the cells to fuse together.

The National Science Foundation - Frontiers of Integrative Biological Research program believe that this research will further our understanding of self-assembly during the organization of cells and tissues into functional organ modules.

More information: Organ printing research project