RTH Foundation Knowledge Base Article

Utilization of 3D Printing to Produce Organ Tissues in BCM Regenerative Replacement Processes

In the near future the BCM production process will begin using the surgeon supplied specific patient's MRI and CT Scan data, combined with the surgeons organ segment removal plans and using BCM ultrapure collagen and other materials as the printer inks to create the resulting custom ordered organ tissue product. This more automated process will 3D print a human organ replacement section and structure to the specification as defined by the MRI, CT and surgeon provided data. This advanced BCM proprietary 3D printer technology is currently in research and development.

Upon maturity of this current BCM development project, BCM proprietary 3D printer produced system will make an organ specific set of tissues to be directly inserted into the specified patient's failing organ. The forth coming BCM produced, 3D printer system delivered, automated process will increase production accuracy and reduce required resources to produce a patient's customized organ tissue.

To introduce this advanced 3D printing approach to healing and to validate BCM's planned integration of 3D printing into the BCM production processes, a summary and links to few relevant articles follows.

Source: https://onlinelibrary.wiley.com/doi/full/10.1002/advs.201900344

Title: 3D Printing of Personalized Thick and Perusable Cardiac Patches and Hearts

"Cardiovascular diseases are the number one cause of death in industrialized nations. To date, heart transplantation is the only treatment for patients with end-stage heart failure. Since the number of cardiac donors is limited, there is a need to develop new approaches to regenerate the infarcted heart. Cardiac tissue engineering provides an alternative approach by integrating cardiac cells and 3D biomaterials. The latter serve as temporary scaffolds, mechanically supporting the cells and promoting their reorganization into a functional tissue. Following in vitro maturation, the engineered cardiac patch can be transplanted onto the defected heart. When full integration to the host commences, the biomaterials gradually degrade, leaving a functional living patch that regenerates the heart."

Source: https://qz.com/616185/this-3d-printer-creates-human-muscles-and-tissues-that-could-actually-replace-real-ones/

Title: 3D Printer Creates Human Muscles And Tissues That Could Actually Replace Real Ones

Researchers at Wake Forest University in North Carolina created a 3D printer that can produce organs, tissues, and bones that could theoretically be implanted into living humans. Published in the scientific journal Nature Biotechnology, the researchers' printer acts much like most 3D printers do, using a computer-controlled nozzle to extrude layers of materials in a very precise pattern.

The layers eventually harden to produce whatever you're trying to print. But unlike with most printers, which put down layers of molten plastic or metal, Wake Forest's printer lays down what are called hydrogels—water-based solutions containing human cells. The university's printer has multiple nozzles, some extruding hydrogels, others biodegradable materials that are used to give the tissue it's printing structure and strength. When the supporting materials dissolve and tissue finishes incubating in the machine, it could be potentially implanted into a person.