Researchers at the University of South Florida have developed an apparatus for direct-contact bio-printing tissues in vitro for subsequent implantation in vivo.

Increasing awareness about the benefits of 3D cell bio-printing and growing demand for quick and cheap solutions for medical problems are key drivers in the broader tissue engineering market. 3D bio-printing is a process of generating human tissue through additive layers of human cells. Existing cell bio-printing technology enables the placement of viable cells into three dimensional constructs. These methods require intermediate structures such as hydrogels, or liquid suspensions. For extrusion bio-printing, cell suspensions have low viscosity and expose cells to high-shear stress when expelled through a nozzle. Cell morphology and shape dependent function are not retained immediately following printing and require a re-adjustment period. Patterning of large areas (1 mm x 1 mm) using ink-jet extrusion methods would take a minimum of 3 hours.

Improving on this need for three-dimensional patterning of large areas, our inventors have developed a method of layer-by-layer, direct-contact formation of composite tissue architectures. The invention is a high-throughput advancement for in vitro tissue formation: the amount of patterned cells can be increased by scaling the size or number of contact stamps in a single fabrication.

**ADVANTAGES:**
- Versatile platform for complex tissue formation
- Maintains cell morphology in tissue modules during assembly of 3D structures
- Integrates into existing 3D printing systems

**Current Technology Status:**
*Laboratory Testing Underway*

The above image illustrates the high-throughput bio-printing platform; consisting of a contact stamp (18), contact stamp storage container (22), contact stamp holder (24), positioning system (16), contact stamp exchange unit (26), and contact stamp actuator (28).

Tech ID # 14B171