



US DEPARTMENT OF DEFENSE

BLAST INJURY RESEARCH PROGRAM COORDINATING OFFICE

Transplants and Grafts

3D Bioprinting of Customizable Bioactive Scaffolds for Repair of Long Bone Injury

Damage to the upper and/or lower extremities are becoming increasingly common among the injuries sustained by Service members. Treatment of these wounds requires complex reconstructive procedures and the need to replace damaged or lost bone.

A team of scientists at New York University School of Medicine (New York, NY) investigated an alternative strategy for the repair of long bone injuries. The investigators have developed a 3D-printed scaffold made of a calcium- and phosphorus-based ceramic material. When evaluated in a rabbit model of full thickness bone segmental defects (a cavity in the bone that cannot be filled without treatment), the implanted scaffold showed increased bone formation and remodeling along the scaffold, while defects not repaired with the scaffold showed limited healing at eight weeks. The scaffold was also shown to decrease in volume over time. This work demonstrates the ability of the developed scaffold to directionally regenerate and remodel bone, and potentially treat critical segmental bone defects for which there is currently no effective patient-specific treatment.

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