



THE UNIVERSITY of TEXAS

HEALTH SCIENCE CENTER AT HOUSTON

Office of Technology Management

BONE GRAFT SCAFFOLDS WITH HIGH-STRENGTH AND HIGH-POROSITY

Market: Damage to bone, whether caused by trauma or disease sometimes requires implantation of a scaffold to guide repair. Spinal fusions, reconstruction after cancer, and dental repairs are but a few examples of procedures that might utilize bone graft scaffolding. According to a March, 2009 Pearl Diver Report, the bone graft substitute market is \$1.5 billion.

Competitors and Current Problems: Ceramic scaffolds are used as grafts for bone tissue engineering. The scaffold should ideally have two features that are traditionally inversely related; the engineered graft should have compressive strength similar to that of natural bone, and should also have completely interconnected pores to allow invasion of live cells. Typically the porosity reduces the compressive strength.

The Technology: A researcher now at the University of Texas Health Science Center at Houston developed a new method of manufacturing biodegradable ceramic scaffolds which can be used as bone biomimetic material that has the ability to be loaded with bioactive agents. Scaffolds can be made with lower porosity (~20%), mimicking cortical bone. Scaffolds can also be made with increased porosity (70-80%), mimicking cancellous bone. Likewise, a single scaffold comprised of both poreless and pore-containing material is easily fabricated. Compressive strength comparisons showed dual layered scaffolding had as strong, or stronger, compressive strength relative to bone. The method allows for control of pore size including multiple pore sizes in a single casting, meaning control of degradation rates and elution rates, as shown in mouse studies using BMP-2. The process is amenable with all implant shapes. Animal studies in a rabbit radial model showed superior healing. The method uses traditional bioceramic components, likely easing the regulatory pathway.

NON-CONFIDENTIAL TECHNOLOGY DESCRIPTION

The preceding is intended to be a non-confidential summary of a novel technology created at the University of Texas Health Science center at Houston (UTHSCH), for which the University has obtained patent protection.

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