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# Fabrication Method for Stratified and Layered Tissue to Repair Osteochondral Defects

**A novel magnetic 3D prototyping method creates structurally superior osteochondral constructs that mimic native tissue for enhanced joint preservation and function, delaying the need for replacement surgery.**

Osteoarthritis is a degenerative disease affecting joints. It is characterized by the wearing of articular cartilage, hyaline cartilage found at the ends of bones to cushion the joint. Articular cartilage facilitates the smooth, painless movement of joints. The goal of treating articular cartilage damage is to provide relief from joint pain, slow the progression of damage, and delay joint replacement surgery; however, treatment is difficult due to the inherent properties of cartilage tissue. Recently, tissue engineering based methods have shown promise; however, they result in tissues that are structurally inferior to natural cartilage.

Purdue University researchers have developed a novel technique to produce osteochondral tissue. This unique fabrication method, Magnetic Prototyping in 3D (MAP3D), can control zonal collagen orientation in a noninvasive manner. MAP3D layered osteochondral constructs have precise collagen alignment that mimics the native tissue, incorporating many key structural elements to modulate depth-dependent biomechanical properties and localizing protein expression. MAP3D allows for tailored macroscale function that can promote joint preservation and prolong the time patients can function before needing total joint replacement surgery.

**Advantages**:

-Compressive stiffness of the collagen scaffold is increased by 50 percent

-Controls collagen alignment noninvasively

-Collagen alignment mimics natural tissue

Potential Applications:

**Technology ID**

65533

**Category**

Biotechnology & Life Sciences/Cell & Gene Therapy Platforms

Materials Science & Nanotechnology/Biomedical & Bioinspired Materials

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