Fibrocartilage Derived from Human Mesenchymal Stem Cells (hMSCs) for Therapeutic Use

Technology #2812

“Lead Inventors: Jeremy J. Mao, DDS, PhD; Chang Hun Lee

Tissue Engineering to Regenerate Fibrocartilage Tissue for Knees, Ligaments, and Tendons Tissue engineering could potentially provide repair treatments for damaged avascular fibrocartilage tissues, which is resistant to regeneration in the human body. Successful derivation of fibrocartilage could help treat or replace damaged knee menisci, ligaments, tendons, intervertebral discs, and temporomandibular joints. Currently, few therapies exist to regenerate fibrocartilage tissue. The therapies that do exist rely on mechanical stimulus to induce fibrochondrogenic differentiation, but yield unreliable cells. Fibrocartilage could be derived from human mesenchymal stem cells (hMSCs), but to date, there has been no reliable way to differentiate stem cells or progenitor cells into fibrochondrocytes.

Fibrocartilage Generated from Human Mesenchymal Stem Cells (hMSCs) This technology uses a mix of growth factors to stimulate hMSCs to differentiate into fibrochondrocytes, which can then be used as therapeutic cells to generate fibrocartilage. Successful derivation of fibrocartilage could provide an option or supplement for repair treatments to damaged knee menisci, ligaments, tendons, intervertebral discs, and temporomandibular joints.

Applications: • The technology can be further developed to provide therapeutic cells for the treatment of damage to tissues made from fibrocartilage, particularly repair for the intervertebral disc, knee meniscus, temporomandibular joint, and triangular fibrocartilage area. • This technology could potentially be injected between intervertebral discs to prevent or treat disc degeneration. • This method could be altered to derive other forms of therapeutic cartilage cells for treating arthritis and other conditions.

Advantages: • This technology yields a stable cell lineage by using chemical factors, rather than chemical stimulus, to induce stem cell differentiation into fibrochondrocytes. • This methodology can easily be adapted and expanded to a higher scale that is useful for tissue engineering and tissue regeneration.

Patent Status: Patent Pending

Licensing Status: Available for Licensing and Sponsored Research Support ”

Inventors

Jeremy Mao