Injectable Joint Lubricant for Treating Osteoarthritis

(00-001)

An injectable hydrogel carries ultra-lubricating phospholipids to a diseased joint, providing an easy and long-term solution for osteoarthritis

Market Overview

This dextran-based hydrogel uses phospholipid delivery to treat degenerative joint diseases, also known as osteoarthritis. Osteoarthritis is the most common type of arthritis, affecting over 27 million Americans over the age of 25. It becomes more common with age, often affecting the neck, lower back, knees, and hips. Normally synovial fluid, a natural aqueous lubricating liquid, is present in joints which reduces friction between joint surfaces. In the case of osteoarthritis, however, the natural lubricating fluid is abnormally low – resulting in pain or discomfort caused by cartilage deterioration from too much friction. Clemson University researchers have developed an easily injectable dextran-based hydrogel which provides lubrication to joints. The low viscosity of this material allows for injections of a small amount of material while offering long-term lubrication. In comparison to the currently used Hyaluronic acid-based viscosupplementation, this material degrades slower for longer-lasting results.

Technical Summary

The dextran-based hydrogel uses as a phospholipid delivery system to provide medical lubrication, specifically synovial joint viscosupplementation. The approach utilizes a group of injectable phospholipids, dipalmitoyl phosphatidylcholine (DPPC). This composition provides an easily injectable gel to provide lubrication in both natural and artificial joints of humans and animals. In vivo testing of articular cartilage in rabbits have been conducted.

Application

Degenerative joint diseases; Biomedical

Development Stage

In vivo tested completed

Advantages

- Delivers a slow-degrading and ultra-lubricating compound, restoring healthy joint function and alleviating pain
- Uses low viscosity material, allowing for injections that offer long-term lubrication
- Utilizes dextran which is derived from natural sugars, limiting potential allergic reactions

App Type	Country	Serial No.	Patent No.	CURF Ref. No.	Inventors
Utility	United States	09/569,009	6,800,298	00-001	Dr. Martine Laberge Dr. Gary Lickfield Dr. Julie-Anne Burdick
Divisional	United States	10/853,611	7,867,985	00-001	

About the Inventors

Dr. Martine Laberge

Chair and Professor of Bioengineering at Clemson University

Dr. Martine currently serves as the Executive Director of CUBEInC in Greenville, South Carolina and holds three issued patents. She earned her Ph.D. in Biomedical Engineering from the University of Montreal, Quebec. Dr. Martine's research interests include total knee transplant, tribology, and endovascular stents. She holds three issued patents

Dr. Gary Lickfield

Professor of Material Science and Engineering at Clemson University

Dr. Gary Lickfield earned his Ph.D. in Physical Chemistry from Clemson University. Prior to joining Clemson faculty, he served as a Research Associate in the Department of Chemistry and in the School of Textiles. He holds one issued patent. His research interests include synthesis and characterization of polymeric materials, polymer surface chemistry and modifications, and computational chemistry/molecular modeling of the interactions controlling surface adsorption.

Dr. Julie-Anne Burdick

Experienced Bioengineer; Hollow Fiber Filters, Quality Documents, Cell Culture, Biomaterial, Product/Process Development

Dr. Julie-Anne Burdick completed her Master's degree in Bioengineering from Clemson University. She went on to complete her Ph. D. in Bioengineering at Arizona State University. She is currently working in the New England private sector as a Senior Scientist for a global life

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