Innovations
UNIVERSITY OF COLORADO
ANSCHUTZ MEDICAL CAMPUS

Heparin – Mimicking Sulfonated Reverse Thermal Gel System for Drug Delivery

Product

Sulfonated Reverse Thermal Gel

Indication

Drug and Protein Delivery System

Value Propositions

- Net negative charge mimics natural heparin function
- Sustained protein release profile

Market

- $231 billion—Global drug delivery systems market (6.1% CAGR 2020-2025)

Intellectual Property

- US Patent No. 9,700,628
- Available for licensing

Background on CU3730D

The development of smart biomaterials, including temperature responsive reverse thermal gels (RTG), represents a significant advancement in the field of tissue engineering and biomolecule delivery. At room temperature, RTG systems exist in a solution state; upon reaching body temperature, the RTG transitions to a semi-solid gel. This unique characteristic may be used to deliver sensitive therapeutic agents to a specific target site, avoiding the side effects of invasive surgeries. Heparin, a naturally sulfated biopolymer, is a critical component of the extracellular matrix. However, use of heparin in delivery systems has major limitations - it is difficult to modify, presents batch-to-batch variability in structure and biocompatibility and has significant undesirable activity in other non-target biological pathways. This innovation addresses these limitations, providing a RTG system that mimics the biofunction of heparin and permits the delivery therapeutic proteins non-invasively and to the location of interest.

Technical Innovation

Dr. Daewon Park and colleagues have developed a novel drug delivery platform that allows for minimal surgical intervention and equipment when placing in a patient. The platform consists of a heparin-mimicking sulfonated reverse thermal gel (SRTG) that serves as a therapeutic protein delivery system. The is produced as a low-viscosity liquid that gels when exposed to body temperature, allowing for delivery and deployment through simple equipment such as a needle or catheter. Furthermore, the negative charge of the gel-matrix allows for the intact delivery of positively charged proteins.

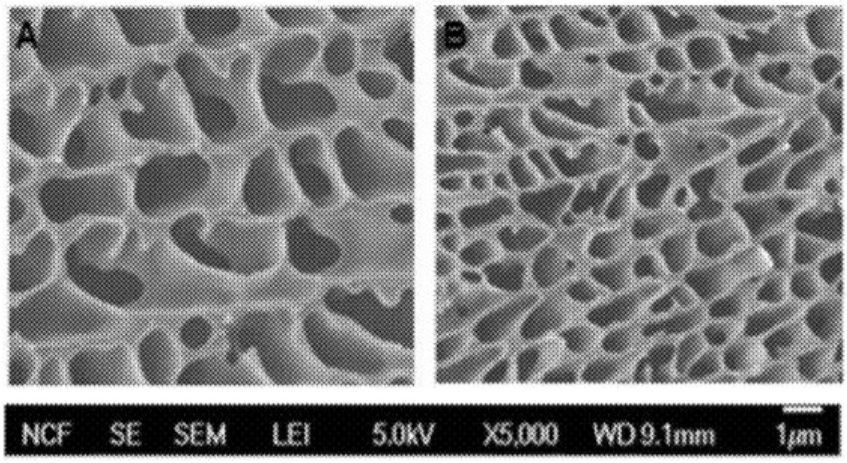

Figure: A pair of scanning electron microscope images of 10% (left) and 15% (right) sulfonated reverse thermal gel.

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US Patent 9,700,628- HEPARIN - MIMICKING SULFONATED REVERSE THERMAL GEL FOR THE DELIVERY OF HEPARIN - BINDING THERAPEUTIC PROTEINS, Issued July, 11, 2017.