THE UNIVERSITY OF MEMPHIS

FedEx INSTITUTE OF TECHNOLOGY

Office of Technology Transfer
New Patent Announcement

PATENT: 12,447,193

Biodegradable Local Delivery Platform Targets Biofilm and Persister-Cell Infections

Implant- and trauma-associated infections are difficult to eradicate because bacteria can organize into protective biofilms and enter a dormant persister state that reduces susceptibility to antibiotics. This patented platform combines chitosan with one or more polyalcohols, including mannitol and polyethylene glycol, to create biodegradable compositions for localized treatment and prevention.

The material can carry high local concentrations of antimicrobials while polyalcohol components stimulate dormant bacteria and improve their susceptibility. The composition may be delivered as a paste, powder, film, sponge, coating, or device-associated material at the site where protection is needed.

APPLICATIONS

- Orthopedic surgical-site and osteomyelitis infection prevention
- Localized treatment around joint replacements, trauma hardware, and other implants
- Antimicrobial coatings or wraps for indwelling medical devices
- Injectable or implantable delivery of antibiotics and antifungals
- Treatment strategies aimed at established biofilms and persister-cell populations
- Wound-care films, sponges, and resorbable local-delivery products

LICENSING OPPORTUNITY

The University of Memphis is seeking commercial partners for development, validation, licensing, and translation of this local anti-infective platform.

ABOUT THE OFFICE OF TECHNOLOGY TRANSFER

Research and innovation are rewarding, but it is the application of those ideas that truly brings them to life. The Office of Technology Transfer (OTT), housed within the FedEx Institute of Technology, guides innovations from big ideas to licensed intellectual property and breakthrough commercial products. To explore licensing and collaboration opportunities, contact the University of Memphis OTT.

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A LOCAL, BIODEGRADABLE APPROACH TO HARD-TO-TREAT INFECTIONS

CHITOSAN
Bioadhesive, biodegradable antimicrobial matrix

POLYALCOHOLS
Mannitol / PEG help stimulate dormant persister cells

ACTIVE AGENTS
Optional antibiotics or antifungals

LOCAL ACTION
Sustained delivery at trauma or implant site

Commercialization Concept: *formulation + payload + delivery format can be tailored to the clinical use case.*

ADVANTAGES

- Targets a key limitation of conventional therapy by helping awaken metabolically dormant persister bacteria.
- Supports high-concentration, site-specific antimicrobial delivery while limiting systemic exposure.
- Biodegradable platform may avoid a second procedure for removal.
- Bioadhesive chitosan can bind tissue and negatively charged implant surfaces.
- Multiple dosage forms and manufacturing routes enable broad product-development flexibility.
- Platform may address both infection prevention and treatment around devices and injured tissue.

TECHNOLOGY

The patented compositions blend chitosan with one or more polyalcohols. Mannitol can act as a metabolic stimulant for persister cells, while PEG can support adhesion, stability, and extended elution. Formulations may be prepared as thin films ground into powder or as lyophilized sponges, then hydrated into a locally administered paste.

INVENTORS

LEAD INVENTOR

Dr. Jessica Amber Jennings
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Dr. Jennings' research focuses on preventing and treating implant-associated infections through biofilm inhibition and dispersal, injectable local delivery systems, nanofibrous membranes, and surface modification of therapeutic biomaterials. Her work bridges biomaterials, infection prevention, drug delivery, and tissue engineering.

COLLABORATORS

- Leslie Pace
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Filed: November 23, 2020 | **Issued:** October 21, 2025

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