INNOVATION PARTNERSHIPS
UNIVERSITY OF MICHIGAN

Bile Salt and Corticosteroid Microparticles for Controlled Release Drug Delivery Applications

TECHNOLOGY NUMBER: 2021-314

OVERVIEW

A novel fabrication of bile salt composite microparticles with controlled-release properties

- A gold ion methodology that produces stable microparticles of various sizes
- Successfully destruction of adipose tissue in a time- and concentration-dependent manner

BACKGROUND

Bile salts are naturally occurring surfactants that help solubilize lipids in the small intestine and regulate several hepatic, biliary, and intestinal functions. Preparations of bile acids and their salts have been proposed and employed as therapeutic agents for the local removal of undesired fat, and the market for agents that help manage unwanted fat deposits is vast. Body image disturbances are common and may be related to body dysmorphic disorder or depression, while fat contouring treatments have been shown to lead to improvements in mood and relationship stability. Liposuction has served as the most common approach for removal of undesired fat deposits, though its use may be limited due to invasiveness, expense, and prolonged recovery time. A noninvasive approach that employs injection of a bile salt solution has been utilized mainly for the removal of submental fat, though this therapy can cause inflammation and bruising at the injection site and requires multiple doses. A need therefore exists to discover a method to produce and administer a solubilized version of these drugs with an acceptable side effect profile.

INNOVATION

University of Michigan researchers have developed a means to utilize the presence of gold ions and water-soluble steroid-type drugs in an oil-water emulsion to enable the fabrication of bile salt microparticles. While particles of this nature have previously been made utilizing a gold nanoparticle template, this is the first methodology where controlled-release particles with regular geometries have been made using a gold ion to facilitate particle formation. The gold ions' reduction at the oil-water interface in a double emulsion solvent evaporation process enables a gold-bile salt interaction and the formation of bile salt particles.These composite drug particles have been shown to slowly degrade over time and release the active drug molecule, making them an effective controlled release drug delivery system. The inventors have illustrated the particles' ability to lyse adipocytes in vitro and in vivo with minimal side effects. Overall, particle-based delivery opens opportunities for localized delivery of these salts, improving

Technology ID
2021-314

Category
Therapeutics and Vaccines
Life Sciences

Author(s)
Daniel Kupor
Hanieh Safari
Michael Felder
Omolola Adefeso

Further information
Stefan Koehler
shkohler@umich.edu

Learn more

efficacy while minimizing side effects associated with oral and existing subcutaneous medications. These particles have potential applications for a wide variety of ailments including dermatological ailments, immunological disorders, and various cancers.