



tissue engineering, tissue repair, drug delivery,
orthopedic

A drug delivery system tuned to the endogenous mechanical environment

Docket # 15-7304

STATE OF DEVELOPMENT

proof of concept using a model
microcapsule system

INTELLECTUAL PROPERTY

Provisional Patent Filed

REFERENCE MEDIA

Tu, Fuquan, and Daeyon Lee.
“Controlling the Stability and Size
of Double-Emulsion-Templated
Poly(lactic--glycolic) Acid
Microcapsules.” *Langmuir* 28.26
(2012): 9944-952.

Bhavana Mohanraj et al. “Mechano-
activatable microcapsules for tunable
drug delivery” Summer Biomechanics,
Bioengineering, and Biotransport
Conference, 2015, June 17

DESIRED PARTNERSHIPS

Collaboration

LEARN MORE

Viviane Martin
martinv@upenn.edu
(215) 746-4275

Technology Overview

Tissues within the body experience mechanical perturbations across multiple force magnitudes and length scales, from mechanotransduction at the cell level to the dynamics of load-bearing joints. These forces not only maintain tissue homeostasis, but can also initiate degenerative processes when applied at supra-physiologic levels. Given the centrality of mechanical loading in normal tissue function, Drs. Mauck, Dodge, and Lee at the University of Pennsylvania developed a mechanically activated drug delivery system to stimulate regeneration and repair in mechanically loaded musculoskeletal tissues (e.g. cartilage, muscle, bone).

This technology has a wide variety of uses, such as prophylactic treatment of a joint after surgery, prevention of post-traumatic osteoarthritis, and improvement of cartilage regeneration and repair using tissue-engineered cartilage strategies.

Advantages

- Localized delivery
- Sequential release of therapeutics over a long period of time
- Ease of maintenance of drug concentration within a therapeutic range
- Physiologic/self- regulating release

Inventors

Dr. Mauck: <http://www.med.upenn.edu/apps/faculty/index.php/g20002880/c1924/p5897469>

Dr. Dodge: <http://www.med.upenn.edu/apps/faculty/index.php/g20002880/c1925/p8336972>

Dr. Lee: <http://www.seas.upenn.edu/~leegroup/people.html>