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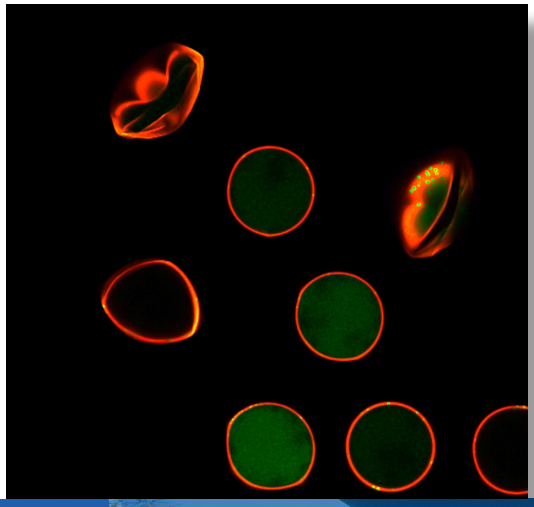
Empowering Ideas



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 Daeyeon 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

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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
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