Materials for the Future:
Innovations in Bio-Materials and Bio-Imaging

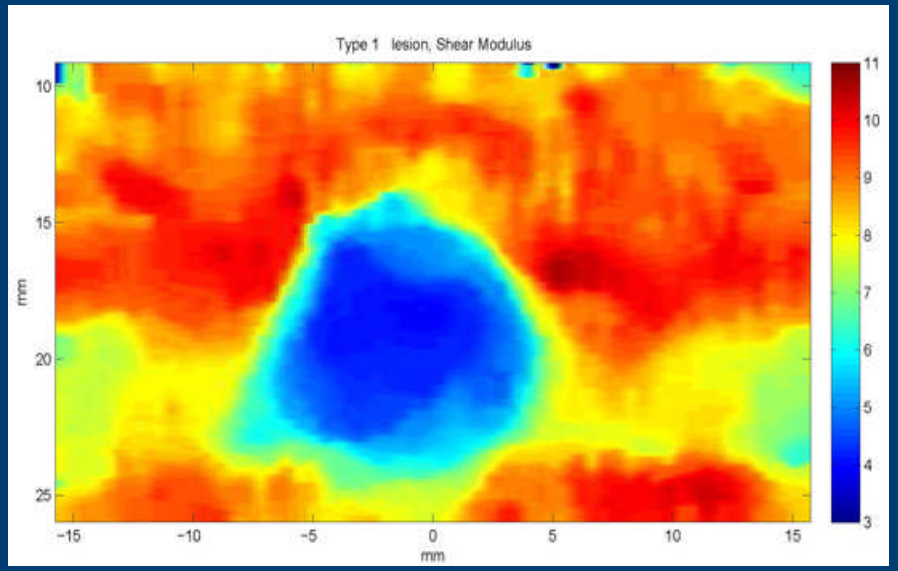
Dr. Corine Farewell

Office of Technology Transfer

September 21, 2009

Ultrasound Imaging of Tissue Stiffness

- Dr Stephen McAleavey's work on Spatially Modulated Ultrasound Radiation Force (SMURF) identifies changes in tissue stiffness which have long been associated with disease. Quantification of tissue stiffness is needed to reveal diffuse disease, e.g. liver fibrosis. There is strong evidence that in some cases quantification of tissue stiffness can supplement or replace hazardous biopsy methods.



- Corine Farewell
- 585-273-2314

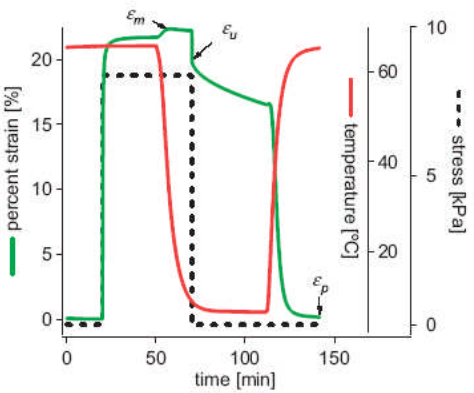
Shape Memory Polymers

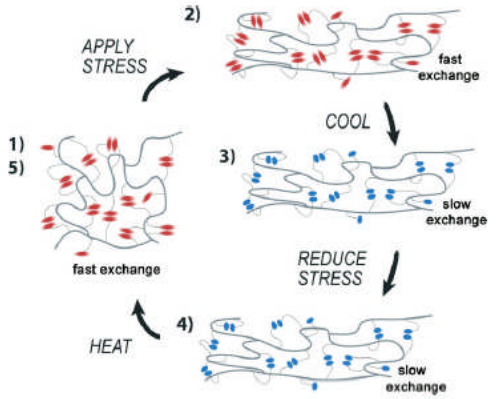
- These shape-memory materials are transparent to light in all processing temperatures and exhibit amorphous or rubbery “fixed” states. This polymer allows for precision tuning of the shape recovery rate. These characteristics could prove important in decreasing the recovery time and the invasiveness of surgery.
  - Corine Farewell
  - 585-273-2314

Properties of this class of shape memory polymers can be augmented for unique and specific applications:

Medical: Prosthetics, Stents, Implants – internal and external, Surgical tools

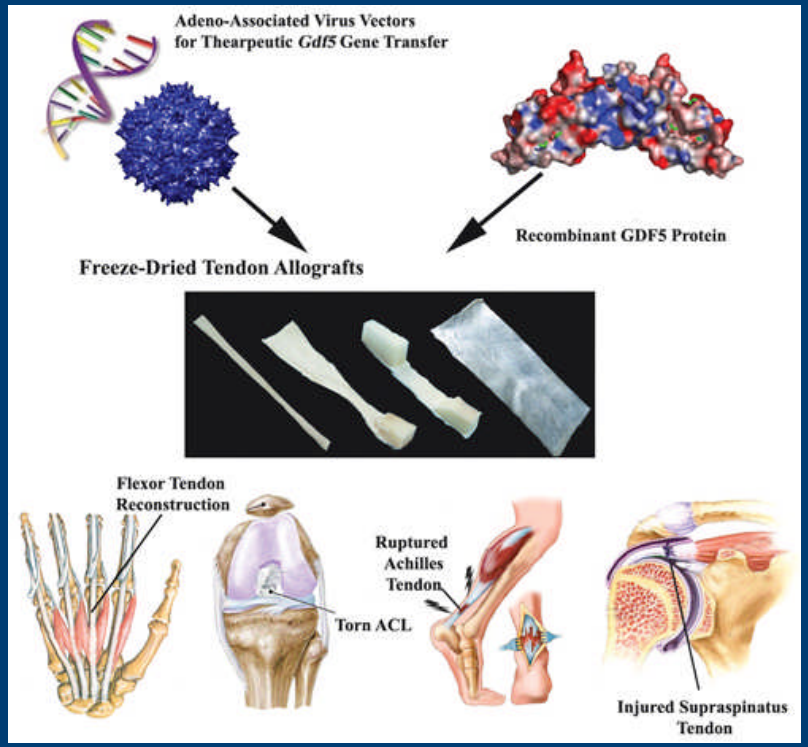
Packaging



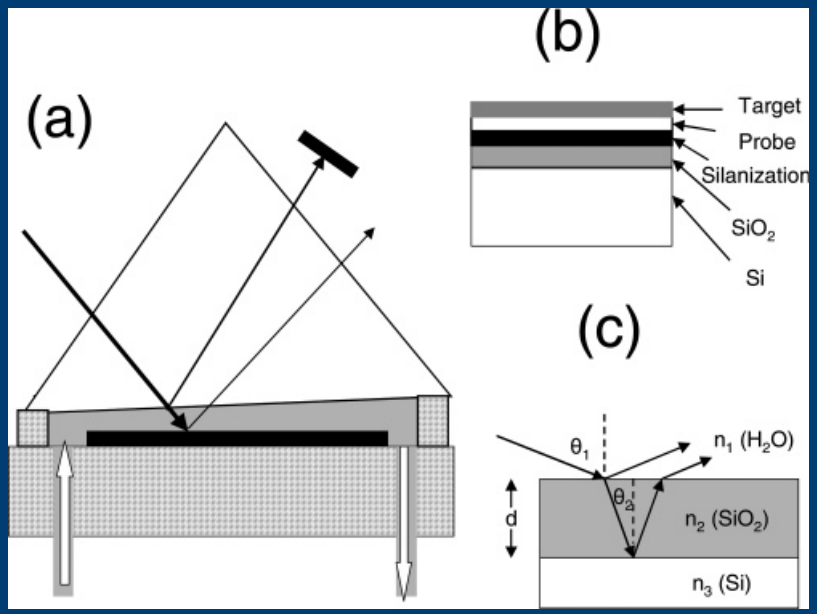


Freeze Dried Tendon Allografts

- Dr. Awad's work is focused on the concept of the therapeutically-endowed freeze-dried tendon allograft. Tendon and ligament allografts can be loaded, by virtue of their innate hydrophilic properties when freeze-dried, with gene delivery vectors or recombinant or tissue-derived growth factors and potentially used in reconstruction of the Anterior Cruciate Ligament (ACL), Achilles Tendon (AT) and the supraspinatus rotator cuff tendon among other applications.
  - Mithun Mukherjee URMC OTT
  - 585-784-8850



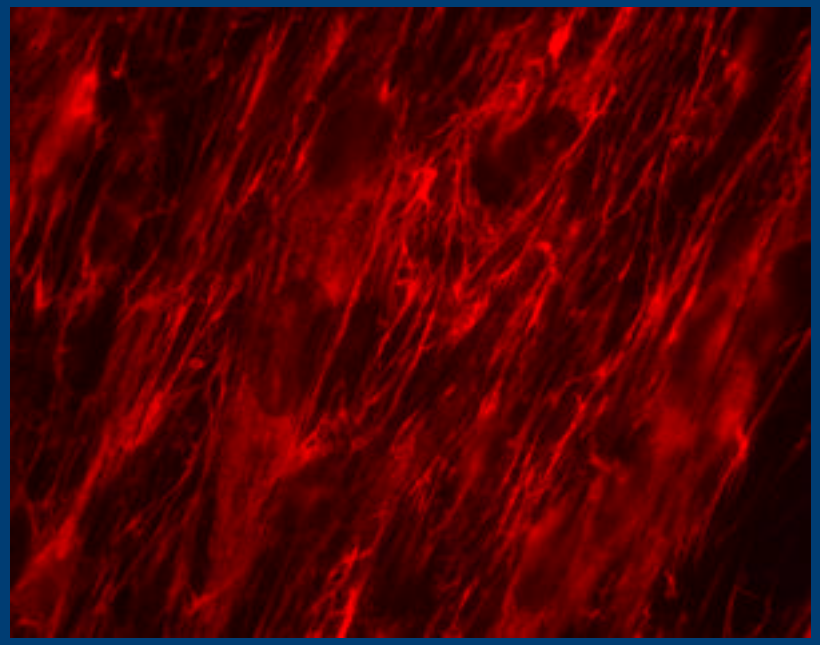
Reflective Interferometric (RI) bio-detector



- **Based on research from Dr Rothberg This technology uses polarized light reflectance for label-free detection of pathogens, proteins and other target bio-molecules on a micro-array chip, with a sensitivity similar to that of SPR (Surface Plasmon Resonance) and ELISA enzymatic amplification techniques, but with a simpler, lower cost system.**
  - Jack Fraser
  - 585-273-3250

Target molecules are detected by the change in reflectivity of polarized light, as shown in (a) from a thin film interference plate. The interference plate is a silicon wafer with its native layer of oxide (SiO2) coated with analyte molecules designed to bind selectively to the target biological material (b), which provides near-complete destructive interference, in the absence of the target, as shown in (c).

Ultrasound Use for Wound Healing



- Corine Farewell RC – OTT
- 585-273-2314

- There is a critical need for new technologies to accelerate or improve the healing of chronic soft tissue wounds. Funded by the NIH, Professor Diane Dalecki and Denise Hocking lead a multidisciplinary research program to develop the use of ultrasound in chronic wound therapy. Current efforts concentrate on using ultrasound to enhance cell growth and contractility, stimulate epithelial cell migration, and promote collagen organization and mechanical strength in tissues.

Navigating the University to discover new technologies

- Office of Technology Transfer
  - Specific are of interest
  - More generalized mining
- Research Group
  - Publications
  - Presentations
  - Conferences

The Web

- Technologies Available for Licensing:
  - demo

Once you find a technology of interest

- Contact with Tech Transfer
- Meet with the Inventor under NDA
- Due Diligence
- Define “The Product”
- The Agreement
  - Individualized for each set of circumstances

Thank You

- Corine Farewell
  - Call : 585-273-2314
  - Stop by: 608 Hylan Bldg.