Tufts TECH TRANSFER

Technology available January 2013

Silk Bandages for Corneal Tissue Repair

Available Technologies:

- T001233
- T001430
- T001462

Features and Applications:

- Transparent thin films (2 - 4 μm) for corneal repair
- Ocular bandages for support and drug delivery
- Biodegradable
- Biocompatible
- Micropatterned structure to replicate corneal stromal tissue

Researchers at Tufts have developed an extensive portfolio based on reengineering silk fibroin biopolymers for corneal and other ocular repair products. These silk scaffolds are safe, non-immunogenic, and environmentally friendly [1]. They are also easily programmed to biodegrade at desired (and pre-determined) rates, as well as have the ability to release bioactive compounds.

Silk fibroin thin films (2 - 4 μm) have been engineered to replicate corneal stromal tissue architecture [2] and contain surface features to optimize fibroblast alignment [3]. These films were engineered to be transparent, breathable, cell-scaffold materials ideal for corneal bandages. Recent advancements have led to the development of improved silk corneal bandages, with degradation rates optimized for ocular tissue environments [4]. This promising device offers a new substitute to ocular pressure patches and bandages. The silk is readily engineered to degrade, while releasing therapeutics at the source. This has valuable implications in both ocular delivery and repair.

Transparent silk films

Tufts professor Fiorenzo Omenetto demonstrates how his lab engineered optically transparent silk films which are effective cell scaffolds and could act as corneal bandages.

[1] Altman et al. *Biomaterials* (2003), 401-416.

[2] Lawrence et al. *Biomaterials* (2009), 1299 - 1308.

[3] Gil et al. *Macromol Biosci* (2010), 10, 664 - 673.

[4] Shang et al. *tvst* (2012), 2, 1 - 11.

Summary

The biopolymer silk has been used to generate novel corneal scaffold materials. These scaffolds are high strength, porous, and have been engineered specifically to adapt to corneal fibroblast ingrowth. These silk bandages are excellent candidates as corneal grafts and other ocular drug delivery, support, and tissue repair applications.

Several IP positions are now available for licensing from Tufts University. Check out a full description of the technology at [http://techtransfer.tufts.edu/]

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