

Technology available January 2013

Available Technologies:

- ◆ T001537
- ◆ T001601
- ◆ T001649
- ◆ T001665
- ◆ T001713
- ◆ T001818

Features and Applications:

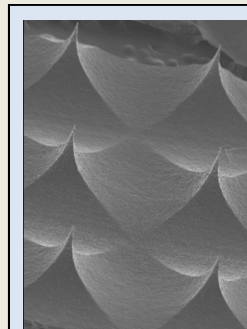
- Silk-based adhesives for wound care
- Biodegradable, and biocompatible
- Silk e-gels and pH responsive polymerization
- Microneedle patches for transdermal drug delivery
- Wound sealants with superior properties for clotting and adhesion

Silk-based Adhesives and Bandages

Researchers at Tufts University have developed a new range of new silk adhesive materials which controllably biodegrade and are easily biofunctionalized. These adhesives can be used as a continuous monitoring device, wound dressing, tissue sealants, or skin patch to release a bioactive agent.

Novel silk-PEG-based tissue sealants can be used to immediately seal oozing wounds. These polymers exhibited superior properties to CoSeal, the leading commercially available counterpart [1]. Silk electrogels (e-gels) were generated that respond to an applied magnetic field or changes in solution pH and provide a unique application as responsive hydrogels for biomedical applications [2].

Recently, silk microneedle bandages were developed [3] that can be loaded with bioactive compounds which maintain their activity while in use. These microneedle patterns adhere painlessly to skin and deliver therapeutics or provide a means to monitor blood chemistry. These adhesives, loaded with tetracycline, were



Silk Microneedles

Silk-based microneedle bandages adhere painlessly to the skin while slowly biodegrading. The silk material can be used to monitor localized changes in blood chemistry, or deliver a therapeutic agent through controlled release.

able to inhibit the growth of *S.aureus*, demonstrating their potential to prevent localized infections. Additionally, the researchers are able to adjust the processing conditions to precisely control drug release rates from the microneedles.

- [1] Serban et al. *J. Biomed. Mat. Res. A* (2011), 98A, 567 - 75.
- [2] Yucel et al. *J. Struct. Biol.* (2011), 170, 406 - 12.
- [3] Tsioris et al. *Ad. Materials* (2011), 22, 330 - 335.

Summary

Silk shows immense promise as an adhesive for biomedical applications. New microneedle patches adhere painlessly to the skin while delivering a drug load in a controllable fashion. The

ability to incorporate electronic and RFID sensors into silk bioadhesives makes it possible to use this technology for continuous blood monitoring and many other applications not possible with

traditional adhesives and bandages. **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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