

Waterproof Protein-Based Adhesives

Track Code: 2016-LIU-67241

Categories:

- Chemical Engineering
- Medical/Health

Keywords:

- Adhesives
- Biomedical Engineering
- Chemical Engineering
- Medical Devices
- Medical/Health
- Surgical Tools

Around 230 million invasive surgical procedures are performed every year worldwide and almost all of these procedures introduce additional tissue damage when stitches and staples are used to seal the incision. Designing an effective surgical adhesive that does not cause extra damage and may be applied internally is an important goal in biotechnology research. To be effective, a soft tissue adhesive should be biocompatible, set in a wet environment, create a strong bond, and match the stiffness of the surrounding soft tissues. The surgical glues used most commonly, fibrin-based and cyanoacrylate, are not effective enough to replace stitches and staples. Fibrin-based sealants form weak bonds and cyanoacrylates cause inflammation.

Researchers at Purdue University are developing an effective surgical adhesive that shows promise in other applications as well. The glue uses a family of recombinantly produced proteins and an enzymatically modified amino acid to form a strong elastic bond between the soft tissues being joined. The structural control afforded by this genetic engineering approach will allow molecular level alterations to the material's properties for promise in future uses. For example, the challenging process of integrating biologically inert prostheses with native tissue could be improved by adhering growth factor domains on prostheses to promote cell proliferation. This novel material may also be used to prevent migration of cells after chondrocyte implantation in cartilage repair.

Advantages:

- Matches soft tissue elasticity
- Genetic approach allows many possible future uses

Potential Applications:

- Medical/Health
- Surgical adhesive to replace stitches and staples

-Prostheses
-Cartilage repair

People:

- Liu, Julie C (Project leader)
- Brennan, Mary Jane
- Wilker, Jonathan J

Intellectual Property:

Application Date: August 8, 2016

Type: CIP-Patent

Country of Filing: United States

Patent Number: 10,351,743

Issue Date: July 16, 2019

Application Date: July 15, 2016

Type: Utility Patent

Country of Filing: United States

Patent Number: (None)

Issue Date: (None)

Application Date: July 15, 2015

Type: Provisional-Patent

Country of Filing: United States

Patent Number: (None)

Issue Date: (None)

Contact OTC:

Purdue Office of Technology Commercialization
The Convergence Center
101 Foundry Drive, Suite 2500
West Lafayette, IN 47906

Phone: (765) 588-3475

Fax: (765) 463-3486

Email: otcip@prf.org