PIEZOELECTRIC POLYMERS

Tech ID: 34011 / UC Case 2025-123-0

PATENT STATUS

Patent Pending

BRIEF DESCRIPTION

The challenge in utilizing α-Linolenic acid (ALA) for medical adhesives has been its poor water solubility and the high hydrophobicity of poly(ALA), typically necessitating elevated temperatures, organic solvents, or complex preparation methods for tissue application. UC Berkeley researchers have developed ALA-based powder and low-viscosity liquid superglues that overcome this limitation by polymerizing and bonding rapidly upon contact with wet tissue. The versatile adhesives are formulated using a monomeric mixture of ALA, sodium lipoate, and an activated ester of lipoic acid. These adhesives demonstrate high flexibility, cell and tissue compatibility, biodegradability, and potential for sustained drug delivery as a small molecule regenerative drug was successfully incorporated and released without altering the adhesive's properties. Additionally, the inherent ionic nature of the adhesives provides high electric conductivity and sensitivity to deformation, enabling their use as a tissue-adherent strain sensor.

SUGGESTED USES

- Medical and surgical applications for rapid and flexible bonding of wet biological tissue.
- Sustained and localized drug delivery systems for regenerative medicine.
- Development of tissue-adherent strain sensors for monitoring deformation and electrical signals.

ADVANTAGES

- Rapid polymerization and bonding upon contact with wet tissue, addressing limitations of prior ALA-based adhesives.
- No need for elevated temperatures, organic solvents, or complex preparations for application.
- High flexibility as confirmed by stress-strain measurements.
- Cell and tissue compatible and biodegradable.
- Potential for sustained drug release without compromising adhesive properties.

CONTACT

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INVENTORS

- Messersmith, Phillip B.

OTHER INFORMATION

CATEGORIZED AS

- **Materials & Chemicals**
  - Biological
  - Other
  - Polymers
- **Medical**
  - Devices
  - New Chemical Entities, Drug Leads
  - Other
  - Therapeutics
- **Sensors & Instrumentation**
  - Biosensors
  - Medical
  - Physical Measurement

RELATED CASES

2025-123-0

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High electric conductivity and sensitivity to deformation due to inherent ionic nature, enabling use as a strain sensor.

RELATED MATERIALS

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Medicinal Adhesive Compositions

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