Photoactive Material Blends as Cardiac Photostimulators

Tech ID: 34270 / UC Case 2025-800-0

BRIEF DESCRIPTION

This invention introduces a novel approach to cardiac tissue stimulation and maturation through the use of photoactive organic and biological material blends.

FULL DESCRIPTION

Researchers at UC Irvine have developed photoactive material blends that can control cardiac tissues. By harnessing light, this technology offers a wireless, genetic modification-free method for pacing cardiac contractions and promoting cardiac tissue maturation. Available in two forms, one based on synthetic polymer layers and another on synthetic biomolecule blends, these materials are designed to convert light into electrical stimuli, offering an innovative solution to cardiac tissue development and repair.

SUGGESTED USES

- Cardiac tissue engineering and regeneration therapies.
- Development of next-generation pacemakers and cardiac stimulatory devices.
- Research tools for studying cardiac electrophysiology and stem cell-derived cardiomyocyte maturation.
- Non-invasive treatment options for patients at risk of arrhythmias due to immature cardiac cells.

ADVANTAGES

- Enables higher spatiotemporal resolution in cardiac tissue stimulation compared to traditional electrode methods.
- Offers a genetic modification-free approach, preserving the native genetic makeup of cells.
- Utilizes soft, conformable materials that can be patterned as microfeatures for precise application.
- Facilitates non-invasive interventions in cardiac tissue development and repair, potentially reducing the risk of arrhythmias associated with immature cells.

PATENT STATUS

Patent Pending

RELATED MATERIALS

CONTACT

Ben Chu
ben.chu@uci.edu
tel: .

OTHER INFORMATION

CATEGORIZED AS

- **Biotechnology**
  - Health
- **Materials & Chemicals**
  - Biological
  - Chemicals
  - Polymers
- **Medical**
  - Devices
  - Disease: Cardiovascular and Circulatory System
  - Stem Cell

RELATED CASES

2025-800-0

» Yao, Z.-F., et al. Ardona, H. A. M. (2025). Complementary biomolecular coassemblies direct energy transport for cardiac photostimulators. PNAS, 122 (36). - 09/04/2025

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5270 California Avenue / Irvine,CA
92697-7700 / Tel: 949.824.2683