Hydrogelated Cells for Regenerative Medicine Applications

Tech ID: 34335 / UC Case 2025-423-0

ABSTRACT

Researchers at the University of California, Davis have developed a technology that introduces an approach to creating semi-living, non-replicating cellular systems for advanced therapeutic applications.

FULL DESCRIPTION

Utilizing a novel method of intracellular hydrogelation, this technology stabilizes mammalian cells, transforming them into semi-living entities. These engineered cells maintain their native secretion capabilities, protein synthesis, and therapeutic functionalities while gaining resistance to a variety of stressors. By embedding a synthetic polymer network within the cells, this platform effectively creates transient cell devices that can operate in challenging environments without replication, paving the way for innovative treatments in regenerative medicine, drug delivery, and beyond.

APPLICATIONS

- Tissue regeneration and wound healing.
- Revascularization and neuroprotection.
- Cell transplant in diabetes therapy.
- Drug delivery systems utilizing the cell's secretion capabilities for therapeutic molecule delivery.
- Development of semi-living materials with therapeutic properties for regenerative medicine.
- Angiogenesis promotion in critical care and chronic disease treatments.

FEATURES/BENEFITS

- Enhances stability and resistance to external stressors, including lethal concentrations of hydrogen peroxide and osmotic shock.
- Preserves essential cellular functions, inlcluding secretion, protein synthesis, and metabolic activity.
- Capable of producing therapeutic factors such as promoting angiogenesis, regnerating tissue, and treating chronic disease.
- Flexibility to be applied to a wide range of mammalian cell types, including stem cells, cancer cells, beta cells, and immune cells.
- Non-replicating nature of the cells minimizes risks associated with cell proliferation in vivo.
- Overcomes limitations of current therapeutic approaches by combining the benefits of cell therapy, synthetic materials, and small molecules.
- Addresses the challenge of cell loss and degradation in therapeutic applications.
- Solves the issue of maintaining therapeutic functionality under stress conditions that would compromise natural cells.

PATENT STATUS

Country	Type	Number	Dated	Case
Patent Cooperation Treaty	Published Application	WO2026/060231A1	03/19/2026	2025-423

Additional Patent Pending

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OTHER INFORMATION

KEYWORDS

regenerative medicine, synthetic biology, human cells, cell therapy

CATEGORIZED AS

- **Biotechnology**
  - Genomics
  - Health
  - Proteomics
- **Medical**
  - Delivery Systems
  - Devices
  - Gene Therapy
  - Stem Cell
  - Therapeutics
- **Nanotechnology**
  - NanoBio
- **Sensors & Instrumentation**
  - Biosensors
  - Medical

RELATED CASES

2025-423-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- A New Cell-free Protein Expression System with three-fold higher protein yield in batch and continuous mode than existing systems

- Protein Translation Machinery One Shot (TraMOS) Tool
- Exosome-Mimicking Nanovesicles
- Neuronal Injury Targeted Engineered Placental Mesenchymal Stem Cell Derived Extracellular Vesicles
- Systems and Methods of Single-Cell Segmentation and Spatial Multiomics Analyses
- Hydrogelated Bacteria as Antibacterial Vaccines
- Generalizable and Non-genetic Approach to Create Metabolically-active-but-non-replicating Bacteria
- Proteoglycan Mimetics For Enhanced Wound Healing Angiogenesis And Vascular Repair
- Ligands for Improved Angiogenesis and Endothelialization of Blood Contacting Devices

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