Hydrogels for Vascular Regeneration and Tissue Repair

Tech ID: 33672 / UC Case 2023-754-0

BRIEF DESCRIPTION

This invention introduces a novel approach to tissue engineering through the development of gelatin-based hydrogels that promote vascular regeneration and tissue repair without the need for growth factors.

FULL DESCRIPTION

Researchers at UC Irvine have developed technology for creating controlled synthetic hydrogels that support the formation of functional vasculature, essential for tissue regeneration. By leveraging the mechanical and chemical properties of gelatin-based hydrogels, this approach enables the development of therapeutic vessels, facilitating the regeneration of vascularized grafts for regenerative medicine applications. The hydrogels are designed to mimic the natural extracellular matrix, promoting endothelial cell growth and the formation of vascular structures with open lumens, thereby overcoming one of the main limitations in tissue engineering - insufficient vascularization.

SUGGESTED USES

- Regenerative medicine for the development of vascularized grafts.
- Disease modeling to understand vascular diseases and develop targeted therapies.
- Drug screening platforms to evaluate the efficacy and safety of new pharmaceuticals.
- Tissue engineering for the repair or replacement of damaged tissues and organs.

ADVANTAGES

- Induces vascularization without the addition of growth factors, reducing complexity and cost.
- Optimized mechanical and chemical properties encourage the formation of vascular structures with open lumens.
- Supports the co-culture of endothelial cells and fibroblasts, enhancing morphogenesis and tissue integration.
- Enzymatically crosslinked gelatin-based hydrogels offer excellent biodegradability, biocompatibility, and cellular interaction.
- Facilitates the study of vascular remodeling and the effects of mechanical cues on vascular assembly in 3D models.

PATENT STATUS

Patent Pending

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OTHER INFORMATION

CATEGORIZED AS

- **Medical**
  - Research Tools
- **Research Tools**
  - Other
  - Screening Assays

RELATED CASES

2023-754-0

RELATED MATERIALS

» Keshavarz, M., & Smith, Q. (2024). Gelatin-Mediated Vascular Self-Assembly via a YAP-MMP Signaling Axis. In Advanced Functional Materials. Wiley.

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