Engineered Biomaterial to Prevent Endothelial Inflammation

Tech ID: 30261 / UC Case 2019-557-0

ABSTRACT

Researchers at the University of California, Davis have developed a biocompatible material to mimic the glycocalyx, the natural layer of molecules that coats the outside of endothelial cells. This technology can be used to treat inflammation in diseases characterized by dysfunction in leukocyte-endothelial cell interactions.

FULL DESCRIPTION

Endothelial cells can lose glycocalyx when patients face chronic or acute systemic inflammation like that seen in COVID-19 or following ischemia reperfusion injury. When this loss of glycocalyx occurs, cell surface receptors are exposed to the extracellular environment. Circulating white blood cells (WBCs) then encounter the exposed receptors and bind to them - inducing an adverse inflammatory response. While circulating platelets support thrombus formation after encountering the receptors.

Researchers at the University of California Davis have developed an engineered biomaterial that prevents this inflammatory response by binding to the exposed receptors, thereby "hiding" the endothelial cell from the WBCs and platelets. The biomaterial consists of two parts: a binding peptide resistant to enzymatic degradation; and a glycosaminoglycan. The binding peptide has a unique, peptide-resistant sequence that improves function at lower doses. Its overall composition is very similar to that of natural glycocalyx, making it a likely candidate for safe and effective use as a therapeutic in humans.

APPLICATIONS

- A therapeutic for treating coagulopathy without systemic antiplatelet activity
- Reducing endothelial cell inflammation
- Minimizing disease-caused dysfunction in leukocyte-endothelial cell interactions

FEATURES/BENEFITS

- Protease-resistant
- Very similar to natural counterpart
- Endothelial cell receptor-specificity

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	12,527,873	01/20/2026	2019-557

Additional Patent Pending

CONTACT

University of California,
Davis Technology Transfer Office
techtransfer@ucdavis.edu
tel: 530.754.8649.



INVENTORS

- Chiamvimonvat, Nipavan
- Dehghani, Tima
- Lam, Kit S.
- Liu, Ruiwu
- Panitch, Alyssa
- Sodhi, Harkanwalpreet
- Thai, Phung

OTHER INFORMATION

KEYWORDS

glycocalyx, endothelial cell, leukocyte, peptide, mimetic, glycosaminoglycan, inflammation response, platelet, coagulopathy

CATEGORIZED AS

- **Materials & Chemicals**
  - Other
- **Medical**
  - Disease: Autoimmune and Inflammation
  - Disease: Respiratory and Pulmonary System
  - Therapeutics

RELATED CASES

2019-557-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Novel Solid Tumor Chemodrug LLS2
- Affinity Peptides for Diagnosis and Treatment of Severe Acute Respiratory Syndrome Coronavirus 2 and Zika Virus Infections
- Nanoparticles for Drug Delivery, Tissue Targeting and Imaging Analysis
- Conjugates That Combine HDAC Inhibitors and Retinoids into Disease Preventatives/Treatments
- Soluble Epoxide Hydrolase-Conditioned Stem Cells for Cardiac Cell-Based Therapy
- A Novel RGD-Containing Cyclic Peptide for use in Cancer Imaging and as a Targeted-Therapy Ligand
- Site-Specific Ligation and Compound Conjugation to Existing Antibodies
- Functional Illumination in Living Cells
- Beneficial Effects of Novel Inhibitors of Soluble Epoxide Hydrolase as Adjuvant Treatment for Cardiac Cell-Based Therapy
- Multifunctional Porphyrin-Based Nanomedicine Platform
- A Two-step Drug Delivery System Based on Click Chemistry
- Transformable Smart Peptides as Cancer Therapeutics
- Programmable Peptide Nucleic Acid-Based Nanoplatform for Customizable Drug Delivery
- Systems and Methods of Single-Cell Segmentation and Spatial Multiomics Analyses
- Proteoglycan Mimetics For Enhanced Wound Healing Angiogenesis And Vascular Repair
- Nanoplatform for Cancer Therapy
- Ligands for Improved Angiogenesis and Endothelialization of Blood Contacting Devices

University of California, Davis
Technology Transfer Office
1 Shields Avenue, Mrak Hall 4th Floor,
Davis,CA 95616

Tel: 530.754.8649
techtransfer@ucdavis.edu
https://research.ucdavis.edu/technology-transfer/
Fax: 530.754.7620

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