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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 |
|---------------------------|--------------------------------|--------------------------------|------------|----------|
| Patent Cooperation Treaty | Reference for National Filings | 2020/205602 A1 | 10/08/2020 | 2019-557 |

Patent Pending

CONTACT

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



INVENTORS

- ▶ Chiamvimonvat, Nipavan
- ▶ Deghani, 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
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- ▶ Nanoparticles for Drug Delivery, Tissue Targeting and Imaging Analysis
- ▶ Conjugates That Combine HDAC Inhibitors and Retinoids into Disease Preventatives/Treatments
- ▶ Artificial Intelligence-Based Evaluation Of Drug Efficacy
- ▶ 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
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- ▶ Functional Illumination in Living Cells
- ▶ Beneficial Effects of Novel Inhibitors of Soluble Epoxide Hydrolase as Adjuvant Treatment for Cardiac Cell-Based Therapy
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University of California, Davis
Technology Transfer Office
1850 Research Park Drive, Suite 100, ,
Davis, CA 95618

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

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