Site-specific Chemical Ligation of Native Human Serum Albumin as a Carrier for Drugs

Tech ID: 34334 / UC Case 2022-574-0

ABSTRACT

Researchers at the University of California, Davis, have developed a method to prepare chemically well-defined HSA-drug conjugates, such that ligation can occur in vitro or in vivo under physiological condition.

FULL DESCRIPTION

Human serum albumin (HSA), the most abundant protein in human blood plasma, has long been recognized for its versatility in clinical applications. Its natural abundance, biocompatibility, and ability to bind various molecules make it an attractive platform for both diagnostic and therapeutic purposes. Clinically, HSA has been successfully employed as a non-covalent carrier in several approved drugs, including insulin (e.g., Levemir), GLP-1 analogs (e.g., Liraglutide), and chemotherapeutics (e.g., Abraxane). Despite these successes, attempts to develop HSA-based covalent drug conjugates have not yet resulted in any approved therapies, highlighting a gap in translating covalent HSA-drug conjugates into clinical use.

Using the one-bead-one-compound (OBOC) peptide library, researchers at the University of California Davis have discovered several reactive peptidomimetics that covalently bond and modify HSA. These acrylated-peptidomimetics conjugate HSA through Aza-Michael addition in a site-specific manner. Also, the peptidomimetics are compatible with the maleimide-based protein functionalization, enabling dual functionalization of HSA. Preliminary data in the laboratory indicate that HSA-based modifications may enable new treatment options for diabetes and certain cancers.

APPLICATIONS

- Preparation of well-defined HSA-drug covalent conjugates for drug delivery.

FEATURES/BENEFITS

- Use of biocompatible peptidomimetics scaffolds.
- Can attach different payloads for specific drug targeting.

PATENT STATUS

Country	Type	Number	Dated	Case
Patent Cooperation Treaty	Reference for National Filings	WO 2024/077212	04/11/2024	2022-574

Patent Pending

RELATED MATERIALS

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OTHER INFORMATION

KEYWORDS

albumin, peptidomimetics, human serum albumin, diabetes, cancer, therapeutics, drug delivery

CATEGORIZED AS

- **Medical**
  - Delivery Systems
  - Disease: Cancer
  - Disease: Metabolic/Endocrinology
  - Therapeutics

RELATED CASES

2022-574-0

- Site-Specific Albumin-Selective Ligation to Human Serum Albumin under Physiological Conditions - 11/09/2022

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
- Artificial Intelligence-Based Evaluation Of Drug Efficacy
- 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
- Ligands for Alpha-4-Beta-1 Integrin
- Functional Illumination in Living Cells
- Multifunctional Porphyrin-Based Nanomedicine Platform
- A Two-step Drug Delivery System Based on Click Chemistry
- Transformable Smart Peptides as Cancer Therapeutics
- Engineered Biomaterial to Prevent Endothelial Inflammation
- Programmable Peptide Nucleic Acid-Based Nanoplatform for Customizable Drug Delivery
- PVA Nanocarrier System for Controlled Drug Delivery
- Systems and Methods of Single-Cell Segmentation and Spatial Multiomics Analyses
- Nanoplatform for Cancer Therapy

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