PVA Nanocarrier System for Controlled Drug Delivery

Tech ID: 27195 / UC Case 2012-126-0

ABSTRACT

Researchers at the University of California, Davis have designed and synthesized a unique type of water-soluble, biodegradable targeting poly(vinyl alcohol) (PVA) nanocarrier system for controlled delivery of boronic acid containing drugs, chemotherapy agents, proteins, photodynamic therapy agents and imaging agents.

FULL DESCRIPTION

Nanotechnology, as an emerging field, shows promise for the development of novel diagnostic, imaging and therapeutic agents for a variety of diseases including cancer. Nanoparticles offer several distinct advantages in these applications such as improved solubility, prolonged *in vivo* circulation time and preferential accumulation at a tumor site. One obstacle to the effective clinical application of nano-therapeutics is a lack of high affinity and high specificity targeting ligands that can deliver nanomedicines to a tumor or target site with high efficiency *in vivo*.

Researchers at the University of California, Davis have designed and synthesized a unique type of water-soluble, biodegradable targeting PVA nanocarrier system for controlled delivery of boronic acid containing drugs, chemotherapy agents, proteins, photodynamic therapy agents and imaging agents. These PVA-based carriers can: (i) be engineered to maximize preferential uptake into target sites (e.g. tumors); (ii) minimize premature release of boronic acid containing therapeutics, chemotherapeutic agents, and proteins and; (iii) can be triggered to release a payload drug on demand at the tumor site via exogenous administration of mannitol and/or reducing agents. These biodegradable nanoparticles are promising agents for the targeted intracellular delivery of anticancer drugs.

APPLICATIONS

- Cancer treatment via targeted nanotechnology

FEATURES/BENEFITS

- Cost effective
- Biocompatible and water soluble polymer
- Maximum preferential uptake at target site
- Controlled release of boronic acid therapeutics, chemotherapeutic agents and proteins
- On demand triggered release of payload at target site (e.g. tumor)

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,135,309	10/05/2021	2012-126

CONTACT

Raj Gururajan
rgururajan@ucdavis.edu
tel: 530-754-7637.

INVENTORS

- Lam, Kit S.
- Li, Yuanpei
- Xiao, Kai

OTHER INFORMATION

KEYWORDS

nanoparticles, chemotherapy agents, cancer treatment, photodynamic therapy, imaging, nanotechnology, ligands, nanomedicines

CATEGORIZED AS

- **Biotechnology**
  - Health
- **Imaging**
  - Medical
- **Medical**
  - Delivery Systems
  - Disease: Cancer
  - Imaging
  - Therapeutics
- **Nanotechnology**

- NanoBio

RELATED CASES

2012-126-0

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
- 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
- Engineered Biomaterial to Prevent Endothelial Inflammation
- Sequential Targeting and Crosslinking Nanoparticles for Tackling the Multiple Barriers to Treat Brain Tumors
- Systems and Methods of Single-Cell Segmentation and Spatial Multiomics Analyses
- Active Nanoplatform with High Drug Loading Capacity for the Diagnosis and Treatment of Cancer
- Mitochondria Targeting Photosensitizer for Photodynamic Therapy

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