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# 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

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## INVENTORS

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## 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
- ▶ Early Detection of Ovarian Cancer Using Markers to Short Chain Carbohydrates
- ▶ 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

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