Active Nanoplatform with High Drug Loading Capacity for the Diagnosis and Treatment of Cancer

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ABSTRACT

Researchers at the University of California, Davis have developed an active nanoplatform (F/HAPIN) for cancer diagnosis and therapy.

FULL DESCRIPTION

Nanoscaled drug delivery systems (NDDSs) are engineered by nanotechnologies for targeted delivery and controlled release of combinations of active pharmaceutical ingredients (APIs). The application of NDDSs in cancer improves the solubility of APIs, protects APIs from degradation without inducing side effects along the healthy organs. Nevertheless, current NDDSs suffer from low drug loading capacity.

Researchers at the University of California, Davis have developed a self-indicating combination of full/ high active pharmaceutical ingredients (API) loaded nanoplatform (F/HAPIN) for cancer diagnosis and therapy. The platform allows for nearly 100% combination drug loading with highly customizable drug delivery. Additionally, the platform has the capability to be both carrier-free and self-delivered while having controllable combination drug release. The use of the highly controllable platform with chemotherapeutic agents and photosensitizers achieves synergistic, precise and more efficient tumor ablation and lowers the risk of tumor recurrence in cancer.

APPLICATIONS

- Cancer diagnosis and therapy
- Photodynamic diagnosis of tumors
- Photoacoustic tomography for lymphatic mapping and tumor detection
- PET imaging and radiotherapy
- MRI imaging
- Sonodynamic therapy

FEATURES/BENEFITS

- Near 100% drug loading capacity
- Carrier-free and self-delivered
- Easily fabricated with simple chemical synthesis
- Synergistic effect
- Controllable drug release
- Self-indicating feature *in vitro* and *in vivo* dispositions fluorescently
- Structure-dependent fluorescence quenching

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OTHER INFORMATION

KEYWORDS

nanoplatform, cancer, oncology, carrier-free, fluorescence, pharmaceutical, drug loading, high capacity, phototherapy, radiotherapy, sonodynamic therapy

CATEGORIZED AS

- **Imaging**
  - Medical
- **Medical**
  - Delivery Systems
  - Diagnostics
  - Imaging
  - Screening
  - Therapeutics

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,559,585	01/24/2023	2017-568

- **Nanotechnology**
- Other

RELATED CASES

2017-568-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Multifunctional Porphyrin-Based Nanomedicine Platform
- Sequential Targeting and Crosslinking Nanoparticles for Tackling the Multiple Barriers to Treat Brain Tumors
- PVA Nanocarrier System for Controlled Drug Delivery
- Mitochondria Targeting Photosensitizer for Photodynamic Therapy

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