Synthetic Nanoparticles for Delivery of Immunomodulatory Compounds
Technology #18878

Applications

The current invention of synthetic nanoparticle carrying cyclic dinucleotide (CDN), an immunomodulatory compound, can be used to induce or enhance immune responses with the potential use as adjuvant for vaccines. It can also be used to elicit an immune responses against cancer or bacterial infections.

Problem Addressed

The role of CDN as an immunomodulatory compound has been demonstrated for a while; however, its use has been limited due to poor pharmacokinetics. Injected CDN is rapidly flushed from the site of injection, leading to systemic inflammation. Thus, there is a need for CDN delivery methods that retain the compound at the site of injection. The current invention utilizes synthetic nanoparticles formed by mixing CDN with peptide nucleic acid (PNA)-amphiphile conjugate to increase retention at the site of injection and avoid systemic inflammatory effects.

Technology

This invention uses PNA oligomer as a carrier of CDN, where they form reversible noncovalent complexes through pi-pi base stacking and hydrogen-bond interactions. The PNA oligomer is covalently conjugated to an amphiphile such as diacyl lipid tail, and optionally may include a polyethylene glycol (PEG) molecule. The arrangement of the lipid tail and PEG molecule allows for modulation of size and structure of the synthetic nanoparticle to control CDN delivery based on the desired response.

Advantages

- PNA-amphiphile conjugate acts as a modulatable carrier of CDN to control delivery and reduce systemic inflammatory effects.

Categories For This Invention:

Materials
Hydrophobic/Hydrophilic
Life Sciences
Biomaterials
Micro/nanoparticles (Biomaterials)
Clinical Applications
Immunology
Infectious Disease
Oncology
Therapeutics
Vaccine

**Intellectual Property:**

Synthetic nanoparticles for delivery of immunomodulatory compounds
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