

Polysaccharide A-Based Particulate Systems For Attenuation Of Autoimmunity, Allergy and Transplant Rejection

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ABSTRACT

Researchers at the University of California, Davis have developed a customizable polysaccharide that can be added to nanoparticles to reduce their rejection by the human immune system.

FULL DESCRIPTION

Therapeutic treatments such as vaccines, nanoparticle administration, and organ transplants all interact with the human immune system. Adverse immune responses can cause rejection of the therapeutic substance, leading to poorer outcomes for patients. Immunomodulatory agents that are recognized by regulatory T cells to trigger immune tolerance and are crucial for the successful use of therapeutics such as nanoparticles. Immunomodulatory polysaccharides are found in nature on the surface of harmless gut bacteria. However, isolation and chemical modifications of these polysaccharides often make them lose their immunomodulatory activity. Therefore, there is a need to synthetic and nanofabricated bioactive platform that retain their immunodulatory properties.

Researchers at the University of California, Davis have developed bacterially-derived Polysaccharide A (PSA) based nanoparticle (NPs) platforms targeted to dendritic cells (DCs) (and other immune cells) and encapsulating disease-relevant antigens. The modifications achieved by the researchers allow the polysaccharides to be tailored for specific uses with high efficiency chemical reactions that can be carried out without losing the ability to modulate immune system activity. Polymers or antigens could be incorporated with PSA via click chemistry reactions to generate conjugates that can be fabricated into nanoparticles. These modified polysaccharide-based nanoparticles have potential for widespread application in medical imaging, small molecule delivery, and vaccines that can avoid rejection by the immune system.

APPLICATIONS

- Coatings for nanoparticle therapeutics to avoid rejection by the immune system.
- Creation of degradable nanoparticles that can be administered with reduced side-effects.
- Imaging and diagnostic tests through the addition of fluorescent reporters.

FEATURES/BENEFITS

- Customizable polysaccharide conjugates: Chemical groups such as reporters, antigens, polycations, and polyanions can be added through high-efficiency chemical reactions.
- Customizable nanoparticles: The polysaccharides can be assembled around nanoparticles in a number of ways and can be added in layers in certain arrangements. Nanoparticles assembled in this way can still modulate the immune response.

PATENT STATUS

Country	Type	Number	Dated	Case
Patent Cooperation Treaty	Published Application	WO 2023/147504	08/03/2023	2022-558

Additional Patent Pending

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OTHER INFORMATION

KEYWORDS

Polysaccharide A,
microparticles,
nanotechnology, dendritic
cells, regulatory T-cells

CATEGORIZED AS

- **Biotechnology**
 - Health
 - Other
- **Materials & Chemicals**
 - Biological
 - Nanomaterials
 - Other
- **Medical**
 - Delivery Systems
 - Imaging
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 - Therapeutics
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