



TECHNOLOGY

Biomaterial coatings to Promote Immune Tolerance

OVERVIEW

Background

A primary function of the immune system is to protect the body from foreign pathogens. However, sometimes there are errors in the immune system that cause it to attack and eliminate the body's own cells – these events are classified as autoimmune reactions. Autoimmunity spans a range of important diseases including multiple sclerosis, diabetes, lupus, rheumatoid arthritis, and some types of allergies and asthma. These types of reactions are also highly relevant in organ and limb transplant fields. These conditions may focus on specific organs or specific cell types in a target tissue or throughout the entire body. Frequently, autoimmunity involves a progression of symptoms creating a chronic, debilitating, and eventually life-threatening disease. Although no cures currently exist, typical treatments for the symptoms of autoimmune diseases are life-long immune suppressants that minimize the immune system's attacks on the patient. However, these treatments normally act non-specifically and can lead to opportunistic infections due to the dampened or suppressed immune system of the patient.

Innovative Technology

Researchers at the University of Maryland have developed a biomaterial coatings platform for the treatment of autoimmunity. This platform – assembled entirely from biological materials – is well defined and can be designed to avoid triggering inflammatory immune processes, which could exacerbate autoimmune symptoms. These biomaterials will selectively promote regulatory immune cells that shift the patient's immune response away from inflammatory function and toward regulatory function. Importantly, this platform allows for promotion of tolerance specific for the target molecule responsible for the autoimmune reactions by expanding regulatory immune cells with this same target specificity. Thus, treatment with these materials could decrease or eliminate autoimmune driven inflammation while leaving the rest of the immune system intact. This selective targeting lowers concerns about opportunistic infections that can occur with current treatments for autoimmune disease.

APPLICATIONS

- Treatment of autoimmune disease
- Regulation of chronic inflammatory disease
- Improved acceptance and integration of organ and limb transplants

ADVANTAGES

- Design of fully-defined therapeutic agents from biological materials
- Coating can be injected in a self-assembled form or coated onto injectable particles or biomedical devices/scaffolds
- Ability to tune intrinsic inflammatory properties of biomaterials
- Promotion of regulatory immune cells specific for an autoimmune target to control autoimmunity without broad immunosuppression
- Materials can be targeted to immune cells or tissues to reduce side effects

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Additional Information

INSTITUTION

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PATENT STATUS

Pending

LICENSE STATUS

Available for exclusive or non-exclusive license

CATEGORIES

- Biologics
- Biomaterials
- Drug delivery devices
- Vaccines

EXTERNAL RESOURCES

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