148. Antigen-Specific Tolerizing Treatment for MS

(University of Florida)

5TH KDDF GLOBAL C&D TECH FAIR

Asset Overview

Product Type	Immunotherapy
Disease Area	CNS Disease
Indication	Multiple Sclerosis
Current Stage	Lead Optimization
Target	Immune system cells
MoA	Dual-sized, polymeric microparticles (dMPs) loaded with specific antigen and tolerizing factors for intra- and extra-cellular delivery, designed to recruit and modulate dendritic cells toward a tolerogenic phenotype without systemic release.
Brief Description	• Inventors have developed antigen-specific, tolerizing treatment for MS. This is a combinatorial dual-sized MP system (dMP), encapsulating, MS specific antigens and agents selected for their capacity to modulate DC function: both through intracellular delivery of agents in phagocytosable small MPs, and subcutaneous local deposition of agents for controlled release in MPs too large to phagocytose. • Disease blocking in mouse model of MS was associated with a reduction of infiltrating CD4+ T cells, inflammatory cytokine-producing pathogenic CD4+ T cells, and activated macrophages and microglia in the central nervous system. • CD4+ T cells isolated from dMP-treated mice were anergic in response to disease-specific, antigen-loaded splenocytes. • The efficacy of localized microparticle-based drug delivery to mediate antigen-specific tolerance to block MS without global immunosuppression.
Intellectual Property	WO2020010221A1
Publication	• Nano and Microparticle Emerging Strategies for Treatment of Autoimmune Diseases - Multiple Sclerosis and Type 1 Diabetes. Adv Healthc Mater. (2020) • Treatment with an antigen-specific dual microparticle system reverses advanced multiple sclerosis in mice. PNAS. (2022)
Inventors	Dorina AVRAM, Benjamin George Keselowsky, Joshua Stewart, Jonathan Joseph CHO

Highlights

- Highly specific because of the use of MS specific antigens
- Modulates dendritic cells of immune system to restore immune homeostasis
- Localized delivery of agents as opposed to other currently available systemic treatments, hence no global immunosuppression
- Use of small- and large-sized microparticles that provides intra- and extra-cellular delivery of agents, thus providing comprehensive autoimmune protection

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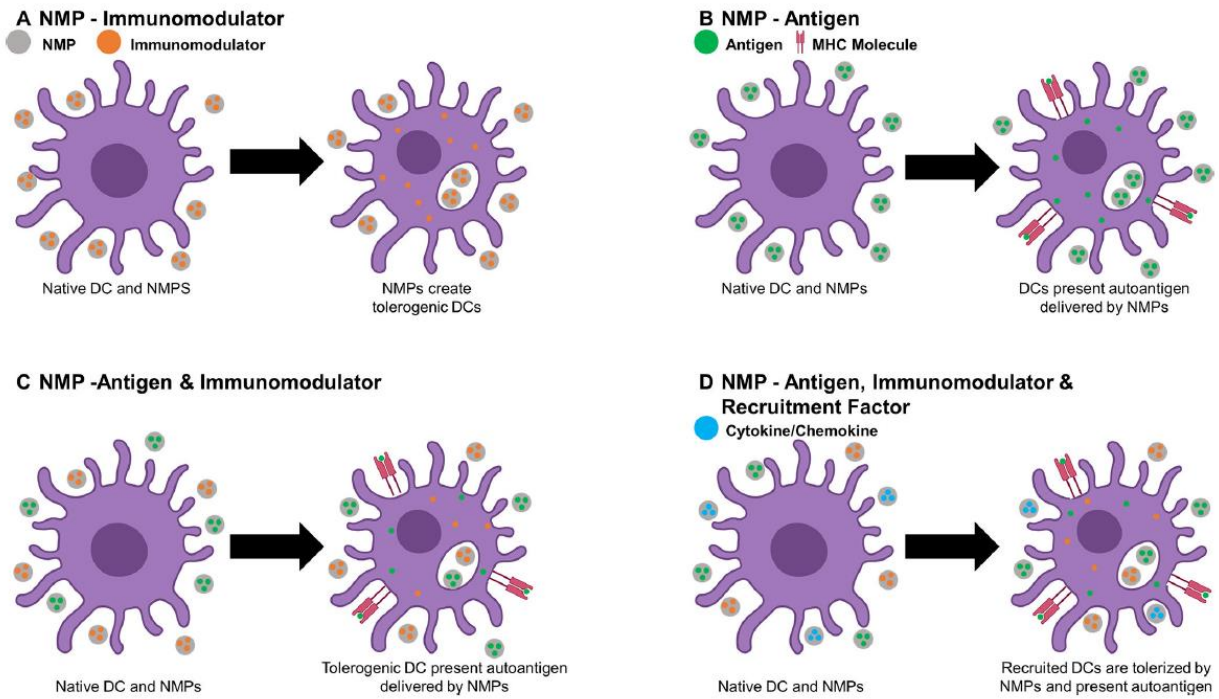
Key Data

Representative methods of alleviating autoimmunity with NMPs



A) NMPs that deliver immunomodulators to DCs in order to create a tolerized phenotype, B) delivery of autoantigen for presentation by DCs, C) delivery of both immunomodulators and antigen, to tolerize DCs which will then present the autoantigen in a tolerogenic context, and D) delivery of recruitment factors to increase DC recruitment to the injection site where autoantigen is taken up and immunomodulators induce a tolerogenic phenotype, after which DCs traffic to draining lymph nodes.