Hydrophilic Carbon Clusters for the Treatment of Chronic Inflammatory Diseases

Published date: Jan. 10, 2014

Technology description

Challenge

Lymphocytes play major roles in mediating and regulating immune responses and have been implicated in chronic inflammatory diseases such as multiple sclerosis, rheumatoid arthritis, and asthma. Immunomodulatory therapies that preferentially inhibit effector memory T (T_{EM}) lymphocytes without affecting naïve and central memory (T_{CM}) lymphocytes would reduce side effects associated with current therapies for chronic inflammatory conditions.

Solution

Researchers at Rice University demonstrate that poly(ethylene glycol)-hydrophilic carbon clusters (PEG-HCCs) exhibit immunomodulatory properties that make them attractive candidates for therapeutic use in the treatment of chronic inflammatory diseases. PEG-HCCs are shown to enter human T cells, preferentially inhibiting the proliferation of T_{EM} lymphocytes without inducing the death of T cells or causing generalized immunosuppression. These PEG-HCCs do not affect antigen processing and presentation by macrophages, and a reduction in the number of lesions to the blood-brain barrier was observedin vivoupon administration of PEG-HCCs to a model of multiple sclerosis in rats.

Benefits and features

Preferential inhibition of T_{EM} lymphocytes
PEG-HCCs bioavailable with long half-life upon injection
PEG-HCCs can be used in combination therapies involving drug delivery

Technology Relevant Papers and Web Links

Tour website: jmtour.com
A provisional patent application has been filed for this invention.

Application area

This invention finds potential application as a novel therapeutic for the treatment of chronic inflammatory diseases that are mediated by T_{EM} lymphocytes.

Institution

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