Stephen D. Miller, J Neurol Disord 2015, 3:3
http://dx.doi.org/10.4172/2329-6895.S1.002

OMICS International
conferenceseries.com

International Congress on
Neuroimmunology and Therapeutics
DoubleTree by Hilton Hotel San Francisco Airport, San Francisco, CA, USA

Therapeutic Inflammatory Monocyte Modulation using MARCO-Targeting Carboxylated Immune-Modifying Nanoparticles for Amelioration of Neuroinflammatory Disease

Stephen D. Miller
Northwestern University, USA

Inflammatory monocyte-derived effector cells are speculated to play a major pathologic role in the pathogenesis of numerous inflammatory neurological diseases. However, no treatment option currently exists that is capable of specifically modulating these cells. We show that intravenously infused 500 nm diameter negatively-charged, biodegradable immune-modifying-nanoparticles (IMPs) formulated from the FDA-approved biopolymer, poly(lactic-co-glycolic) acid (PLGA), are specifically taken up by inflammatory monocytes, in an opsonin-independent fashion, via the macrophage receptor with collagenous structure (MARCO). Subsequently, these monocytes no longer trafficked to sites of inflammation, rather, IMP infusion caused their sequestration in the spleen (through apoptotic cell clearance mechanisms) and ultimately caspase 3-mediated apoptosis. Administration of IMPs immediately following disease initiation in mouse models of relapsing experimental autoimmune encephalomyelitis (R-EAE), acute spinal cord injury, epilepsy and lethal West Nile virus encephalitis, markedly reduced monocyte accumulation at CNS inflammatory foci, significantly reduced disease symptoms and promoted tissue repair. Together these data highlight the intricate interplay between scavenger receptors, the spleen and inflammatory monocyte function; indicate a major pathologic role for blood-borne inflammatory monocytes rather than CNS-resident microglia in a variety of infectious and non-infectious neuroinflammatory diseases; and support the translation of IMPs for therapeutic use in a range of neuroinflammatory diseases caused or potentiated by inflammatory monocytes.

Biography

Stephen Miller is the Judy E. Gugenheim Research Professor of Microbiology-Immunology at Northwestern University Feinberg School of Medicine in Chicago. He received his Ph.D. in 1975 from the Pennsylvania State University and did postdoctoral training in cellular immunology at the University of Colorado Health Sciences Center before joining the faculty at Northwestern in 1981 where he currently serves as Director of the Northwestern University Interdepartmental Immunobiology Center. Dr. Miller has published more than 370 research papers, serves on the editorial boards of multiple journals, and is internationally recognized for his research on pathogenesis and regulation of autoimmune diseases using antigen-specific tolerance and monocyte targeting strategies.

s-d-miller@northwestern.edu

Notes: