Immunoregulation In The Brain

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Abstract
Immunoregulatory cytokines play an important role in controlling neuroinflammation and are of interest as therapeutic targets in diseases such as Multiple sclerosis (MS). Microglia (brain macrophages) are increasingly seen to play a major role in homeostatic regulation in the CNS. Microglia modulate T cell and other immune responses in the CNS via secretion of selective profiles of cytokines that influence the local immune environment, such as Type I interferons, as well as chemokines. Type I interferons (IFN), soluble secreted cytokines that comprise the multi-gene alpha family and a single gene beta molecule, signal through a shared IFNAR receptor and are implicated in antiviral responses. IFNβ is used as a first-line therapy for MS. Type I IFN are induced within the central nervous system (CNS) during inflammation or by experimental application of ligands for innate receptors. Cell sources include microglia as well as extraparenchymal myeloid cells. Responding cells include microglia and astrocytes. Effects of Type I IFN induction within the CNS include suppression of EAE in mice. The mechanism for this suppression may include induction of regulatory cytokines. Unlike MS, the antibody-mediated demyelinating disease Neuromyelitis optica (NMO) is refractory to IFNβ treatment. Correspondingly, NMO-like pathology is reduced in mice that lack the IFNAR receptor. Understanding how these regulatory programs are triggered and maintained will be key to therapeutic exploitation.

Trevor Owens moved from Ireland to Canada in 1972 and obtained his BSc (1974) and MSc (1977) at McGill University in Montreal. He obtained a Ph.D in biology, with Gordin Kaplan, at the University of Ottawa in 1981. He did postdoctoral training in immunology, first at University College London with Av Mitchison, and then at the Walter and Eliza Hall Institute for Medical Research in Melbourne Australia, with Jacques Miller. His research was on T and B lymphocytes, and how they are activated. He returned to McGill University as an Assistant Professor in 1987 and in 1990 he joined Jack Antel at the Neuroimmunology Unit of the Montreal Neurological Institute, where he built up a strong research program as a Professor in the McGill Departments of Neurology and Neurosurgery, and Microbiology and Immunology. His laboratory focuses on animal models of multiple sclerosis and specifically on interactions between immune cells and glial cells in the brain and spinal cord. He was Coordinator of the Neuroimmunology Unit from 1995 until 2004, when he became Professor at the University of Southern Denmark, where he has been Leader of the Neurobiology Research Department since its formation in 2010.