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Antigen-specific therapy of eae via intranasal delivery of filamentous phage displaying a myelin immunodominant epitope

Beka Solomon

Department of Molecular Microbiology and Biotechnology, Tel Aviv University, Israel

The presence of anti-myelin antibodies in patients with early multiple sclerosis (MS) and in MS animal models led to renewed interest in a role for B cells, plasma cells and their products in the pathogenesis of the disease. Here we propose a novel strategy based on engineered filamentous phage in which its major coat protein was fused to the immunodominant epitope derived from the myelin oligodendrocyte glycoprotein (MOG 37-44). Filamentous phages are well-studied, both structurally and genetically. Their shape as a long fiber, 1000nm long and 6nm wide, enables penetration to the central nervous system via nasal administration. Experimental autoimmune encephalomyelitis (EAE) diseased mice (as a model of MS) intranasally treated with phage-MOG showed: improved clinical scores; reduction of antibodies against MOG; reduced proinflammatory cytokines, in particular monocyte chemoattractant protein 1 (MCP-1), interferon γ (IFN-γ) and IL-6; and prevented demyelinization, compared to untreated animals. Brain delivery of MOG via filamentous phages suggests that the improved clinical effects obtained in EAE mice may be due to depletion of MOG autoantibodies in situ and/or stimulation of immune mechanisms towards induced tolerance in the periphery, indicating that the humoral immune system in MS would be a reasonable therapeutic option.

Biography

Prof. Solomon was the first investigator to visualize and develop the potential for immunotherapy for Alzheimer's disease. She is Professor and Chair for Biotechnology of Neurodegenerative Diseases at Tel-Aviv University, Israel. She is a member of the editorial board of several peer-reviewed journals. She was awarded the prestigious Zenith Award of the Alzheimer Association, being the first recipient in Israel and recently received the Dana Foundation Award for Neuroimmunology. She was included in Scientific American's list of 50 of the world's leading innovators for 2008. She received her Ph.D. from the Weizmann Institute of Science, Rehovoth, Israel.