Vaccine and Antibody Development Against Parkinson’s Disease

Researchers at the University of South Florida have identified three peptide fragments from human alpha synuclein protein that can be used to generate a preparation to reduce Parkinson’s disease (PD) symptoms, either through vaccine development or the generation of monoclonal antibodies.

PD is a neurodegenerative disease caused by progressive accumulation of abnormal intracellular aggregates of alpha synuclein (α-Syn) protein known as Lewy bodies. Classical clinical signs include bradykinesia, resting tremors and rigidity. Symptomatic relief is provided by dopamine replacement, however, the underlying disease process continues unabated. The advances in research with immunotherapies for Alzheimer’s disease have opened new opportunities for treatment of PD. Vaccines developed against α-Syn proteins and the administration of antibodies against α-Syn have been studied by several research groups in recent times. Treatment options, however, are still limited due to problems with the immune tolerance associated with aging and the control of abnormal responses to vaccination.

Our researchers have addressed this concern with the identification of three peptide fragments from human α-Syn protein. These fragments were used to sensitize bone marrow derived dendritic cells in order to create a preparation that can induce a good immune response and can inhibit PD development. This invention provides a dendritic cell-based vaccine that can both treat symptoms of PD and has potential in preventing the condition entirely. The dendritic cells can be collected from the patient’s own blood, eliminating the possibility of tissue rejection, and can serve as self-adjuvants with no additional stimulation of the immune system required. Early testing with mouse models have shown improved locomotor function without provocation of a generalized inflammatory response. The merits of this invention offer a safe and critical resource for clinical application in treating PD.

ADVANTAGES:

- Improved locomotor function
- No elicitation of generalized inflammatory response
- Promise for vaccine development
- Potential for creating monoclonal antibodies to treat PD

Treatment and Prevention of Parkinson’s Disease

α-Syn Peptide Selection: the fragments labeled A, B and C indicate the peptides utilized in this study, each peptide consisting of 20, 22, and 20 amino acids, respectively.

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