Researchers at the University of South Florida have developed antibodies and a dendritic-cell (DC) based vaccine for the treatment of Parkinson’s disease (PD).

PD is a neurodegenerative disease caused by the progressive accumulation of abnormal intracellular aggregates of the alpha synuclein (α-synuclein) protein. Classical clinical signs of the disease include bradykinesia, rest tremor, and rigidity. Symptomatic relief is provided by a dopamine replacement, but the underlying disease process continues unabated. DCs play a central role in initiating the primary immune response in the body. Antigen-sensitized DCs have been used as vaccines in many fields and are FDA approved to treat various diseases including HIV and cancer. However, there are currently no FDA approved DC based vaccines to treat PD, but preliminary success with DCs in the treatment of Alzheimer’s disease may indicate success for the treatment for PD as well.

USF researchers have developed a DC-based vaccine against α-synuclein, antibodies against α-synuclein, and methods of treating, preventing, and/or vaccinating against PD. This invention also provides methods of protecting against dopaminergic neuron cell death in a subject, as well as a composition comprised of an isolated dendritic cell that is sensitized to at least one peptide fragment of the α-synuclein protein. The DCs 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. 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 the treatment of PD.

ADVANTAGES:

- No immune response
- Potential to create monoclonal antibodies to treat PD
- Improved locomotor function
- Potential to treat and prevent PD

α-Synuclein Epitopes That Protect Against Dopaminergic Neuron Cell Death

Rotometric Locomotor Performance of Mice 17 Months after Vaccination

Rh-α-Synuclein Sensitized DC Vaccinated Mice Performed Significantly Better than Mice Vaccinated with Non-Sensitized DCs