Preliminary Report on the Safety and Tolerability of Bone marrow-derived Allogeneic Mesenchymal Stem Cells infused intravenously in Parkinson’s disease Patients

Mya Schiess1, Jessika Suescun1, Timothy Ellmore4, Marie-Francoise Doursout2, Erin Furr-Stimming1, Hongyu Miao3, Zhuyong Mei5, Adrian Gee5
1Department of Neurology, 2Department of Anesthesiology, 3Department of Biostatistics, University of Texas McGovern Medical School, 4Department of Psychology, City University of New York (CUNY), 5Center for Gene Therapy, Baylor College of Medicine

Objective:
Prove safety and feasibility of allogeneic mesenchymal stem cells (MSC) purified from bone marrow derived from a healthy adult and delivered intravenously in escalated doses to patients with idiopathic Parkinson’s disease (PD).

Background:
Considerable evidence supports a critical role of chronic neuroinflammation in the degenerative process of PD. Through paracrine and exosome actions MSC exerts regenerative and immunomodulatory effects.

Design/Methods:
A total of 20 subjects (M 11: F 9) between 45-78 years of age who met the UK Brain Bank criteria for idiopathic PD; OFF state H&Y of ≤ 3. Each dose cohort consists of 5 study subjects that received one of four doses of MSC: 1, 3, 6 or 10 x10⁶ MCS/kg of body weight. MSC were manufactured by the Pediatrics-Hematology-Oncology Cell & Gene Laboratory. Subjects are evaluated over a year at weeks 3, 12, 24 and 52. Safety as the primary outcome safety is defined as the absence of transfusion reactions, adverse events or organ damage. Secondary outcomes are defined by therapy impact on PD progression based on UPDRS, TUG, PDQ-39, H&Y, C-SSRS, neuroimaging, and immunologic profile.

Results:
All 20 subjects have received a single IV infusion without any adverse reactions in the first 24 hours. In subsequent follow up the most common side effect was hypertension, arthralgia, and nausea (27% for each), which was mild and transient in all cases, not requiring treatment. To date, the first fourteen patients sustained a reduction in UPDRS-III motor score (OFF state) at 12 weeks follow up.

Conclusions:
Preliminary findings from this ongoing small proof-of-concept study, that allogeneic MSC infusions appear to be safe and well tolerated in subjects with mild to moderate Parkinson’s disease. Our preliminary results warrant the completion of the study with the goal of identifying an ideal, well-tolerated dose that is associated with an improvement in cognition, motor function, and disability.