Scientists 1 step closer to cell therapy for multiple sclerosis patients

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Scientists at The New York Stem Cell Foundation (NYSCF) Research Institute are one step closer to creating a viable cell replacement therapy for multiple sclerosis from a patient's own cells.

For the first time, NYSCF scientists generated induced pluripotent stem (iPS) cells lines from skin samples of patients with primary progressive multiple sclerosis and further, they developed an accelerated protocol to induce these stem cells into becoming oligodendrocytes, the myelin-forming cells of the central nervous system implicated in multiple sclerosis and many other diseases.

Existing protocols for producing oligodendrocytes had taken almost half a year to produce, limiting the ability of researchers to conduct their research. This study has cut that time approximately in half, making the ability to utilize these cells in research much more feasible.

Stem cell lines and oligodendrocytes allow researchers to "turn back the clock" and observe how multiple sclerosis develops and progresses, potentially revealing the onset of the disease at a cellular level long before any symptoms are displayed. The improved protocol for deriving oligodendrocyte cells will also provide a platform for disease modeling, drug screening, and for replacing the damaged cells in the brain with healthy cells generated using this method.

"We are so close to finding new treatments and even cures for MS. The enhanced ability to derive the cells implicated in the disease will

undoubtedly accelerate research for MS and many other diseases," said Susan L. Solomon, NYSCF Chief Executive Officer.

"We hope that this protocol will be helpful to the MS field and the larger scientific community to better understand human oligodendrocyte biology and the process of myelination. This is the first step towards very exciting studies: the ability to generate human oligodendrocytes in large amounts will serve as an unprecedented tool for developing remyelinating strategies and the study of patient-specific cells may shed light on intrinsic pathogenic mechanisms that lead to progressive MS". said Dr. Valentina Fossati, NYSCF – Helmsley Investigator and senior author on the paper.

In multiple sclerosis, the protective covering of axons, called myelin, becomes damaged and lost. In this study, the scientists not only improved the protocol for making the myelin-forming cells but they showed that the oligodendrocytes derived from the skin of primary progressive patients are functional, and therefore able to form their own myelin when put into a mouse model. This is an initial step towards developing future autologous cell transplantation therapies in multiple sclerosis patients

This important advance opens up critical new avenues of research to study multiple sclerosis and other diseases. Oligodendrocytes are implicated in many different disorders, therefore this research not only moves multiple sclerosis research forward, it allows NYSCF and other scientists the ability to study all demyelinating and central nervous system disorders.

Multiple sclerosis is a chronic, inflammatory, demyelinating disease of the central nervous system, distinguished by recurrent episodes of demyelination and the consequent neurological symptoms. Primary progressive multiple sclerosis is the most severe form of multiple

sclerosis, characterized by a steady neurological decline from the onset of the disease. Currently, there are no effective treatments or cures for primary progressive multiple sclerosis and treatments relies merely on symptom management.

Provided by New York Stem Cell Foundation