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Researchers define ideal time for stem cell collection for Parkinson's disease therapy

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Researchers have identified a stage during dopamine neuron differentiation that may be an ideal time to collect human embryonic stem cells for transplantation to treat Parkinson's disease, according to data presented at Neuroscience 2008, the 38th annual meeting of the Society for Neuroscience.

Lorraine Iacovitti, Ph.D., professor and interim director of the Farber Institute for Neurosciences of Thomas Jefferson University, and her research team found that neural progenitor cells that express the gene Lmx1a are committed to the midbrain dopamine neuron lineage, but still retain proliferative capacity. Because of these characteristics, the stage at which Lmx1a is expressed may be ideal for transplantation.

"Identifying the subset of developing dopamine neurons and selecting those cells at the stage appropriate for their transplantation has been challenging," said Dr. Iacovitti. "Our research demonstrates that we are now able to grow neurons and select the ones that may work as a therapy, without the use of synthetic genes. This advance represents an important leap forward in the quest to devise a viable cell replacement therapy for Parkinson's disease."

The Lmx1a-positive cells cannot be identified solely by this transcription factor. However, Dr. Iacovitti and her team also found that a large percentage of the Lmx1a-positive cells express a cell surface protein called TrkB. This protein was not expressed on any of the other cell types identified in the cell culture. With TrkB as a cell surface marker,

dopamine neuron progenitor cells derived from human embryonic stem cells can be selected from a heterogenous population using magnetic-activated cell sorting (MACS) or fluorescence-activated cell sorting (FACS). Neither process alters the stem cell's genome. Dr. Iacovitti and her team are now testing the ability of these cells to counteract Parkinson's disease in animal models. They will also be adapting these procedures developed in human embryonic stem cells to adult-derived human induced-pluripotent stem cells.

Source: Thomas Jefferson University