New research from Memorial Sloan Kettering Cancer Center (MSKCC), Cornell University, and The University of Connecticut describes a novel way of producing therapeutic nerve cells that can cure mice with Parkinson's-like disease. The work, which will be published in the October issue of Nature Biotechnology (available online September 21), provides the first evidence that cloned cells can cure disease in an animal model.

In 2001, Lorenz Studer, MD , Head of the Stem Cell and Tumor Biology Laboratory at MSKCC, and his colleagues at Rockefeller University published research in which they generated unlimited numbers of genetically matched dopamine nerve cells using cloned stem cells whose genetic material originated from the mouse's own tail. Dopamine neurons are nerve cells that are lost in patients who have Parkinson's disease.

Because the initial method worked for cells derived from some mice but not others, Dr. Studer and his colleagues developed a better, more efficient way of selectively generating dopamine neurons that eliminates that variability in order for therapeutic cloning to work consistently for every animal. While they did not yet develop a new cell line for each of the mice treated, their results prove in principle that the method can work for all cloned cell lines tested.

Using the new technique, the team differentiated stem cells into genetically matched neural cells in vitro. They were able to selectively develop nerve cells specific to the forebrain, midbrain, hindbrain, and spinal cord, as well as supporting neural cell types called glial cells. The research demonstrates how closely the generated nerve cells in the culture dish mimic normal brain cell development, including how long the process takes, the appearance of the cells, and their function.

The new technique is a model system that will provide scientists with the opportunity to see how the brain develops in vitro, and conduct experiments such as observing in a culture dish the developmental consequences of disrupting single or multiple genes," said Dr. Studer, senior author of the study.

The next step is to develop unique cell lines for a number of Parkinsonian mice and show that these cloned cells can cure each individual mouse.

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