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Human brain stem cells grown in rats

Breakthrough Paves Way For Treatement Of Parkinson's, Epilepsy Patients

London: In a medical breakthrough, scientists claim to have found that human brain stem cells which were transplanted into the brains of newborn rats have matured and are able to function just like native rat cells.

An international team has said that the finding demonstrates the potential for people with brain damage, caused by epilepsy or Parkinson's for example, to use their own brain stem cells as a treatment.

The key finding was that the stem cells had the ability to turn into all types of brain tissue in rats. This includes the neocortex, which deals with higher processing, and the hippocampus, involved in memory and spatial awareness.

"We're showing the most dramatic integration of human adult neurons into rat brains," Steven Roper of the University of Florida in Gainesville, who led the team, was quoted by the New Scientist as saying.

For their research, the scientists extracted the adult stem cells from tissue taken from teenage girl's brain as part of standard epilepsy surgery. Then they multiplied the cells in the laboratory, and then genetically engineered them so that they would glow green under ultraviolet light.

Next, they injected groups of the cells into the brains of newborn rats. Three weeks later, they examined the rats' brains and found green cells throughout. "The cells matured into neurons appropriate for each part of the brain they reached," Roper said.

The human cells had begun to form synapses, or communication links, between neighboring cells. The scientists also found that the cells were fully functional and able to signal to rat neurons, as shown by lab tests monitoring the cells' electrical activity.

"That suggests that the transplanted human cells have integrated very well into this host circuitry," Roper added.

The hope is that when people with brain damage undergo surgery, it may be possible to isolate stem cells from excised tissue. These could then be multiplied in the lab, turned into cell types from which the person might benefit, then returned to the brain, say the scientists.

"At least some types of epilepsy are a result of abnormalities in the brain circuitry that makes up that part of the brain," Roper said. "And a lot of these might be due to a loss of certain types of neurons in these regions where the seizures start. If we could use cells to reconstitute those lost neurons, it might actually cure the epilepsy in some cases."

The findings had been presented at the American Epilepsy Society's annual meet in San Antonio on December 7.

The research was funded by an advocacy group, Citizens United for Research in Epilepsy, or Cure. AGENCIES