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Use of Human Fetal Brain Cells for Neurotoxicity Study

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ABSTRACT

A range of neurological disorders are debilitating and are caused mainly due to irreversible damage to neuronal cells. Animal models do not realistically represent the human disease and the results obtained using animal models often fail to hold true in human settings. In such a scenario use of human cell culture system as an *in vitro* system is a reasonable approach. The neural stem cell has great importance as it relates directly with neurogenesis in memory and neural functions. Human neural stem cell promises a diversity of applications such as modeling for early human neurogenesis, neuronal migration, neurogenic disorders and screening of small molecule of drug in the CNS. The idea of stem cell therapy raised hope for patients and caregivers for several neurodegenerative diseases based on promises of initial transplantation experiments in experimental and clinical studies. To reap the benefits of this scientific advancement and to use it as a therapeutic approach, a purified, continuous and sufficient population of well characterized human neural precursor cells (hNPCs) that have the ability to differentiate into glial cells and neurons is a pre-requisite. Besides their potential to be used in stem cell therapy, the hNPCs are also a very valuable tool for basic research studies involving human stem cell research. An *in vitro* human fetal brain cell culture system offers a great deal of benefit for studying neuropathogenesis at cellular and molecular levels. Therefore, we focused our efforts in isolating primary human brain cells for its use as an experimental tool to study cellular and molecular basis of neurological complications. We used this unique cell culture system of human neural precursor cells as a tool to investigate HIV-1 neuropathogenesis. Also, the potential of this robust cell culture system has been used for studying neuron-glia cross talk and *in vitro* model for neurodegenerative diseases such as Parkinson's disease and Alzheimer's disease.

Keywords: Fetal human brain cells, Neural precursor cells, Neurotoxicity

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