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Perspective

Development and Disorders Involving in Neural Stem Cells

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DESCRIPTION

During embryonic development, Neural Stem Cells (NSCs), which are self-renewing, multipotent cells, first produce the radial glial neural stem cells that give rise to the neurons and glia of the central nervous in all animals. In severely constrained areas of the adult vertebrate brain, some neural progenitor stem cells survive and continue to generate new neurons. One of the most significant phenotypic differences across species is the size of the central nervous system; thus, one of the most significant forces driving vertebrate evolution has been changes in the genes that control the size of the neural stem cell compartment. The ability of stem cells to develop into many cell types is one of their primary characteristics. They divide into two parent cell by symmetrical or asymmetrical cell division. Both daughter cells in asymmetric cell division are stem cells. One tissue regeneration and one specialized cell are produced by an asymmetric division of a stem cell. NSCs mainly differentiate into oligodendrocytes, astrocytes, and neurons. While additional substances produced by the brain progenitors and stem cell populations are also necessary for optimal growth, epidermal protein and Fibroblast Growth Factors (FGF) are mitogens that encourage brain progenitor and stem cell development *in vitro* . NSCs are thought to be the source of adult brain neurogenesis. NSCs in the adult brain are still unknown in terms of their genesis and identification. An adult NSC that is radial and positive for glial fibrillary acidic protein is the most frequently accepted model. Type B stem cells that are in a quiescent state are able to do so because of the renewable tissue provided by the unique niches made up of blood vessels, astrocytes, microglia, ependymal cells, and extracellular matrix that are found in the brain. The stem cells are fed, given structural support, and kept safe in these niches up until outside stimuli activate them. Once activated, Type B cells mature into active proliferating intermediate cells known as Type C cells, which then divide to form neuroblasts made up of Type A cells. The environment, or stem cell niche, provides extrinsic stimuli that encourage NSCs to start differentiating. When triggered, the rostral migratory stream, which has a marrow-like structure containing ependymal cells and astrocytes, migrates certain neural cells. Glial tubes made of astrocytes and ependymal cells are used by migratory neuroblasts. The astrocytes in the tubes offer protection from electrical and chemical signals sent by neighboring cells as well as assistance for the migratory cells. The fundamental antecedents for rapid cell growth are astrocytes. While additional substances produced by the brain progenitor and stem cell populations are also necessary for optimal growth, Epidermal Growth Factor (EGF) and Fibroblast Growth Factor (FGF) are data which were collected that encourage neural progenitor and stem cell growth *in vitro*. NSCs are thought to be the source of adult brain neurogenesis. NSCs in the adult brain have an unknown origin and identity. While additional substances produced by the brain progenitor and stem cell populations are also necessary for optimal growth, Epidermal Growth Factor (EGF) and Fibroblast Growth Factor (FGF) are data which were collected that encourage neural progenitor and stem cell growth *in vitro*. NSCs are thought to be the source of adult brain neurogenesis. NSCs in the forebrain have an unknown origin and identity. The huge diversity of neurons, astrocytes, and oligodendrocytes in the growing central nervous system is produced by NSCs, which play a significant role in development. In addition to providing neurons for the olfactory bulb in mice, they also play a crucial role in adult animals' learning and hippocampus plasticity. Significantly, numerous research teams from all around the world are now clarifying the function of NSCs during illnesses. The current work includes looking at how people and animal models react to stroke, sclerosis, and Parkinson's disease. The findings of this ongoing study may one day be used to treat neurological disorders in people. Neural progenitor cells produced from the human midbrain are capable of diffusing down several neural cell lineages that result in neurosphere and various neural phenotypes. A 3D *in vitro* model of the human can be created using neural progenitor cells obtained from the human midbrain. The adherent monolayer and the neurosphere culture systems are the two methods for cultivating neural progenitor cells taken from the human midbrain. The ability of the neurosphere culture system to aggregate and proliferate human midbrain-derived neural progenitor cells

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under serum-free media conditions in addition to the presence of skin growth factor and fibroblast growth factor-2 has previously been used to isolate and expand CNS stem cells.