

Method of Neuronal Stem Cell Production

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Technology description

UC San Diego investigators have developed a method for obtaining neural stem cells from embryonic stem cells (ESC) or induced pluripotent stem cells (iPSC). The method includes the steps of culturing ESC or iPSC in a medium comprising leukemia inhibitory factor (LIF), an inhibitor of glycogen synthase kinase 3 (GSK3) and an inhibitor of transforming growth factor-beta (TGF- β). Neural stem cells made in accordance with the method may be administered to a patient to treat a neurological disorder, for example Parkinson's disease, or an eye disease such as macular degeneration or glaucoma. The invention also provides a culture media supplement comprising LIF, GSK3 and TGF- β . Cell-based therapeutics and research and development in the area of neural injury and neurological disorders could benefit from a renewable source of neural stem cells. Human embryonic stem cells provide indefinitely self-renewing cells with differentiation potential, but are inferior to lineage-restricted cells as they are prone to causing teratomas and fail to repopulate host tissues in vivo. Significant challenges in isolation and long-term cultivation of tissue-specific stem cells has restricted broad use of neural stem cells. Accordingly, there is a need for a method for obtaining a renewable source of neural stem cells.

Related Materials

[Li et al, Proc Natl Acad Sci USA, 2011 May 17; 108\(20\):8299-304, "Rapid induction and long-term self-renewal of primitive neural precursors from human embryonic stem cells by small molecule inhibitors"](#) .

Application area

Possible commercial applications include cell-based therapies for treating a neurological disorder and culture media supplements. In addition to therapeutic uses, neural stem cells made in accordance with this method may also have applications in basic research, drug discovery and disease modeling.

Advantages

The current method provides an in vitro renewable source of neural stem cells.

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