MAKE THE MOST OF EVERY CELL

Stem Cells

No more dissecting embryos for rat neural stem cells

New GIBCO® Rat Fetal Neural Stem Cells

- → Supports adherent and neurosphere cultures
- → Retains undifferentiated phenotype
- → Supports differentiation into neurons, astrocytes, and oligodendrocytes

Neural stem cells (NSCs) are self-renewing multipotent stem cells that can differentiate into neurons, oligodendrocytes, and astrocytes.[1] NSCs can be isolated from the fetal or adult central nervous system, or derived from embryonic stem cells. Because of their capacity to generate neurons and glial cells, NSCs are a valuable source not only for neuroscience research but also to treat neurodegenerative diseases or neurological disorders.[2–4]

Supports adherent and neurosphere cultures

Rat fetal NSCs are isolated from the cortex of Sprague-Dawley E14 rats. Each vial contains 2 x 10^6 cells, which can be expanded up to three passages in adherent as well as neurosphere suspension cultures using StemPro® NSC SFM. StemPro® NSC SFM enables superior expansion of rat fetal NSCs in both adherent cell culture as well as neurosphere suspension cell culture (Figure 1).

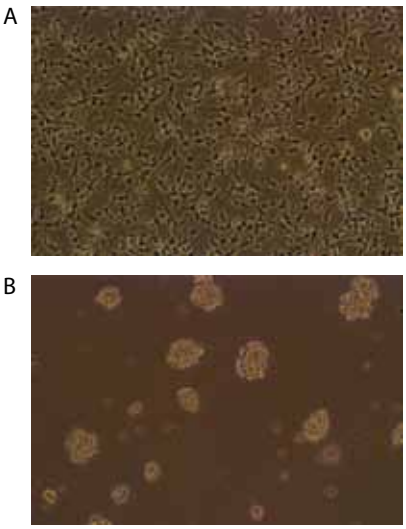

Figure 1—Expansion in adherent and neurosphere cell culture. **(A)** Rat fetal NSCs at passage 3 (P3) in adherent cell culture using StemPro® NSC SFM media. **(B)** Rat fetal NSCs at P3 in neurosphere suspension culture using StemPro® NSC SFM.

invitrogen™

Retains undifferentiated phenotype

GIBCO® Rat Fetal NSCs can be expanded in StemPro® NSC SFM media up to three passages without differentiation with more than 75% of rat fetal NSCs retaining their undifferentiated phenotype (Figure 2).

Supports differentiation into neurons, astrocytes, and oligodendrocytes

After proliferating rat fetal NSCs up to 3 passages, the cells were expanded from 2 x 10^6 cells to 300 x 10^6 cells and differentiated into multipotent lineages. Rat fetal NSCs spontaneously differentiate into neurons, oligodendrocytes, or astrocytes upon withdrawal of bFGF from culture media (Figure 3).

Components of the kit

1. GIBCO® Rat Fetal Neural Stem Cells (2 x 10^6 cells)
2. StemPro® NSC SFM Medium

References

1. Wu, Y.Y. et al. (2002) Isolation of stem and precursor cells from fetal tissue. *Methods Mol Biol* 198:29–40.
2. Bjorklund, A., and Lindvall, O. (2000) Cell replacement therapies for central nervous system disorders. *Nat Neurosci* 3:537–544.
3. Temple, S. (2001) The development of neural stem cells. *Nature* 414:112–117.
4. Zhao, C. et al. (2008) Mechanisms and functional implications of adult neurogenesis. *Cell* 132:645–660.

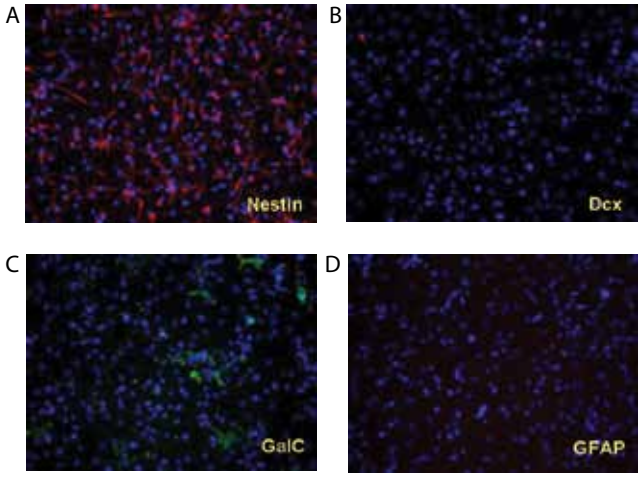

Figure 2—Fluorescence images (20x) of rat fetal NSCs at P3 cultured in StemPro® NSC SFM for 10 days and stained for the appropriate phenotypic marker using fluorescence-conjugated antibodies. Nuclei were stained with DAPI (blue) in all images. While approximately **(A)** 90% of the cells stain positive for the undifferentiated NSC marker Nestin, less than 10% of the cells are positive for differentiated cell type markers **(B)** Dcx, **(C)** GalC, and **(D)** GFAP.

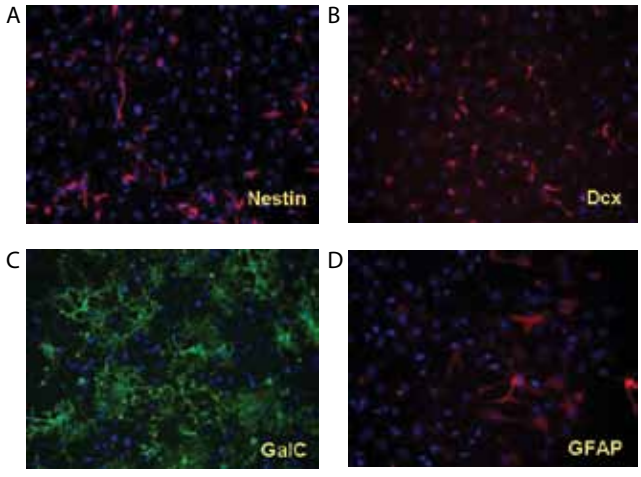

Figure 3—Differentiation potential of rat fetal neural stem cells proliferated up to passage 3 in StemPro® NSC SFM media. After 3 passages in StemPro® NSC SFM Medium, cells were induced to differentiate by withdrawal of mitogen. Upon differentiation, cells start to lose **(A)** NSC marker expression (Nestin) but differentiate into **(B)** neurons (Dcx), **(C)** oligodendrocytes (GalC), and **(D)** astrocytes (GFAP).

Ordering information

Product	Quantity	Cat. no.
GIBCO® Rat Fetal Neural Stem Cells	1 vial (2 x 10^6 viable cells/mL)	N7744-100
GIBCO® Rat Fetal Neural Stem Cell Kit	1 kit	N7744-200