NEURAL STEM CELL PRODUCTS

Neural Stem Cells

Standardized Media and Reagents

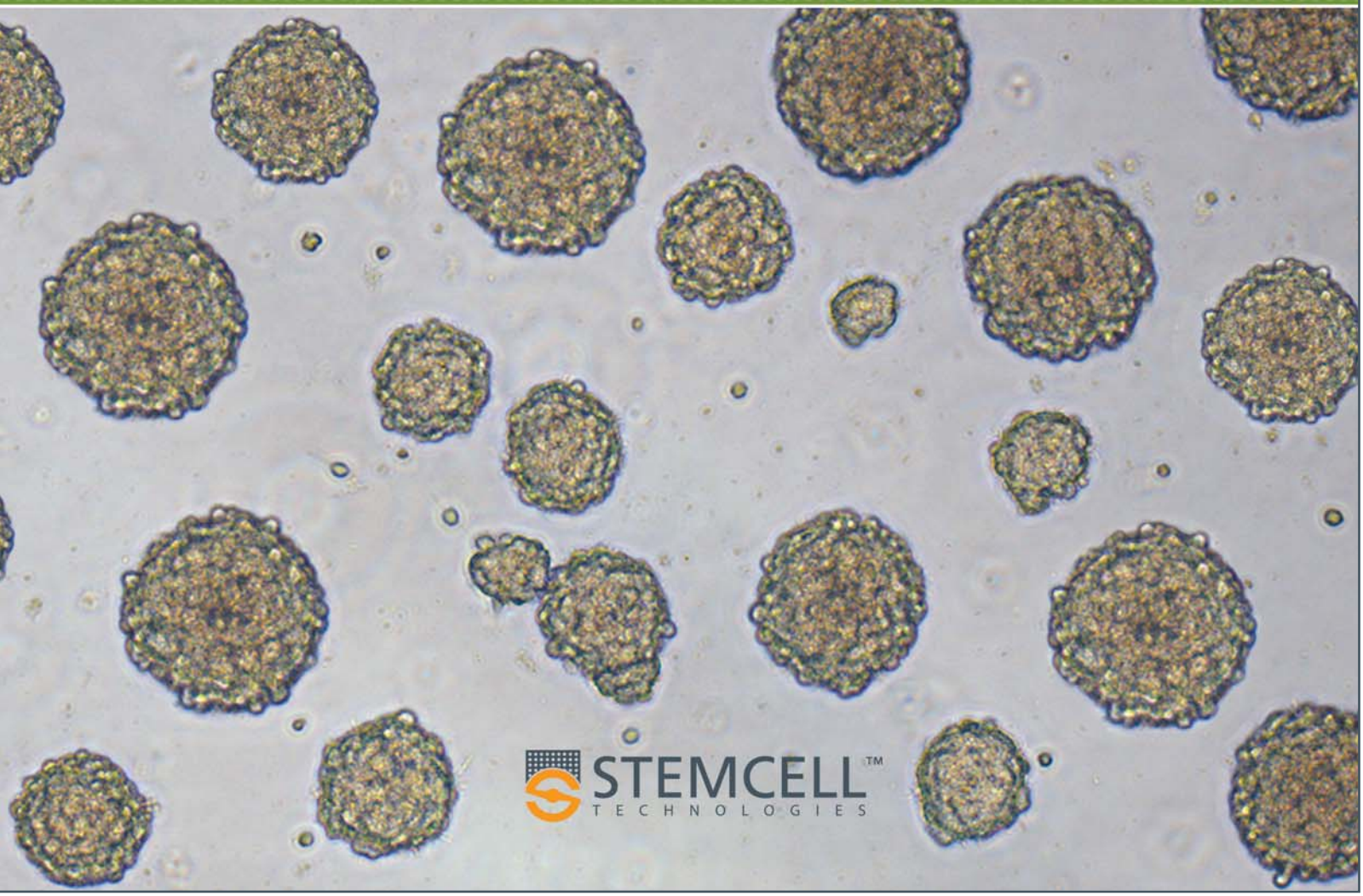


Table of **Contents**

Scientists Helping Scientists

STEMCELL Technologies has been setting standards for quality cell culture media and reagents since 1993. As scientists helping scientists, we have developed over 1000 specialty products for stem cells from a variety of tissues, including neural, hematopoietic, pluripotent, mesenchymal, mammary and more. The NeuroCult™ product line includes nearly 30 different media products, culture assays and differentiation kits for primary mammalian neural stem cells, as well as media supplements for neurons. Learn from NeuroCult™ protocols, educational videos, webinars and mini-reviews at www.stemcell.com.

Superior Neural Stem Cell Culture

With Consistent, High-Quality Media and Reagents

Neural stem cells (NSCs) are defined as cells with the ability to proliferate, self-renew, and produce a large number of functional progeny that can differentiate into neurons, astrocytes and oligodendrocytes. They were first isolated from the embryonic and adult mouse striatum in the early 1990s using the neurosphere assay,[1,2] and have since been identified in nearly all regions of the embryonic mouse, rat and human CNS as well as the subgranular layer of the dentate gyrus in the mature CNS.[3] Recently, malignant multipotent neural stem-like cells, or brain tumor stem cells (BTSCs), have also been isolated from various brain cancers.[4]

In order to leverage the full potential of NSCs and BTSCs for illuminating CNS development and pathology, high-quality in vitro culture methodologies are vital. The standardized NeuroCult™ culture system provides a wide range of species-specific media and supplements, for the proliferation and differentiation of rat, mouse and human NSCs. As with all of STEMCELL Technologies' products, NeuroCult™ media adhere to our renowned quality control standards, which include prescreening raw materials before use and performance testing in relevant assays.

NeuroCult™ also provides optimized protocols for proliferation of NSCs using neurosphere or adherent monolayer cultures. By supporting neurosphere and adherent monolayer culture, NeuroCult™ provides researchers with the flexibility to use the culture system most suited to the NSC properties under investigation.

Obtain high-quality NSC cultures for reproducible experimental results with versatile, standardized NeuroCult™.

Advantages of NeuroCult™ for Neural Stem Cells

STANDARDIZED. Standardized media and culture conditions minimize variability and lead to increased reproducibility between experiments.

OPTIMIZED. Species-specific formulations are optimized for expansion and differentiation of human, rat or mouse neural stem and progenitor cells.

EASY TO USE. Products are supplied with detailed technical manuals to guide researchers through the culture of neural stem cells.

VERSATILE. Supports neural stem and progenitor cells from normal and tumor tissues.

WALLCHART

Neural Stem Cells (collaboration with Nature Neuroscience)

www.stemcell.com/NSCWallchart

SCAN ME

Culture Mouse Neural Stem Cells

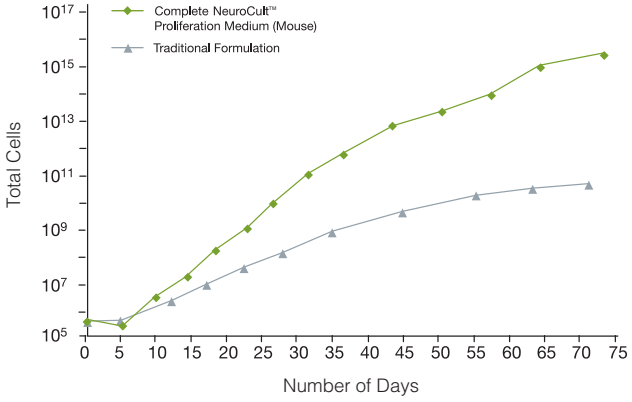
Increase Mouse Neural Stem Cell Expansion with NeuroCult™

Maintain mouse neural stem and progenitor cell culture for extended periods of time in standardized NeuroCult™ culture media. Optimized protocols are available for both neurosphere and adherent monolayer culture methods.

Primary neural stem and progenitor cells from embryonic and adult mouse CNS can be cultured with the serum-free NeuroCult™ Proliferation Kit (Mouse) to achieve significantly increased total cell expansion when compared to a traditional formulation (Figure 1). Mouse neural stem and progenitor cells can be differentiated into neurons, astrocytes and oligodendrocytes by plating cells with the NeuroCult™ Differentiation Kit (Mouse) (Figures 2B-E).

In addition, cryopreserved passage 1 neurospheres from three different regions of mouse embryonic day 14 (E14) CNS are available. Cryopreserved neurospheres are easy to use, convenient and cost-effective, enabling researchers to avoid live animal work and laborious preparation time by utilizing prepared neurospheres.

FIGURE 1. Comparison of cell expansion with the NeuroCult™ Proliferation Kit (Mouse) and a traditional formulation using the neurosphere culture system (n = 3)



Cells microdissected from the cortices of E14 mice were cultured as neurospheres in Complete NeuroCult™ Proliferation Medium (Mouse) or a traditional formulation containing 20 ng/mL rh EGF. At Day 71, cells cultured in Complete NeuroCult™ Proliferation Medium (Mouse) were at Passage 13 while cells cultured in a traditional medium formulation were at Passage 10. Complete NeuroCult™ Proliferation Medium (Mouse) consists of NeuroCult™ NSC Basal Medium (Mouse), NeuroCult™ NSC Proliferation Supplement (Mouse) and 20 ng/mL rh EGF.

WEBINAR

Neurosphere versus Adherent Monolayer NSC Culture Systems

www.stemcell.com/CulturingNSCs

SCAN ME

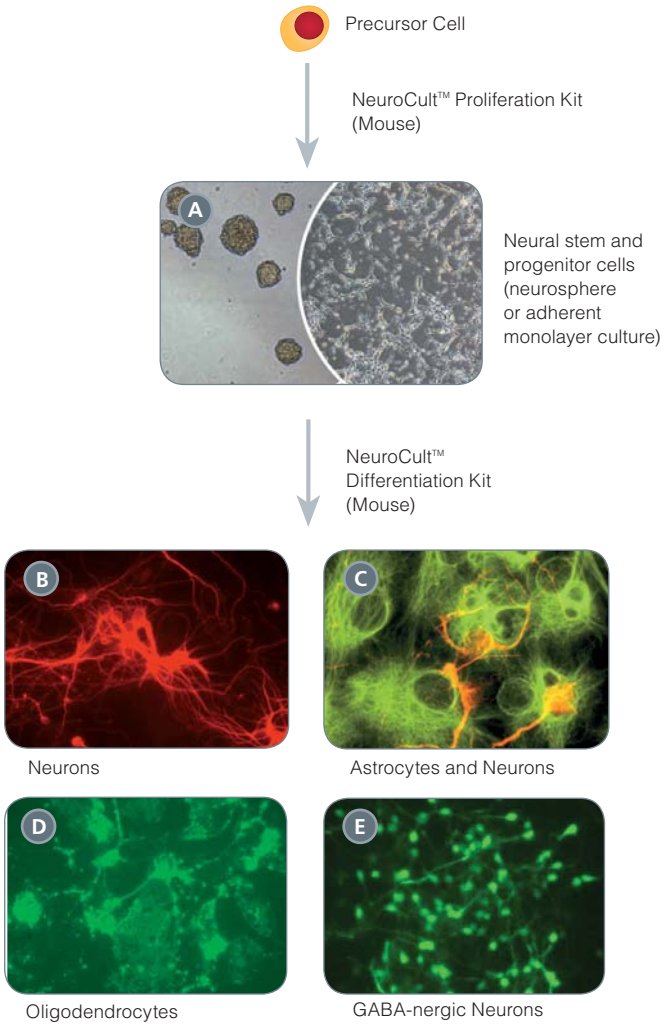
VIDEO

NeuroCult™ Proliferation Media

www.stemcell.com/NSCMediaVid

SCAN ME

FIGURE 2. Proliferation and differentiation of mouse neural stem cells using NeuroCult™



A. Mouse neural stem and progenitor cells cultured with the NeuroCult™ Proliferation Kit (Mouse).

B. Immunofluorescent staining of neuron cell body and processes (red) with mouse monoclonal ß-Tubulin III antibody (Catalog #01409).

C. Immunofluorescent staining of astrocytes (green) with rabbit polyclonal GFAP antibody (Catalog #01415) and neurons (red) with mouse monoclonal MAP2 antibody (Catalog #01410).

D. Immunofluorescent staining of oligodendrocytes (green) with mouse monoclonal O4 Oligodendrocyte Marker antibody (Catalog #01416).

E. Immunofluorescent staining of GABA-nergic neurons (green) with rabbit polyclonal GABA antibody (Catalog #01411).

PRODUCT	QUANTITY	CATALOG #
Proliferation Medium		
NEW USE! NeuroCult™ Proliferation Kit (Mouse)*	500 mL	05702
Differentiation Medium		
NeuroCult™ Differentiation Kit (Mouse)	500 mL	05704
Kit Components		
NeuroCult™ NSC Basal Medium (Mouse)	450 mL	05700
NEW USE! NeuroCult™ NSC Proliferation Supplement (Mouse)*	50 mL	05701
NeuroCult™ NSC Differentiation Supplement (Mouse)	50 mL	05703
Neurospheres		
Cryopreserved Mouse E14 Striata Neurospheres	5 x 10^6 cells	00330
Cryopreserved Mouse E14 Cortex Neurospheres	5 x 10^6 cells	00331
Cryopreserved Mouse E14 Ventral Mesencephalon Neurospheres	5 x 10^6 cells	00332

* Requires supplementation with rh EGF (Catalog #02633). When culturing cells obtained from adult mouse, rh bFGF (Catalog #02634) and heparin (Catalog #07980) are also required.

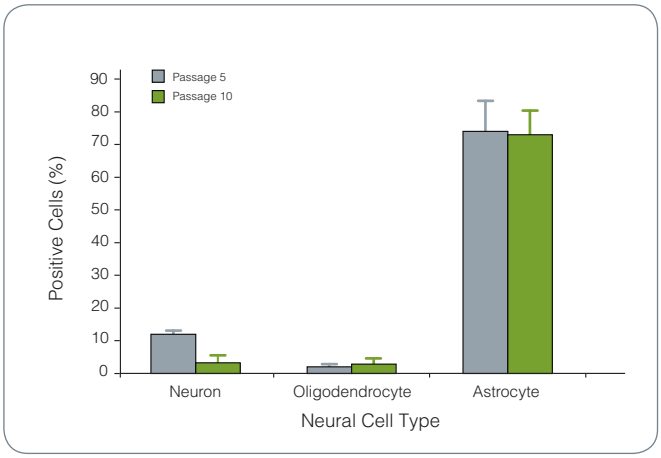
Culture Rat Neural Stem Cells

Maintain Rat Neural Stem Cells in Long-Term Cultures with NeuroCult™

Optimize embryonic and adult rat neural stem cell culture with standardized NeuroCult™ culture media. Neurospheres or primary cells from rat CNS cultured with the **NeuroCult™ NS-A Proliferation Kit (Rat)** (Catalog #05771) maintain multi-lineage potential for at least 10 culture passages (Figures 3 and 4). This serum-free formulation offers significantly increased total cell expansion compared to a traditional media formulation when grown in either T-25 cm^2 flasks or ultra-low adherent culture dishes (Figure 5). The rate of doubling is highest using the NeuroCult™ NS-A Proliferation Kit (Rat) and T-25 cm^2 tissue culture flasks. Rat neural stem and progenitor cells can be differentiated into neurons, astrocytes and oligodendrocytes using the **NeuroCult™ NS-A Differentiation Kit (Rat)** (Catalog #05772) (Figures 3 and 4).

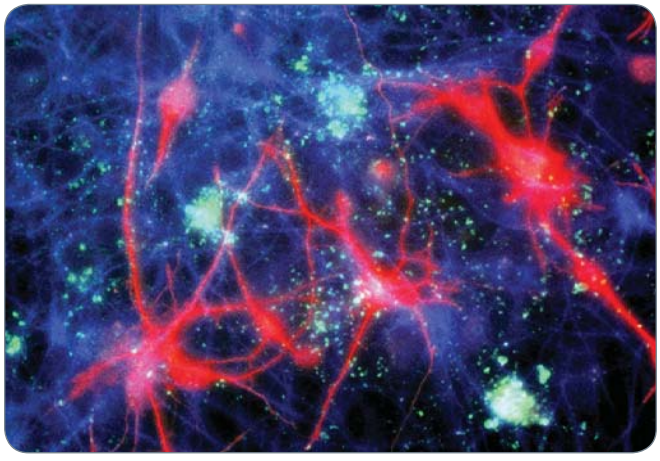
Cryopreserved passage 1 neurospheres (Catalog #00340/00341/00342) from three different regions of rat embryonic day 18 (E18) CNS are available. Cryopreserved neurospheres are easy to use, convenient and cost-effective. Researchers can avoid live animal work and laborious preparation time by utilizing prepared neurospheres.

FIGURE 3. Multi-lineage differentiation potential of rat neural cells derived from neurospheres cultured with the NeuroCult™ NS-A Proliferation Kit (Rat) and differentiated with the NeuroCult™ NS-A Differentiation Kit (Rat)



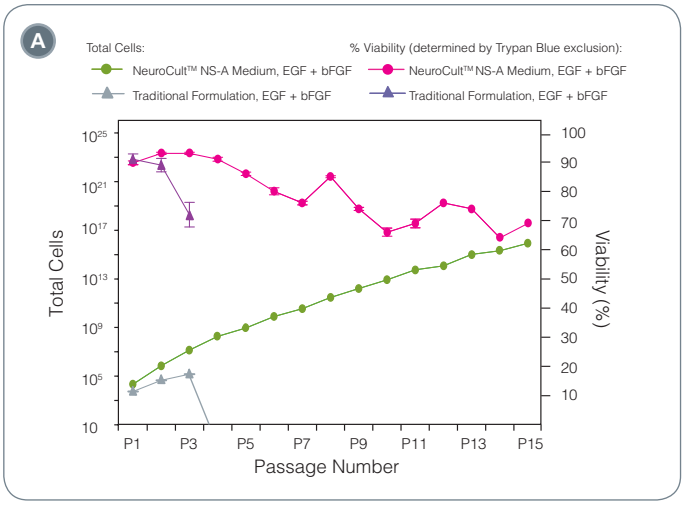
Neurons, oligodendrocytes and astrocytes are observed after culturing with the NeuroCult™ NS-A Proliferation Kit (Rat) for more than 5 passages (prior to differentiation).

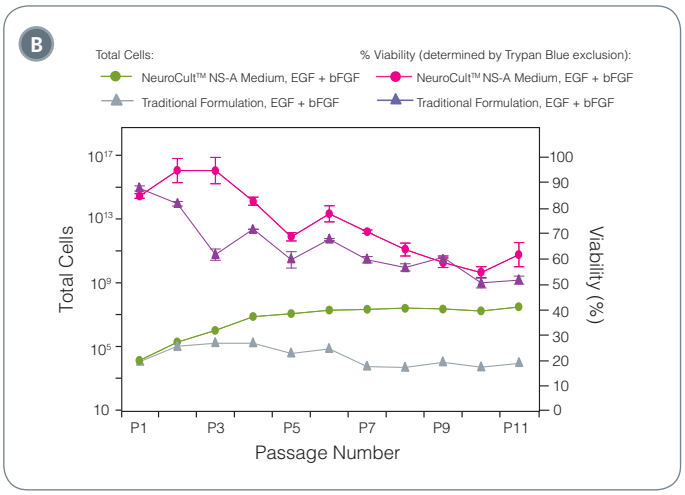
FIGURE 4. Rat neural stem cells cultured with the NeuroCult™ NS-A Proliferation Kit (Rat) maintain multi-lineage differentiation potential in long-term cultures



Neurons (red) were detected with a mouse monoclonal ß-Tubulin III antibody (Catalog #01409), oligodendrocytes (green) with a mouse monoclonal O4 Oligodendrocyte Marker antibody (Catalog #01416) and astrocytes (blue) with a rabbit polyclonal GFAP antibody (Catalog #01415).

FIGURE 5. Comparison of cell expansion and percent viability obtained for neurospheres cultured in (A) T-25 cm² flasks or (B) ultra-low adherent dishes with the NeuroCult™ NS-A Proliferation Kit (Rat) or a traditional formulation





A. Cells cultured with the NeuroCult™ NS-A Proliferation Kit (Rat) (NS-A Medium) continued to generate neurospheres beyond passage 15 resulting in an increase in total cell number. Cells cultured with a traditional formulation did not generate new neurospheres beyond passage 3 when cultured in T-25 cm² flasks.

B. Neurospheres could be continually generated in both media formulations beyond passage 10. However, higher cell expansion and percent viability were observed with the NeuroCult™ NS-A Proliferation Kit (Rat) (NS-A Medium) compared to a traditional formulation. Neurospheres cultured in ultra-low adherent dishes were very difficult to dissociate after passage 4.

PRODUCT	QUANTITY	CATALOG #
Proliferation Medium		
NeuroCult™ NS-A Proliferation Kit (Rat)*	500 mL	05771
Differentiation Medium		
NeuroCult™ NS-A Differentiation Kit (Rat)	500 mL	05772
Neurospheres		
Cryopreserved Rat E18 Cortex Neurospheres	1 x 10^6 cells	00340
Cryopreserved Rat E18 Hippocampus Neurospheres	1 x 10^6 cells	00341
Cryopreserved Rat E18 Spinal Cord Neurospheres	1 x 10^6 cells	00342

* Requires supplementation with rh EGF (Catalog #02633), rh bFGF (Catalog #02634) and heparin (Catalog #07980).

Culture Human Neural Stem Cells

Maintain Human Neural Stem Cells in Long-Term Cultures with NeuroCult™

Expand and differentiate human neural stem and progenitor cells from normal or tumor CNS tissues with standardized NeuroCult™ culture media. NeuroCult™ protocols are available for both the neurosphere or adherent monolayer culture systems. The **NeuroCult™ NS-A Proliferation Kit (Human)** contains serum-free medium and supplements for the growth and expansion of neural stem and progenitor cells isolated from human CNS. This optimized medium formulation allows human NSCs to be expanded long-term in culture (Figure 6). The **NeuroCult™ NS-A Differentiation Kit (Human)** contains components to efficiently differentiate human neural stem and progenitor cells into neurons, astrocytes and oligodendrocytes (Figure 7).

PRODUCT	QUANTITY	CATALOG #
Proliferation Medium		
NeuroCult™ NS-A Proliferation Kit (Human)*	500 mL	05751
Differentiation Medium		
NeuroCult™ NS-A Differentiation Kit (Human)	500 mL	05752

NEW USE!

* Requires supplementation with rh EGF (Catalog #02633), rh bFGF (Catalog #02634) and heparin (Catalog #07980).

FIGURE 6. Total cell expansion for fetal human telencephalic and cortical cells cultured as neurospheres with Complete NeuroCult™ NS-A Proliferation Medium containing rh EGF, rh bFGF and Heparin (n = 2)

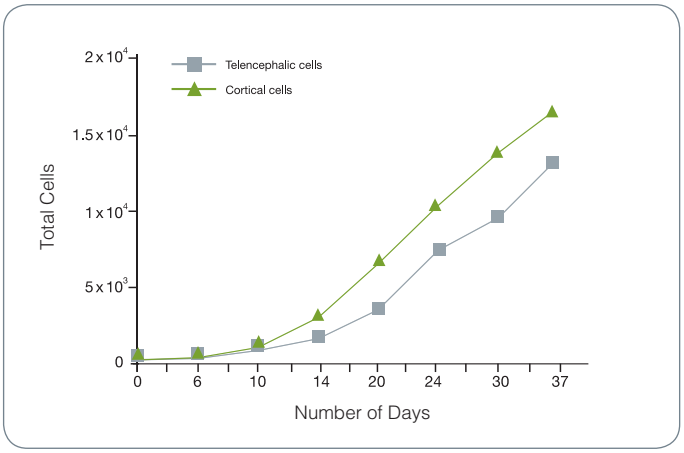
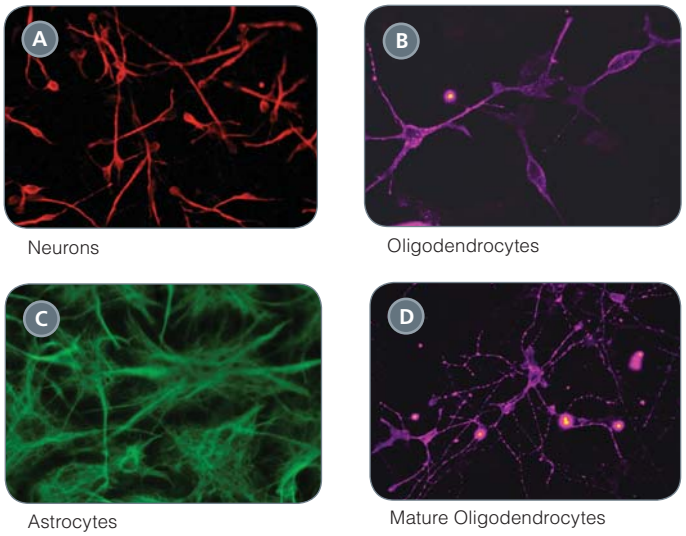


FIGURE 7. Immunofluorescent staining to identify the differentiated cell types generated following culture of human neural stem and progenitor cells with the NeuroCult™ NS-A Differentiation Kit (Human)



Neurons | Oligodendrocytes

Astrocytes | Mature Oligodendrocytes

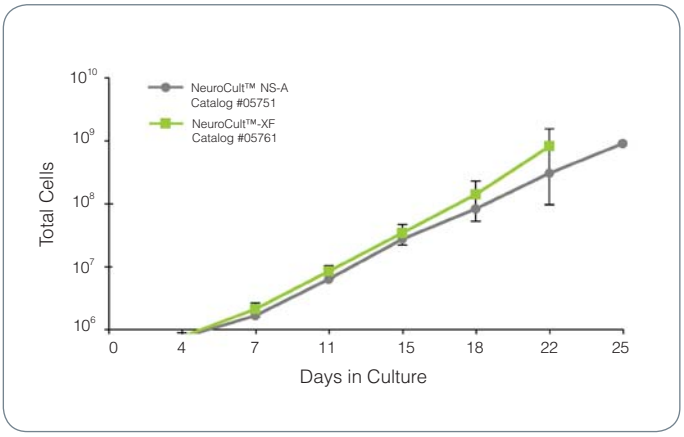
A. Neurons (red) were detected with a mouse monoclonal ß-Tubulin III antibody.
B. Immature oligodendrocytes (purple) were detected with a rabbit monoclonal O4 Oligodendrocyte Marker antibody.
C. Astrocytes (green) were detected with a rabbit polyclonal GFAP antibody.
D. Mature oligodendrocytes (purple) were detected with a galactocerebroside antibody.

Photos and data courtesy of Angelo L Vescovi.

Xeno-Free Human Neural Stem Cell Culture

Given the interest in using neural stem cells for applications in regenerative medicine, there is a need for xeno-free culture systems. STEMCELL Technologies has therefore developed **NeuroCult™-XF Proliferation Medium**, a xeno-free, serum-free culture medium designed to support prolonged and reproducible expansion of human NSCs in culture. Neurospheres can be efficiently generated and expanded in NeuroCult™-XF Proliferation Medium (Catalog #05761) and NSCs maintain multi-lineage potential in long-term cultures (Figure 8 and 9, respectively).

FIGURE 8. Neurospheres derived from human fetal CNS tissue can be efficiently generated for multiple passages in NeuroCult™-XF Proliferation Medium.



Total cell expansion obtained with NeuroCult™-XF is comparable to that obtained with NeuroCult™ NS-A Proliferation Medium (Human).

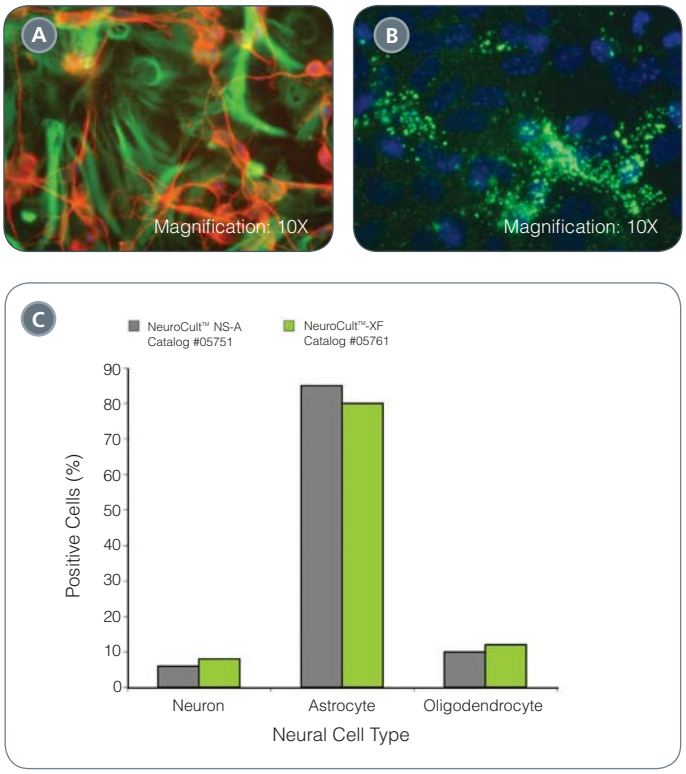
PRODUCT	QUANTITY	CATALOG #
Proliferation Medium		
NeuroCult™-XF Proliferation Medium*	500 mL	05761

NEW USE!

* Requires supplementation with rh EGF (Human) and rh bFGF. To provide a complete xeno-free system, carrier-free cytokines should be used. Carrier-free cytokines are supplied without carrier proteins, such as bovine serum albumin. Human serum albumin can be added during preparation of the cytokine, to increase stability.

Note: The bFGF cofactor, heparin, can be added to NeuroCult™-XF, however, the heparin solution contains non-human animal-derived components and can be omitted if a complete xeno-free system is desired.

FIGURE 9. NSCs cultured in NeuroCult™-XF Proliferation Medium maintain multi-lineage potential in long-term cultures



A. Neurons (red) were detected with a mouse monoclonal ß-Tubulin III antibody and astrocytes (green) were detected with a rabbit polyclonal GFAP antibody.

B. Oligodendrocytes (green) were detected with rabbit monoclonal O4 Oligodendrocyte Marker antibody and cell nuclei (blue) were identified using the DNA dye DAPI.

C. Percentage of neurons, astrocytes and oligodendrocytes generated following differentiation of NSCs previously cultured in NeuroCult™-XF or NeuroCult™ NS-A Proliferation Medium (Human).

Identify and Enumerate Neural Stem Cells

Discriminate Between Neural Stem and Progenitor Cells

Robust functional assays that can identify and measure NSC activity are critical to understanding NSCs and their therapeutic potential. Recent publications have highlighted the limitations of the neurosphere assay as an accurate assay for measuring NSC frequency in relation to NSC regulation.[5,6] One of these major limitations is that not all neurospheres are derived from a NSC.[6] Because the neurosphere assay does not discriminate between neurospheres derived from a neural stem or progenitor cell, enumerating neurosphere numbers and equating this read-out to NSC numbers often overestimates NSC frequency. In addition, neurosphere fusions occur significantly, even at limiting dilution plating[7] and the lack of standardization in the neurosphere culture system makes it difficult to compare experimental results between laboratories.[8,9]

Discriminate between neural stem cells and neural progenitor cells with the single-step Neural Colony-Forming Cell (NCFC) Assay. This collagen-based assay (refer to Figure 10 for a procedure overview) has been incorporated into a complete kit. Using the **NeuroCult™ NCFC Assay Kit**, clonally-derived colonies of different sizes are generated. Cells with high proliferative potential form the largest sized colonies (≥2 mm in diameter) in the NCFC Assay and fulfill all the functional criteria of a NSC (Figures 11 and 12). Cells with low and limited proliferative potential form colonies <2 mm in diameter. They are designated as progenitor cells as they do not meet all the functional criteria of a stem cell (Figure 11).

If desired, colonies can be excised from the collagen matrix and incubated individually in collagenase. The excised colony can then be disrupted to produce a single cell suspension. The cells from a single colony can be used in assays such as the neurosphere assay, plated onto a glass chamber slide and differentiated, or used in any other desired protocol.

The NeuroCult™ Neural Colony-Forming Cell (NCFC) Assay Kit can:

- **QUANTIFY** neural stem and progenitor cells[6,10,11]
- **DISCRIMINATE** between neural stem cells and progenitor cells[6,10,12]
- **COMPARE** neural stem and progenitor cell content in different CNS regions[13,14]
- **STUDY** effects of cytokines or other compounds on neural stem cell regulation[12,14]
- **IDENTIFY** changes in neural stem and progenitor cell numbers in transgenic or other animal models[6,10,12,13]

FIGURE 10. Overview of NCFC Assay Procedure

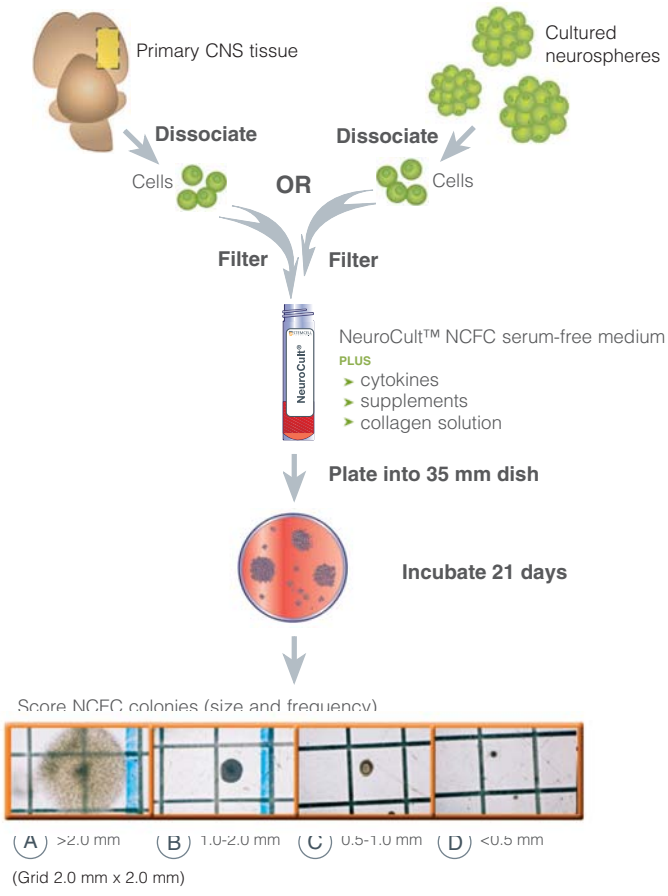
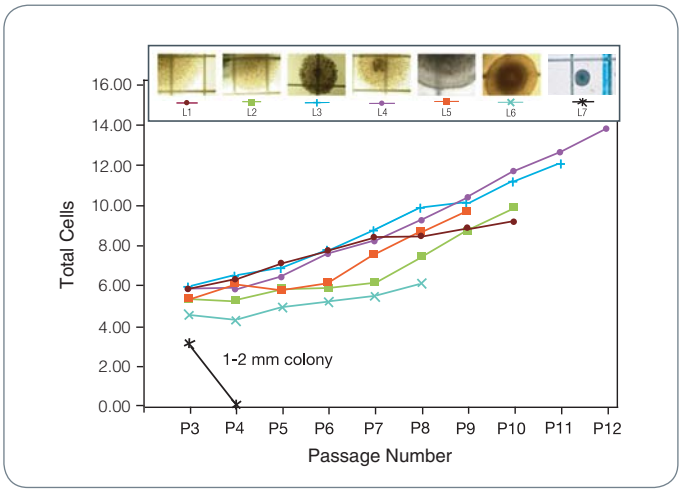
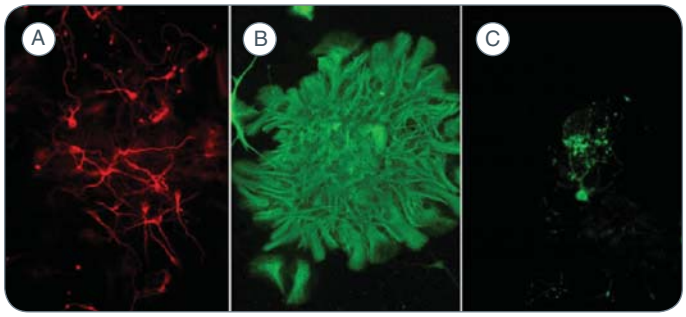


FIGURE 11. Proliferative potential of cells obtained from colonies ≥2 mm in diameter in the NeuroCult™ NCFC Assay



Cells isolated from six representative colonies (L1, L2, L3, L4, L5, L6) ≥2 mm in diameter were passaged in neurosphere cultures and showed high fold expansion and self-renewal ability. Cells from a colony (L7) 1 - 2 mm in diameter failed to form neurospheres past passage 3 (✶).

FIGURE 12. Cells isolated from colonies ≥2 mm in diameter maintain multi-lineage potential



A. Neurons (red) were detected with a mouse monoclonal ß-Tubulin III antibody.

B. Astrocytes (green) were detected with a rabbit polyclonal GFAP antibody.

C. Oligodendrocytes (green) were detected with a rabbit monoclonal O4 Oligodendrocyte Marker antibody.

PRODUCT	QUANTITY	CATALOG #
NeuroCult™ Neural Colony-Forming Cell (NCFC) Assay Kit (Mouse)[1]	1 kit	05740
NeuroCult™ Neural Colony-Forming Cell (NCFC) Assay Kit (Rat)[2]	1 kit	05742

1) Requires supplementation with rh EGF (Catalog #02633). When culturing cells obtained from adult mouse rh bFGF (Catalog #02634) and heparin (Catalog #07980) are also required.

2) Requires supplementation with rh EGF, rh bFGF and heparin.

Components of the NCFC Assay Kit include:

- NeuroCult™ NCFC Serum-Free Medium without Cytokines
- NeuroCult™ Proliferation Supplements (species-specific)
- NeuroCult™ Basal Medium (species-specific)
- Collagen Solution
- Collagenase Solution
- 35 mm Culture Dishes
- Scoring Dishes
- Technical Manual

WEBINAR

Hematopoietic, Neural, and Mesenchymal Toxicity Testing

www.stemcell.com/CASInfoVideo

SCAN ME

VIDEO

NeuroCult™ Neural Colony-Forming Cell (NCFC) Assay

www.stemcell.com/NCFCAssayVid

SCAN ME

Passage Neural Stem Cell Cultures

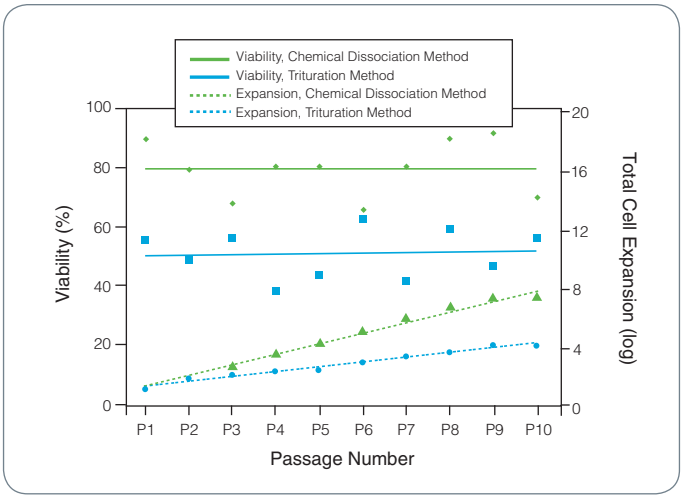
Standardized Methods to Passage NSC Cultures

STEMCELL Technologies has developed the **NeuroCult™ Chemical Dissociation Kit (Mouse)** (Catalog #05707) for the non-mechanical and non-enzymatic dissociation of neurospheres derived from mouse CNS. A significantly higher percent viability and total cell number is observed (after expansion) in comparison to trituration (Figure 13), while maintaining the functional properties of the cells upon subsequent subcultures (Figure 14).

Enzymatic methods are suitable for the dissociation of neural stem and progenitor cells from human, mouse or rat CNS cultured using the neurosphere or adherent monolayer culture methods. STEMCELL provides optimized procedures for the use of **ACCUTASE™** (Catalog #07920) to dissociate NSCs cultured in NeuroCult™. Cell viability and total cell number (after expansion) was higher when neuropheres were dissociated with ACCUTASE™ compared to trituration (data not shown).

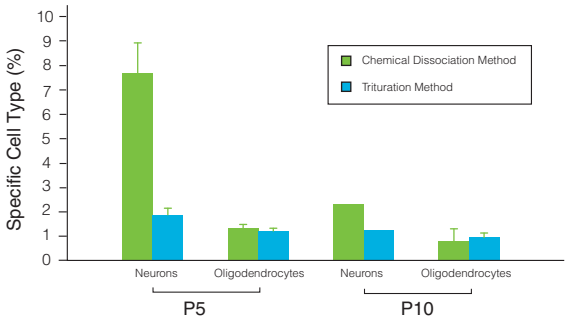
PRODUCT	QUANTITY	CATALOG #
NeuroCult™ Chemical Dissociation Kit (Mouse)	1 kit	05707
ACCUTASE™	100 mL	07920

FIGURE 13. Comparison of percent viability and cell expansion between the NeuroCult™ Chemical Dissociation Kit and trituration.



Mouse neurospheres were dissociated at each passage (up to P10) with the NeuroCult™ Chemical Dissociation Kit or trituration. Cells dissociated with the NeuroCult™ Chemical Dissociation Kit had a significantly higher percent viability and total cell number (after expansion) in comparison with trituration.

FIGURE 14. Comparison of the multi-lineage potential of cells from neurospheres dissociated with the NeuroCult™ Chemical Dissociation Kit and trituration



Cell-specific lineages were determined by immunostaining with specific antibodies for neurons (ß-Tubulin III, Catalog #01409) and oligodendrocytes (MBP, Catalog #01417) at passages 5 and 10. The percentage of astrocytes generated by cells from neurospheres dissociated with the NeuroCult™ Chemical Dissociation Kit or trituration is similar, as determined by immunostaining with GFAP (Catalog #01415; data not shown).

Dissociate CNS Tissue

Enzymatically Dissociate CNS Tissue

The **NeuroCult™ Enzymatic Dissociation Kit for Adult CNS Tissue (Mouse and Rat)** (Catalog #05715) has been developed for the dissociation of adult mouse and rat CNS tissue. The NeuroCult™ Enzymatic Dissociation Kit for Adult CNS Tissue is composed of four optimized solutions which will enzymatically digest tissue from adult mouse and rat CNS, inactivate the enzyme digestion reactions, and resuspend the final single cell suspension. The solutions and protocol have been optimized to ensure that entire procedure is fast, reproducible and yields high cell numbers and viabilities.

PRODUCT	QUANTITY	CATALOG #
NeuroCult™ Enzymatic Dissociation Kit for Adult CNS Tissue (Mouse and Rat)	1 kit	05715

Differentiate Human Pluripotent Stem Cells to Neural Progenitors

Neural induction is the first step in the differentiation of human pluripotent stem cells (hPSCs) to neural progenitor cells (NPCs), which can then differentiate to mature cell types of the central nervous system, including neurons, astrocytes and oligodendrocytes. Neural "rosette" structures represent a readily recognizable morphological signature of early neural induction in vitro.[15]

STEMdiff™ Neural Induction Medium is a defined, serum-free medium that is part of a complete system for the differentiation of hPSCs to neural progenitor cells in as little as 12 days. STEMdiff™ Neural Induction Medium rapidly and efficiently forms neural rosette clusters when used in conjunction with AggreWell™ 800 plates which ensure uniformly-sized neural aggregate formation.

Neural rosette clusters formed using STEMdiff™ Neural Induction Medium can then be selected and isolated for further experiments using enzyme-free STEMdiff™ Neural Rosette Selection Reagent. Together this is a complete, convenient and highly efficient system to obtain up to 100% single neural progenitor cells within 12 days with no manual rosette isolation.

Advantages of STEMdiff™ Neural Induction Medium

- Defined
- Serum-free
- Rapid and efficient neural induction
  - Neural rosettes within 6 days
  - Single cell NPC populations within 12 days

PRODUCT NAME	UNIT SIZE	CATALOG #
STEMdiff™ Neural Induction Medium	100 mL	05831
STEMdiff™ Neural Rosette Selection Reagent	100 mL	05832
AggreWell™ 800 Plate	1 8-well plate/pack	27865

Support Reagents For Neural Stem Cells

Non-Immunological Identification of Stem and Progenitor cells

ALDEFLUOR™ can be used to identify, enumerate, and isolate viable neural stem and progenitor cells,[16-18] based on aldehyde dehydrogenase (ALDH) enzyme activity.

PRODUCT	QUANTITY	CATALOG #
ALDEFLUOR™	40 tests/kit	01700

Antibody-Based NSC Functional Identification Kit

This kit contains neural lineage-specific antibodies, secondary antibodies and complete protocols for performing indirect immunocytochemistry for the detection of neurons (β-tubulin III) astrocytes (GFAP) and oligodendrocytes (Oligodendrocyte Marker O4) simultaneously in differentiated mouse, rat and human CNS cell samples.

PRODUCT	QUANTITY	CATALOG #
NeuroCult™ Neural Stem Cell Functional Identification Kit	80 tests/kit	05716

Heparin

Heparin supports the binding of bFGF to its receptor and increases the stability of bFGF. It is recommended for use with NeuroCult™ Proliferation Kits for the growth and expansion of human, rat and adult mouse neural stem and progenitor cells.

PRODUCT	QUANTITY	CATALOG #
Heparin (0.2% heparin sodium salt in PBS)	2 mL	07980

Cytokines

CYTOKINE	QUANTITY	CATALOG #
Carrier-Free rh EGF	200 µg	02653
rh EGF	200 µg	02633
Carrier-Free rh bFGF	25 µg	02654
rh bFGF	25 µg	02634

References

1. Reynolds BA, et al., J Neurosci 12: 4565-4574, 1992
2. Reynolds BA, et al., Dev Biol 175: 1-13, 1996
3. Conti L, Cattaneo E. Nat Rev Neurosci 11: 176-187, 2010
4. Vescovi, AL et al., Nat Rev Cancer 6: 425-436, 2006
5. Reynolds BA, et al., Nat Methods 2: 333-336, 2005
6. Louis SA, et al., Stem Cells 26: 988-996, 2008
7. Singec I, et al., Nat Methods 3: 801-806, 2006
8. Jensen JB, et al., Mol Neurobiol 34: 153-161, 2006
9. Chaichana K, et al., Stem Cells 24: 2851-2857, 2006
10. Young KM, et al., J Neurosci 27: 8286-8296, 2007
11. Golmohammadi MG, et al., Stem Cells 26: 979-987, 2008
12. Bull ND, et al., J Neurosci 25: 10815-10821, 2005
13. Sii-Felice K, et al., EMBO J 27: 770-781, 2008
14. Pluchino S, et al., Brain 131: 2564-2578, 2008
15. Sonntag KC, et al., Stem Cells 25: 411-418, 2007
16. Corti S, et al., Hum Mol Genet 15: 167-187, 2006
17. Corti S, et al., Stem Cells 24: 975-985, 2006
18. Cai J, et al., J Neurochem 88: 212-226, 2004

Antibodies

TARGET ANTIGEN	CLONE	ANTIBODY	APPLICATIONS	FORMAT	QUANTITY	CATALOG #
Neuron Markers						
Alpha-Internexin	2E3	Mouse IgG_1	IF, IH, Western	Supernatant	500 µL	01443
	1D2	Mouse IgG_1	IF, IH, Western	Supernatant	500 µL	01444
	-	Rabbit Polyclonal	IF, Western	Serum	100 µL	01442
Choline Acetyltransferase (ChAT)	-	Goat Polyclonal	IH, Western	Purified	500 µL	01510
GABA	-	Rabbit Polyclonal	IF	Serum	200 µL	01411
Microtubule Associated Protein 2 (MAP2)	AP20	Mouse IgG_1	IF	Purified	200 µg	01410
	-	Chicken Polyclonal (IgY)	IF, Western	Purified	50 µL	01460
Neurofilament NF-H	NAP4	Mouse IgG_1	IF, Western	Ascites	100 µL	01445
	-	Chicken Polyclonal (IgY)	IF, Western	Purified	50 µL	01446
	-	Rabbit Polyclonal	IF, Western	Serum	100 µL	01447
Neurofilament NF-L	DA2	Mouse IgG_1	IF, Western	Supernatant	500 µL	01448
	-	Rabbit Polyclonal	IC, IF, Western	Serum	100 µL	01449
Neurofilament NF-M	3H11	Mouse IgG_1	IB, IF	Supernatant	500 µL	01451
	-	Rabbit Polyclonal	IC, IF, Western	Serum	100 µL	01469
	-	Chicken Polyclonal (IgY)	IF, Western	Purified	100 µL	01452
Neuronal Class III β-Tubulin	TUJ1	Mouse IgG_{2a}	IF	Purified	250 µL	01409
Tyrosine Hydroxylase	TH2	Mouse IgG_1	IF	Ascites	200 µL	01412
Peripherin	8G2	Mouse IgG_1	IF, Western	Supernatant	500 µL	01454
	7C5	Mouse IgG_1	IC, Western	Purified	500 µL	01455
	-	Rabbit Polyclonal	IC, IF, Western	Serum	100 µL	01453
Astrocyte Markers						
Glial Fibrillary Acidic Protein (GFAP)	2A5	Mouse IgG_1	IF, Western	Supernatant	500 µL	01440
	-	Rabbit Polyclonal	IF	Serum	200 µL	01415
	-	Rabbit Polyclonal	IB, IC	Serum	100 µL	01439
	-	Chicken Polyclonal (IgY)	IF, Western	Purified	100 µL	01441
Oligodendrocyte Markers						
Myelin Basic Protein (MBP)	-	Rabbit Polyclonal	IF	Purified	500 µL	01417
Oligodendrocyte Marker O4	Clone81	Mouse IgM	IF	Purified	50 µg	01416
Oligodendrocyte Marker RIP	RIP	Mouse IgG_1	IH, IC	Ascites	100 µL	01433
Undifferentiated Neural Cell Markers						
Nestin	Rat 401	Mouse IgG_1	IF	Purified	100 µg	01418
SOX-2	-	Rabbit Polyclonal	IC, Western	Purified	100 µg	01438
Central/Peripheral Nervous System						
NGF Receptor, p75 (CD271)	MLR-2	Mouse IgG_{2a}	IH, Western	Purified	100 µg	01463
	MLR-2	Mouse IgG_{2a}	IF	FITC	50 µg	10428
	MC192	Mouse IgG_1	IH	Purified	100 µg	01464
	MC192	Mouse IgG_1	IF	FITC	50 µg	10429
Other						
Glyceraldehyde 3-Phosphate Dehydrogenase GAPDH)	MCA-1D4	Mouse IgG_1	IF, Western	Supernatant	500 µL	01461
Ubiquitin	Ubi-1	Mouse IgG_1	IF, IH, Western	Ascites	100 µL	01459
	-	Rabbit Polyclonal	IF, Western	Serum	100 µL	01458
Vimentin	-	Chicken Polyclonal (IgY)	IF	Purified	100 µL	01462

Applications: IB - Immunoblotting, IC - Immunocytochemistry, IF - Immunofluorescence, IH- Immunohistochemistry, Western - Western Blotting
Format: FITC - Fluorescein Isothiocyanate

Scientists Helping Scientists™ | WWW.STEMCELL.COM

TOLL-FREE PHONE 1 800 667 0322 • PHONE 1 604 877 0713

TOLL-FREE FAX 1 800 567 2899 • FAX 1 604 877 0704

ORDERS@STEMCELL.COM • INFO@STEMCELL.COM

FOR FULL CONTACT DETAILS WORLDWIDE VISIT OUR WEBSITE

FOR RESEARCH USE ONLY. NOT FOR THERAPEUTIC OR DIAGNOSTIC USE. CATALOG #28962 VERSION 2.3.0 OCTOBER 2011