

# Neuroscience

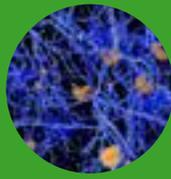
Cell Culture



Transfection



Cryopreservation



Glycobiology



Characterization



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# Cutting Edge Tools for Neuroscience Research

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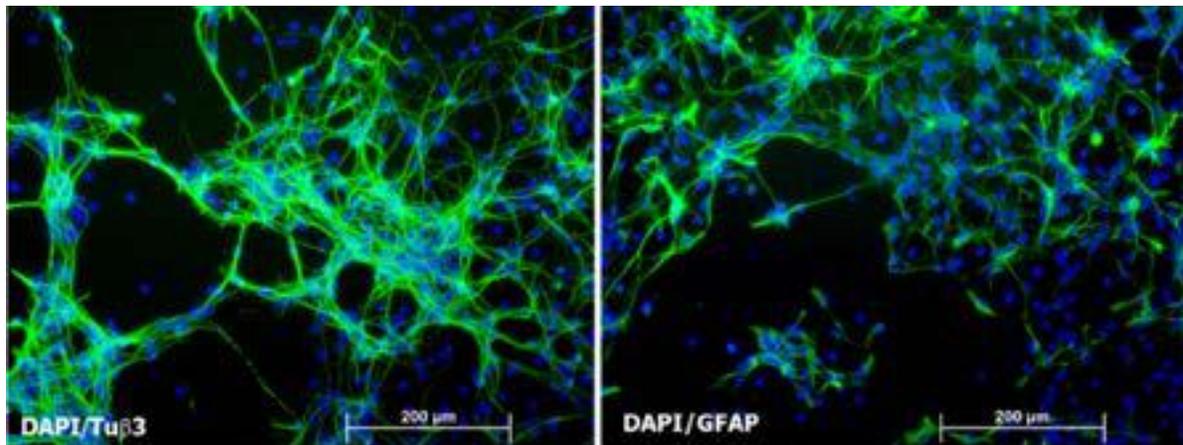


Cellular models are highly important tools for numerous applications in neuroscience, for example the study of neurodegeneration, neurogenesis and developmental diseases. With the discovery that neural stem cells exist in the adult brain, there has been a rapid uptake of the use of these cells in *in vitro* studies. Neural stem cell transplantation is also an emerging strategy for restoring normal function in numerous disorders including Parkinson's Disease and Alzheimer's Disease. Furthermore, the advent of iPSC and genome editing technology including CRISPR has transformed the scope of this research allowing the generation of isogenic models and the ability to obtain large numbers of neural stem cells, which have been traditionally difficult to obtain. There is also a growing sense of the importance of studying the behaviour of neurons, glial cells and neural stem cells within a physiologically relevant context. 3D cell culture is becoming more and more appropriate to establish an appropriate microenvironment for studying neural cells.

AMSBIO offers a range of specific tools & reagents to allow you stay at the forefront of your field. We continually add new resources to our neuroscience range to add to our cutting edge technologies. AMSBIO is your source for neural cells, media and supplements including iPSC-derived cells. Our large range of substrates and matrices including natural extracellular matrices and artificial scaffolds gives you numerous options to develop your *in vitro* system. We also offer proteins, specialised antibodies, ELISA kits & cryopreservation media. We also have an extensive biorepository with neural tissue from numerous species.

## Neural Stem Cells

Neural stem cells are undifferentiated cells found within the brain. They were first described in the subventricular zone (SVZ) by Sally Temple in 1989 but were not isolated until 1992 from adult striatal tissue by Brent Reynolds. Like mesenchymal stem cells, neural stem cells have the capacity to undergo extensive cell divisions *in vitro* and are multipotent in nature. Rat Neural Stem Cells are available from both fetal and adult brain, whereas Mouse Neural Stem Cells are available from fetal brain. Fetal Rat Neural Stem Cells are offered isolated from E14 cortex and from E18 cerebral striatum and mesencephalon brain regions. Mouse Neural Stem Cells are isolated from cerebral striatum and mesencephalon of E14 fetal mouse brains. Neural stem cells are maintained in an undifferentiated proliferative state by culturing them as free-floating neurospheres in serum-free medium optimized with growth factors, or may be cultured as adherent cells on Cultrex® Laminin extracellular matrix.



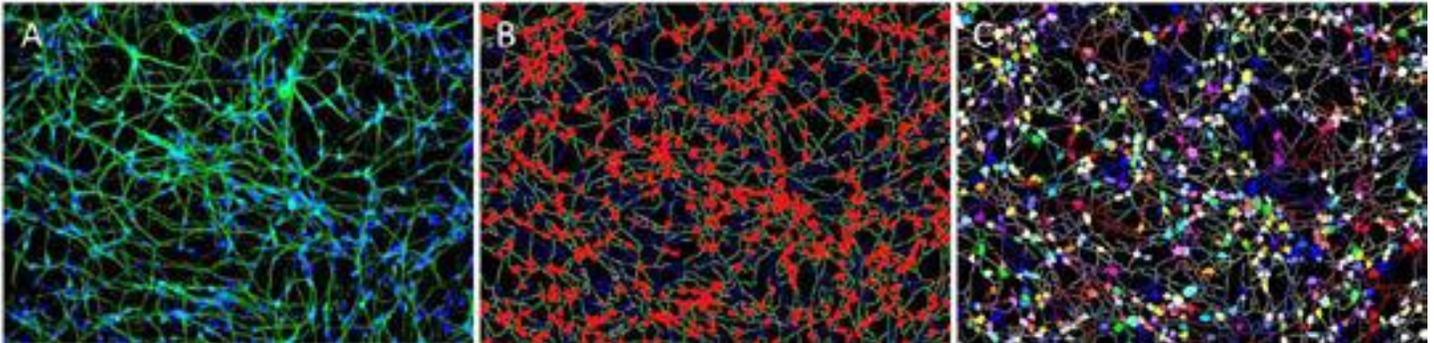
Differentiated Rat Neural Stem Cells, co-stained for the neuronal marker, Tuβ3(left, green), and the astrocyte marker, GFAP (right, green). The nuclei in both images are stained with DAPI (blue).

### Ordering Information:

Cat No.	Description	Pack Size
<a href="#">GSC-8010</a>	Rat Neural Stem Cells Fetal (isolated from E14 cortex)	2 M cells/vial
<a href="#">SR82020A</a>	Rat Neural Stem Cells, Adult, Cryopreserved	0.5 M cells/vial
<a href="#">SR82020AK</a>	Rat Neural Stem Cells, Adult, Complete System	1 Kit
<a href="#">SR82020F</a>	Rat Neural Stem Cells, Fetal, Cryopreserved	0.5 M cells/vial
<a href="#">SR82020FK</a>	Rat Neural Stem Cells, Fetal, Complete System	1 Kit
<a href="#">SM82020F</a>	Mouse Neural Stem Cells, Fetal Cells, Cryopreserved	0.5 M cells/vial
<a href="#">SM82020FK</a>	Mouse Neural Stem Cells, Fetal Cells, Complete System	1 Kit

## Human Induced Pluripotent (HIP) Neural Stem Cells

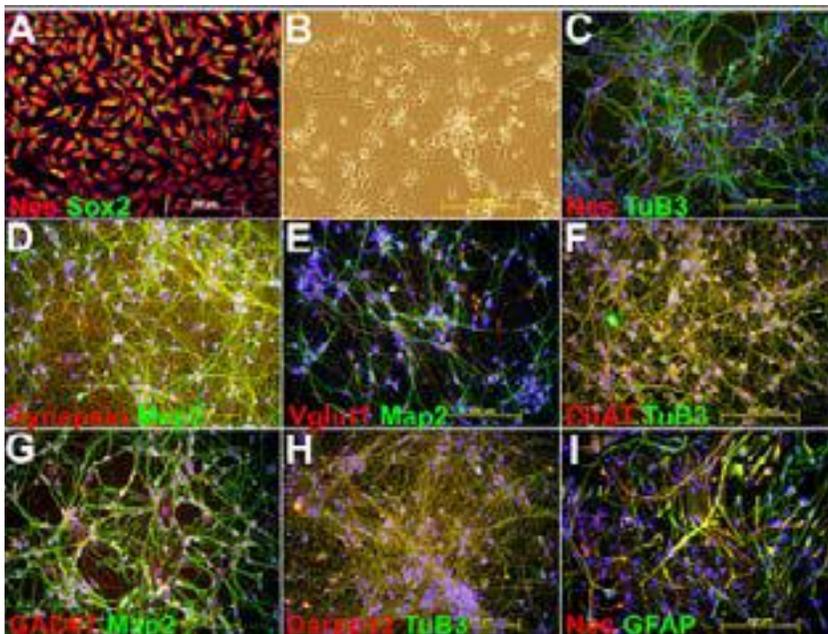
As part of our new HIP (Human Induced Pluripotent) program we are introducing highly pure population of iPSC-derived NSCs for stem cell and CNS research. The NSCs are derived in consistent lots with confirmed normal karyotype. They were derived using a proprietary methodology and are predisposed to spontaneously differentiate into neurons. They also can be directed into astrocytes and oligodendrocytes.



Neuronal differentiation of human iPSC cell-derived NSCs produces a high yield of complex neurons. A) Blue is DAPI staining of cell nuclei. Green is  $\beta$ III Tubulin staining of neuronal processes (neurites). B) Neurite outgrowth analysis showing neuronal cell bodies and neuronal processes (cell body is red, primary processes green, secondary processes blue, tertiary processes gold). C) Pseudo-colored image shows the neural processes and cell bodies.

## HIP™ Neural Stem Cells, (BC1 Line)

These HIP™ Neural Stem Cells (NSCs) are multipotent cells derived from a virus-free, integration-free human induced pluripotent stem cell line, BC1. These BC1 iPSC-derived NSCs proliferate extensively in culture to produce a virtually pure population of neural stem cells capable of differentiating into mature, functional neurons.



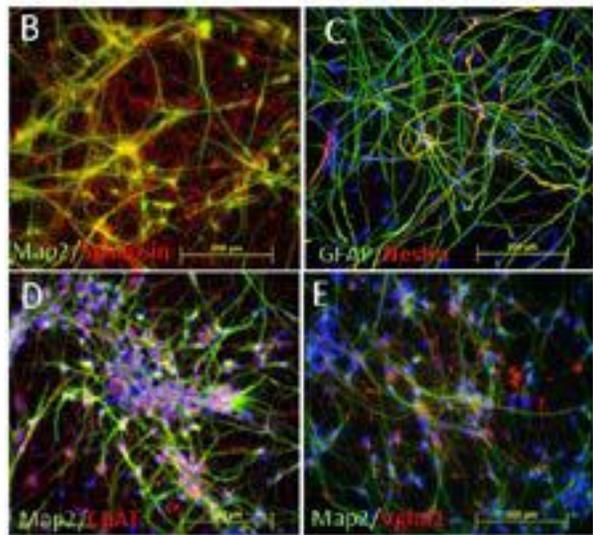
Neuronal differentiation of human iPSC-derived BC1 HIP™ Neural Stem Cells. (A) Proliferating HIP™ BC1 Neural Stem Cells (NSCs) express the neural markers nestin and Sox1. (B) Four days in Differentiation Medium changes the cells to primarily elongated bipolar cells, consisting of TuB3-positive neurons and nestin-positive progenitors (C). After five weeks of differentiation, HIP™ BC1 NSC produce: (D) abundant Map2-positive neurons expressing the synaptic marker Synapsin; (E) Vglut1-positive astrocytes and glutamatergic neurons; (F) ChAT-positive cholinergic neurons; and (G) GABAergic neurons marked by GAD67 or (H) the inhibitory-associated marker Darpp32. (I) Five week cultures can also generate elongated astrocytes marked by GFAP. Blue in all images is Hoechst 33342 nuclear stain. Scale bar = 200 microns

### Ordering Information:

Cat No.	Description	Pack Size
<a href="#">GSC-4301</a>	HIP Neural Stem Cells	1 M cells/vial
<a href="#">GSC-4311</a>	HIP™ Neural Stem Cells, (BC1 Line)	> 1M cells/vial

## HIP Neurons

Human induced pluripotent (HIP™) Neurons are induced pluripotent stem (iPS) cell-derived neuronal progenitors, ideal for studying mechanisms of developmental neurobiology, disease progression, neurotoxicology and other areas of neuroscience. Kit includes Pre-Coat plating solution , GS21™ Neural Supplement and NeuralQ™ Basal Medium.



HIP™ Neurons differentiation to neuronal subtypes - After five weeks of differentiation, cultures show (B) an abundance of MAP2-positive neurons express the synaptic marker Synapsin, (C) Astrocytes marked by GFAP, (D) ChAT-positive Cholinergic neurons and (E) Vglut1-positive Astrocytes and Glutamatergic neurons. Nuclei are labeled with the Hoechst 3342(blue). Scale bars= 200 microns.

### Ordering Information:

Cat No.	Description	Pack Size
<a href="#">GSC-4312</a>	HIP iPS Cell-Derived Neurons	5 M cells/vial

## ES Cell-Derived Neurons: GABAergic neurons

Our GABAergic neurons are differentiated from human embryonic stem cells into mixed cultures with a high percentages of mature, electrically active GABAergic neurons plus supporting astrocytes and oligodendrocytes.

### BENEFITS

- ✓ < 5% dividing cells, electrically active, mostly GABAergic
- ✓ Phenotypically mature expressing Neurofilament 200kD, MAP2b, and synaptophysin
- ✓ True monolayer culture makes for easy visualisation of cell morphology and protein expression/localisation
- ✓ Available from any of our around 100 normal or disease-affected human embryonic stem cell lines

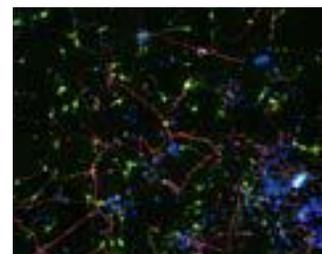


Figure 18. GABAergic neurons. AMSBIO supplies and develops disease-specific pluripotent and differentiated human stem cells for use in medical research to facilitate the advancement of treatment options for people suffering from genetic diseases.

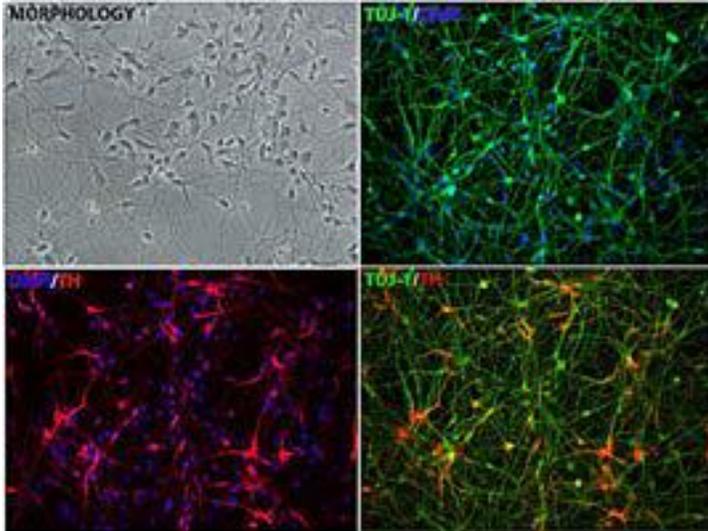
Diseases with reported neural phenotype from our stem cell bank: Robust and reproducible differentiation process with little batch-to-batch and cell line to cell line variation

- ✓ Huntington Disease
- ✓ Fragile X
- ✓ Von-Hippel-Lindau disease
- ✓ Infantile neuroaxonal dystrophy
- ✓ Becker Muscular dystrophy
- ✓ Myotonic dystrophy (Type I and II)
- ✓ Incontinentia Pigmenti
- ✓ Charcot-Marie Tooth disease (type 1A + 1B)
- ✓ Trisomy 21

Contact us on [info@amsbio.com](mailto:info@amsbio.com) for more information and ordering details

## Human iPSC-Derived Dopaminergic Neurons

Dopaminergic neurons in the midbrain play a fundamental role in the control of voluntary movement and the regulation of emotion. Dysfunction of dopaminergic neurons has been implicated in several central nervous system disorders such as Parkinson’s disease, Schizophrenia, bipolar disorder, addiction, and depression. Particularly, the loss of dopaminergic neurons in substantia nigra (SN) region is associated with Parkinson's disease that is one of the most prominent and currently incurable neurological disorders.



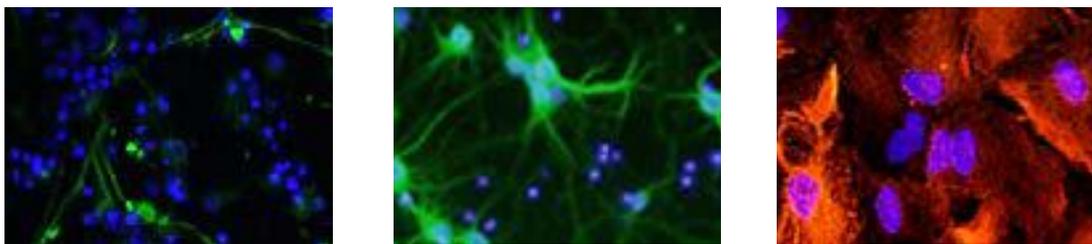
Mature dopaminergic neurons - Immunostaining at 12 days post-seeding, showing that >85% of total cells expressed Tuj-1 marker (green) and >30% expressed TH marker (red). Total count of nuclei (blue) is used as the total number of cells.

Ordering Information:

Cat No.	Description	Pack Size
<a href="#">GSK-4401</a>	Dopaminergic Neurons GS-DOPA Kit	1M cells/vial

## Frozen Primary Neurons

AMSBIO supplies a number of high viability cryopreserved Sprague-Dawley rat primary neurons including rat cortical neurons, glial restricted precursor cells and astrocytes.



Left to right: mature astrocytes , mature cortical neurons post-thaw, mature astrocytes

Ordering Information:

Cat No.	Description	Pack Size
<a href="#">GSC-8220</a>	Primary Rat Cortical Neurons	2 M cells/vial
<a href="#">GSC-8240</a>	Primary Rat Cortical Neurons	4 M cells/vial
<a href="#">GSC-8040</a>	Rat Glial Restricted Precursor Cells	1 M cells/vial
<a href="#">GSC-8030</a>	Primary Rat Astrocytes	1 M cells/vial

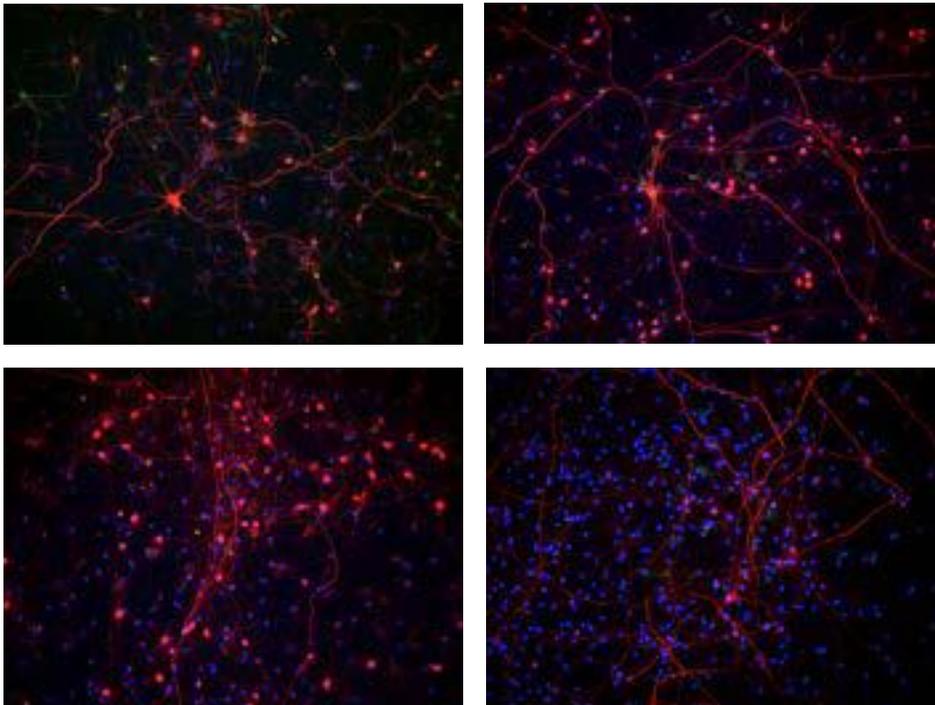
## NeuroPure™ - Live Ready-To-use Neurons

NeuroPure™ Primary Rat Neurons are live neuronal tissues isolated from micro-surgically dissected regions of Sprague/Dawley rat. These neurons are prepared fresh each week and shipped in a nutrient rich medium that keeps the cells alive for up to 14 days under refrigeration.

NeuroPure™ Primary Rat Neuronal Cells are live neuronal tissues isolated from micro-surgically dissected regions of Sprague/Dawley rat. These cells are prepared fresh each week and shipped in a nutrient rich medium that keeps the cells alive for up to 14 days under refrigeration. NeuroPure™ cells are ideal for a wide variety of applications including: transfection, pharmacology studies, immunocytochemistry, and neuron development studies.

### BENEFITS

- ✓ Freshly isolated healthy neurons - not frozen
- ✓ Ready to use - get your primary culture up and running within 1 hour
- ✓ Pure neuronal cells - 99.9% glial cell free
- ✓ Guaranteed quality and consistency

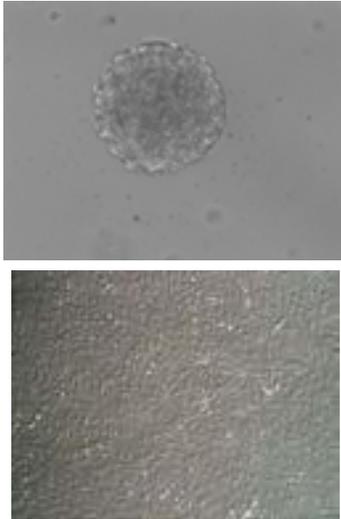


(A & B) Rat Hippocampal cells (C & D) NeuroPure™ Rat Cortical Cells. Triple stained NeuroPure™ neurons after 21 days in culture. Neurofilaments-red were immunostained with rabbit anti-neurofilament antibody and goat anti-rabbit AlexaFluor 568. Glial cells-green were immunostained with a mouse anti-GFAP antibody AlexaFluor 488. DNA-blue was stained with Hoechst 33258 (bis-benzamide).

### Ordering Information:

Cat No.	Description	Pack Size
<a href="#">N100200</a>	E18 Hippocampal Neurons	1 M cells/vial
<a href="#">N200200</a>	E18 Cortical Neurons	1 M cells/vial
<a href="#">N300200</a>	P8 Cerebellar Neurons	4 Pairs
<a href="#">N400200</a>	E18 Hypothalamus Neurons	1 Pair
<a href="#">N500200</a>	E18 Striatal Neurons	1 Pair
<a href="#">N600200</a>	E18 Spinal Cord Neurons	1 Cord
<a href="#">N700200</a>	E18 Midbrain Cells	1 Midbrain

# Neural Cell Culture Media and Supplements



Undifferentiated neural stem cells cultured as neurospheres (top) or as adherent monolayer culture on Cultrex® laminin (bottom)

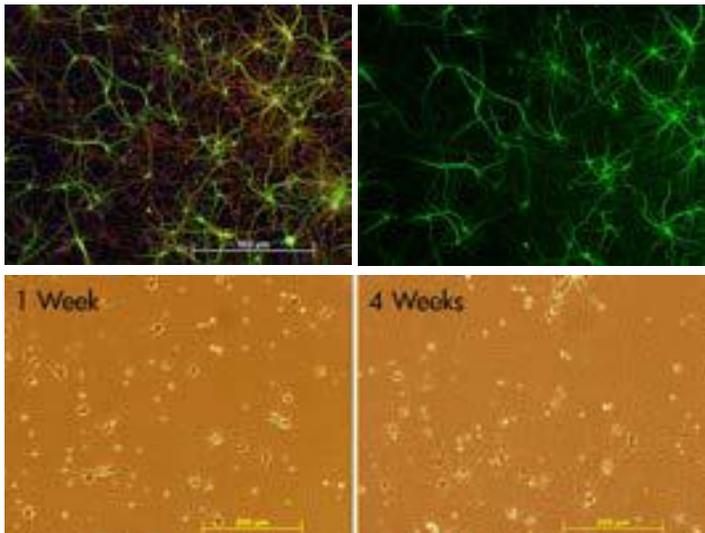
To maintain multi-potentiality of neural stem cells in culture, it is essential that neural stem cells are maintained in a growing and undifferentiated state when cultured *in vitro*. Undifferentiated neural stem cells may be grown as neurospheres, adherent monolayers on tissue culture plates coated with laminin extracellular matrix (Cultrex® Laminin) or in 3D scaffolds.

We supply neural cell culture medium optimized to support undifferentiated growth both as adherent cultures or neurosphere suspensions. We also provide medium, supplements and growth factors to differentiate neural stem cells and to maintain long-term cultures of differentiated cells.

In addition to culture mediums, AMSBIO also supplies all supporting reagents to characterize neural stem cells including nestin antibodies as well as differentiated neurons using  $\beta$ III-tubulin antibodies, oligodendrocytes using O3 antibodies and astrocytes using GFAP antibodies.

## NeuralQ™ Basal Medium

NeuralQ™ Basal Medium is a serum-free basal medium optimized for maximum growth and survival of primary and iPSC-derived neural cells in culture, and based on the previously published formulation by Brewer et al. Intended to be supplemented with the serum-free GS21 Neural Supplement (GSM-3100) along with other standard neuronal growth factor supplements, NeuralQ™ Basal Medium shows superior performance in the overall cell health and viability of neurons during short and long-term culture.



NeuralQ™ supports development of mature neurons - Primary rat neurons (Map2ab, green) cultured 15 days in NeuralQ™ Basal Medium shows healthy, mature neurons in culture.

Healthy, maturing primary rat neurons in culture - NeuralQ™ Basal Medium supports maximum viability and healthy of primary rat neurons during short and longer-term culture.

### Ordering Information:

Cat No.	Description	Pack Size
<a href="#">GSM-9420</a>	NeuralQ™ Basal Medium	500 ml
<a href="#">SMR813250</a>	Rat Neural Stem Cell Growth Medium	250 ml
<a href="#">SMRD813250</a>	Rat Neural Stem Cell Differentiation Medium	250 ml
<a href="#">SMMD813250</a>	Mouse Neural Stem Cell Differentiation Medium	250 ml

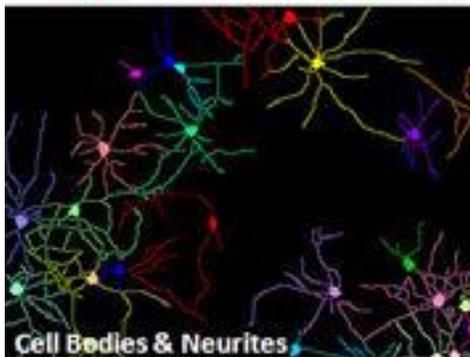
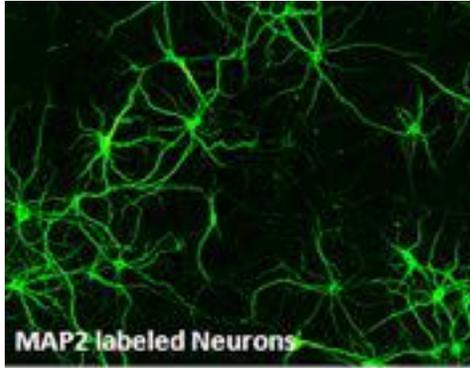
# GS21 Neural Stem Cell Supplement

GS21 is the next generation serum-free neural media supplement, based on the formulation of NS21 Supplement, designed to improve the overall growth and performance of primary neurons. GS21 is specifically optimized for the maturation and long-term viability of primary rat and mouse neurons in culture, without the need for co-culture with astrocyte feeder cells.

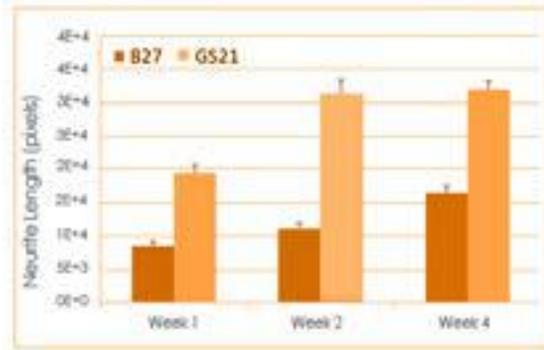
## BENEFITS

- ✓ Significantly improves long-term viability of rat and mouse primary neurons *in vitro*.
- ✓ Enhances neurite outgrowth of primary neurons in culture.
- ✓ Supports growth and maintenance of primary neurons at low / high cell density plating.

GS21 Supplement



Total Neurite Length and Segments

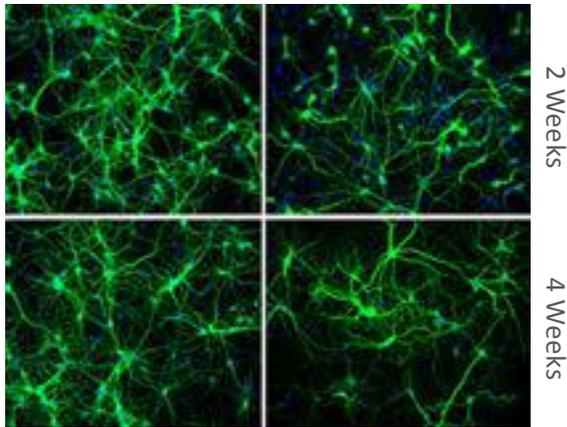


Greater neurite outgrowth after 1,2 & 4 weeks in culture - Primary Neurons were cultured in GS21 supplemented neural base media. MAP2 labeling (top, left) was used to determine boundaries of the individual neuron cell bodies and associated neurites (colors are randomly assigned by the software). GS21 supplemented cultures showed significantly greater neurite lengths (top) and number of neurite segments (bottom) in culture, as compared to cultures supplemented with B27: neurite lengths, 1 week, ( $p=0.022$ ), 2 week ( $p=0.017$ ) and 4 week ( $p=0.023$ ); and number of neurite segments (bottom) in 1 week, ( $p=0.036$ ), 2 week ( $p=0.041$ ) and 4 week ( $p=0.010$ ). Images were acquired using a 10x objective (0.4 NA). Data from  $n=4$  wells is shown as mean  $\pm$  SEM.

### Ordering Information:

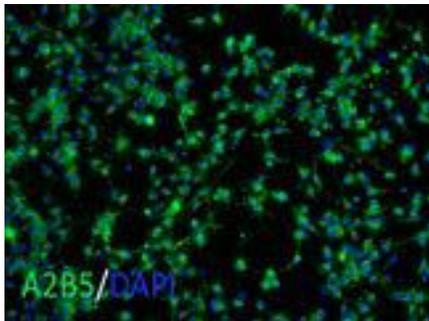
Cat No.	Description	Pack Size
<a href="#">GSM-3100</a>	GS21 Neural Supplement	50 ml
<a href="#">GSM-3110</a>	GS21™ Neural Supplement w/o AO	10 ml
<a href="#">GSM-3120</a>	GS21™ Neural Supplement w/o Steroids (50X)	10 ml

GS21 Supplement      B27 Supplement



Higher neuron viability after 2 & 4 weeks in culture - Primary Rat Cortical Neurons (GSC-8220) cultured in GS21 supplemented culture media showed significantly higher neuron viability after 2 weeks,  $p=0.032$  and 4 weeks,  $p=0.005$  in culture, as compared to cells cultured in B27<sup>®</sup>. Neurons plated in 96-well plates were labeled with MAP2 (green), and Dapi (blue) to denote nuclei. Cells were imaged on a BD Pathway<sup>™</sup> Bioimager after 1, 2 and 4 weeks in culture. Images were acquired using a 10x objective (0.4 NA). Data from n=4 wells is shown as mean  $\pm$  SEM.

## NeuralX<sup>™</sup> NSC Medium

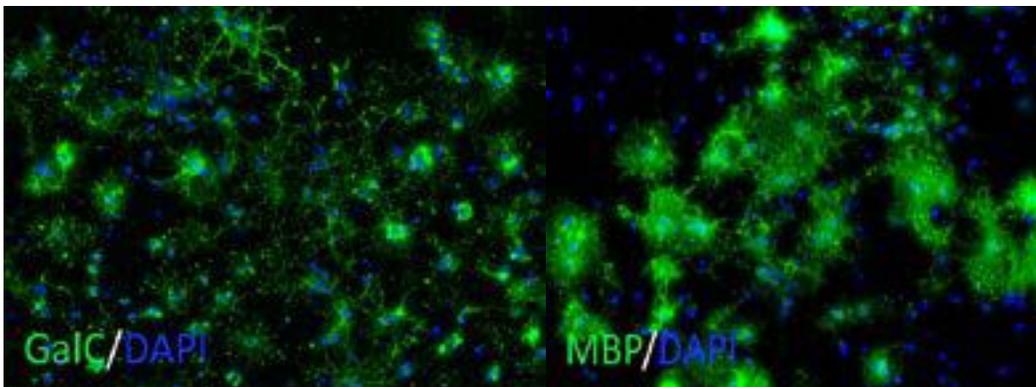


Rat primary oligodendrocyte precursors (GRPs; GSC-9430) exhibit excellent growth, survival and health when grown in NeuralX<sup>™</sup> NSC Medium and GS22<sup>™</sup> Neural Supplement. After rat GRPs were grown for 3 passages in NeuralX<sup>™</sup> NSC Medium with GS22<sup>™</sup> supplement, antibody labeling indicated the cells were still primarily undifferentiated GRPs, as indicated by labeling with A2B5 (green) and DAPI (blue).

A new basal medium formulated for maximum growth and survival of proliferative neural cells such as human iPSC-derived neural stem cells or rat primary oligodendrocyte precursors. It is intended for use with GS22<sup>™</sup> Neural Supplement (GSM-3200). When combined to form a complete medium, NeuralX<sup>™</sup> and GS22<sup>™</sup> demonstrate superior performance in supporting the growth and survival of proliferating neural stem cells in culture.

### BENEFITS

- ✓ Improves long-term viability of proliferative neural cells.
- ✓ Supports more efficient and higher yields of oligodendrocyte precursors.
- ✓ Serum-free, animal-free for minimal risk of introducing adventitious agents into the cell.



Rat primary oligodendrocyte precursors (GRPs; GSC-9430) differentiate into healthy, mature oligodendrocytes. After growing rat GRPs in NeuralX<sup>™</sup> NSC Medium with GS22<sup>™</sup> Supplement for 3 passages, cells were switched to NeuralQ<sup>™</sup> Basal Medium supplemented with GS21<sup>™</sup> Neural Supplement (GSM-3100) for 2 passages. Antibody labeling revealed a significant number of mature, differentiated oligodendrocytes, as indicated by labeling with GaIC (green, left panel) and MBP (green, right panel). Total cells are shown using DAPI (blue, both panels)

## GS22™ Neural Supplement

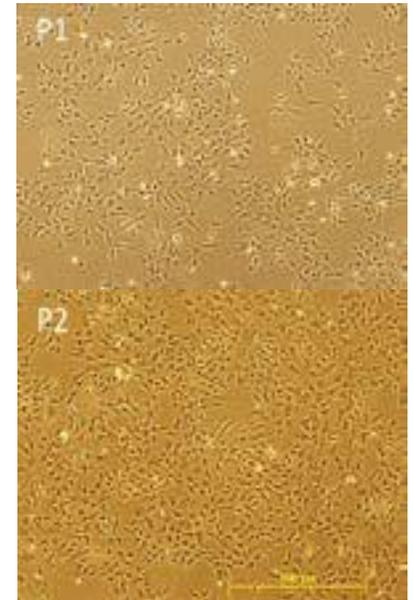
A serum-free neural media supplement specifically optimized for the propagation and long-term viability of proliferative neural cells such as human iPSC-derived neural stem cells or rat primary oligodendrocyte precursors. GS22™ Supplement is intended to be used with NeuralX™ Basal Medium (GSM-9320).

### BENEFITS

- ✓ Improves long-term viability of proliferative neural cells.
- ✓ Supports higher yields of oligodendrocyte precursors.
- ✓ Serum-free and animal-free

#### Ordering Information:

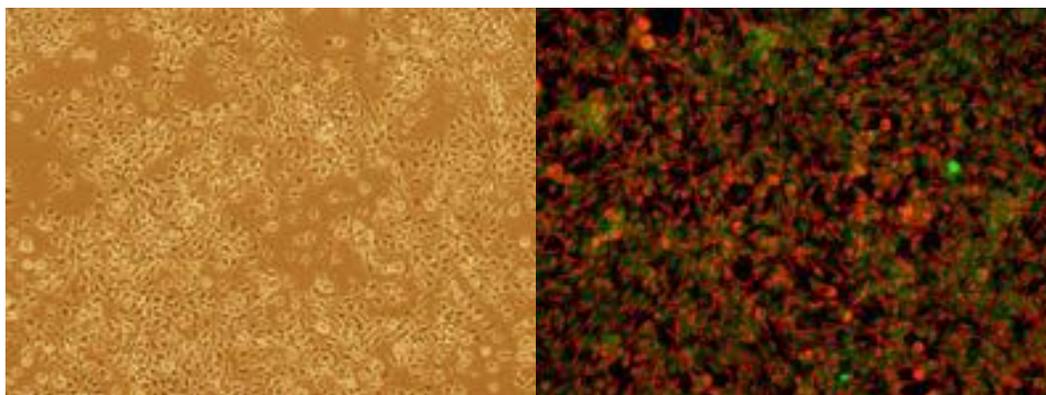
Cat No.	Description	Pack Size
<a href="#">GSM-9320</a>	NeuralX™ NSC Medium	500 ml
<a href="#">GSM-3200</a>	GS22™ Neural Supplement (50x)	10 ml



NeuralX™ Neural Stem Cell Medium and GS22™ Neural Supplement support healthy growth of proliferating human iPSC-derived neural stem cells in culture over multiple passages. HIP™ Human iPSC-derived pluripotent neural stem cells (BC1 line) were maintained in NeuralX™ NSC Medium and GS22™ supplement for 4 days before passaging and continuing culture for another 4 days.

## N2 Supplement

A chemically defined, animal-free, supplement used for expansion of undifferentiated neural stem and progenitor cells in culture. N2 Supplement can also be used for maintenance of post-mitotic primary neurons in culture. N2 Supplement is intended for use with DMEM/F12 medium. While N2 can be used to grow primary neurons, our data indicates that NeuralQ® Basal Medium (GSM-9420) with GS21™ Neural Supplement (GSM-3100) is better suited for this application.



N2 Supplement supports healthy growth of proliferating rat primary neural stem cells in culture over multiple passages. Primary Rat Neural Stem Cells (GSC-8010) were cultured in DMEM/F12 with N2 supplement. After 3 passages, cells were co-labeled with Sox2 (green) and Nestin (red).

#### Ordering Information:

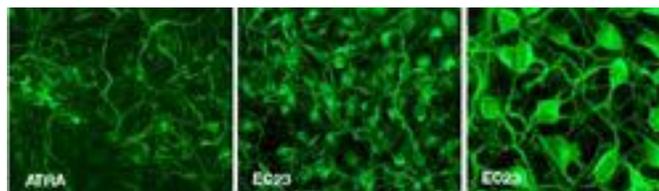
Cat No.	Description	Pack Size
<a href="#">GSM-3300</a>	N2 Supplement (100X)	5 ml

## Synthetic Retinoid ec23®

Controlling cell differentiation in a predictable way is a major challenge in stem cell research. Although natural retinoids can be used to trigger neuronal stem cell differentiation, they are inherently unstable, leading to partially differentiated cultures and highly variable result. ec23® synthetic retinoid derivative represents a new chemically and light stable alternative to ATRA that does not degrade. ec23® enables the robust and reproducible differentiation of stem cells and progenitor cells. With higher stability in tissue culture medium and more potency as differentiation factor than retinoic acid, it produces down regulation of markers associated with the pluripotent stem cell phenotype and increased expression of differentiation markers.

### BENEFITS

- ✓ Mimics the activity of natural retinoid
- ✓ Immune to the disruptive influence of temperature and light
- ✓ Induces neurogenesis with enhanced potency
- ✓ Maximizes the consistency, reliability of neural stem cell differentiation
- ✓ Minimizes culture heterogeneity



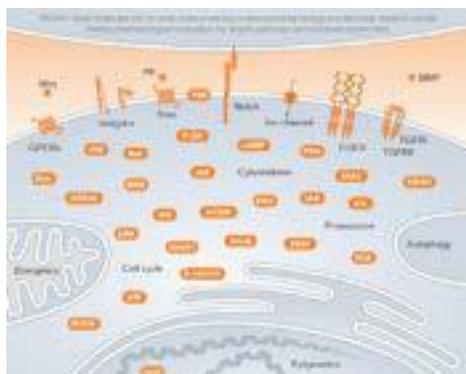
Human TERA2.cl.SP12 pluripotent stem cells exposed to either 10uM ec23® or ATRA form populations of terminally differentiated neurons. Immunocytochemical staining for neurofilament-200 was performed on differentiated cultures and the number of positive cells quantified.

Results show that ec23® is a more potent inducer of neurogenesis than ATRA. In direct comparison to ATRA, we found that synthetic retinoid ec23® induces larger numbers of neural cells with less variability and with the added advantage of compound stability.

### Ordering Information:

Cat No.	Description	Pack Size
<a href="#">AMS.SRP002-2</a>	Synthetic Retinoid ec23®	2x 5 mg

## PATHM<sup>2</sup> Small Molecule Libraries



PATHM<sup>2</sup> small molecule libraries share stem cell and medicinal chemistry expertise to allow you to modulate key cellular processes. Delivered ready-to-use PATHM<sup>2</sup> small molecule libraries offer a convenient tool to screen the effects proven of compounds on your cells. Optimize your culture or differentiation process by screening our PATHM<sup>2</sup> kit to identify accessory small molecules that improve cell viability, proliferation, or yields. Multiple agents were added to interrogate new and emerging networks/targets relevant to neuronal signaling.

### Ordering Information:

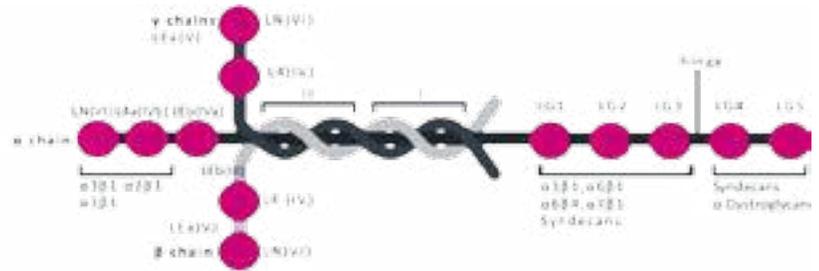
Cat No.	Description	Pack Size
<a href="#">PMMN-KIT</a>	PATHM <sup>2</sup> -Neuro kit (neuronal signaling)	1 Kit
<a href="#">PMM96-KIT</a>	PATHM <sup>2</sup> -96 compound kit (stem cell modulators)	1 Kit
<a href="#">PMMW-KIT</a>	PATHM <sup>2</sup> - Wnt compound kit (wnt modulators)	1 Kit
<a href="#">PMME-KIT</a>	PATHM <sup>2</sup> -Epi compound kit (epigenetic modulators)	1 Kit
<a href="#">PMMP-KIT</a>	PATHM <sup>2</sup> -Phospho kit (kinase inhibitors)	1 Kit
<a href="#">PMMH-KIT</a>	PATHM <sup>2</sup> -Hormone kit (endocrinal and hormonal signaling)	1 Kit

## PATHM<sup>2</sup> CUSTOM OPTIONS

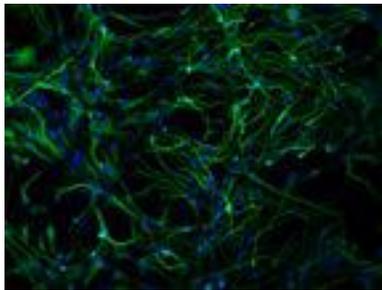
Contact us to request your own small molecule subsets, specific concentrations or dilutions.

## Laminin for Neural Cell Attachment

Laminins (heterotrimers composed of  $\alpha$ ,  $\beta$ , and  $\gamma$  chains), are multifunctional glycoproteins present in basement membranes. Laminin has long been an important mainstay of neural cell culture as coating substrates and is also used as a supplement of culture medium to enhance growth of human neural stem cells. We provide a range of high quality laminin products that are ideally suited as tools for neural cell culture to allow you to select the most suitable version for your research.



Schematic diagram of the modular structure of laminin



### Ordering Information:

Cat No.	Description	Pack Size
<a href="#">3400-010-01</a>	Cultrex® Mouse Laminin I	1 mg
<a href="#">3400-010-02</a>	Cultrex® Mouse Laminin I, PathClear®	1 mg
<a href="#">3400-010-03</a>	Cultrex® Antibiotic-Free Mouse Laminin I PathClear®	1 mg
<a href="#">3401-010-02</a>	Cultrex® Stem Cell Qualified Mouse Laminin I PathClear®	1 mg
<a href="#">3446-005-01</a>	Cultrex® 3D Culture Matrix Laminin I	30 mg
<a href="#">PR12725</a>	Poly-D-Lysine with Laminin Coating Solution	2.5 ml

## MAPTrix™ Animal Free Laminin

Our Mussel Adhesive Protein based matrix (MAPTrix™) recombinant extracellular matrices (ECM) that act as biomimetics for traditional basement membrane extracts. MAPTrix™ replaces traditional ECM with genetically incorporated bioactive peptides (recognition peptides) that provide an environment for the maintenance of cells under serum and feeder-free conditions.

### Bioactive peptide genetically fused to MAP



MAPTrix™ technology for extracellular matrix (ECM) based coatings or surface modification is simple, convenient, and highly reproducible. You can readily engineer a synthetic ECM surface that binds to adhesion receptors such as integrins to promote cell adhesion and spreading. These surfaces mimic the native extracellular environment. Mussel adhesive protein is highly desirable for use in a variety of biological and medical applications due to its strong, wet, adhesive, non toxic, biodegradable, and low immunogenicity properties.

MAPTrix™ biomimetics are already used in: stem cell technology, tissue engineering scaffolds, drug delivery, cell surface modification and coating of medical devices.

Ordering Information: MAPTrix™ L

Domain	Peptide Motif	Cat No. *
α1 chain	RQVFQVAYIIIIKA	<a href="#">16204x</a>
	IKVAV	<a href="#">16224x</a>
	AASIKVAVSADR	<a href="#">16225x</a>
	NRWHSIYITRFG	<a href="#">16226x</a>
	TWYKIAFQRNRK	<a href="#">16229x</a>
	RKRLQVQLSIRT	<a href="#">16232x</a>
α3 chain	IAFQRN	<a href="#">16228x</a>
	KNSFMALYLSKGRLVFALG	<a href="#">16293x</a>

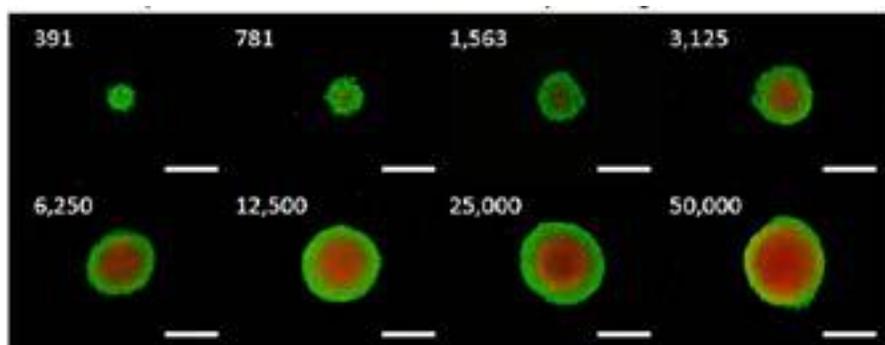
Domain	Peptide Motif	Cat No. *
α5 chain	GIIFFL	<a href="#">16369x</a>
γ1 chain	KAFDITYVRLKF	<a href="#">16442x</a>
	RNIAEIIKDI	<a href="#">16460x</a>
β1 chain	RYVVLPR	<a href="#">16411x</a>
	YIGSR	<a href="#">16414x</a>
	LGTIPG	<a href="#">16421x</a>

\*KEY TO CATALOG NUMBERING

Cat. No. ending with X =	Pack size+
Replace X with: 2	2.5 mg protein, aqueous solution at 0.5mg/ml
Replace X with: 4	10 mg protein, aqueous solution at 1mg/ml

## Extracellular Matrix for Neurosphere Formation

Neurospheres demonstrated the first unequivocal evidence that cells derived from adult brain can have stem cell properties and remain a useful tool for the *in vitro* study of neural stem cells. Applications include analysis of self-renewal capacity, potency, neural development and neurogenesis. We provide an optimized spheroid formation matrix to help with consistent generation of neurospheres for use in your research.



Evaluation of U87MG neurosphere cell viability for different seeding densities. Human glioblastoma astrocytoma, U87MG, were seeded at concentrations indicated in spheroid formation ECM in a 96 well spheroid formation plate, and cultured for 72 hours to form neurospheres. Cultures were treated with 2 μM calcein AM and 1 μg/ml Ethidium Bromide in PBS for 20 minutes. Spheroids were photographed under epifluorescence using FITC and TRITC filters, and the images were merged. Green cells are indicative of live cells and red cells are indicative of dead or dying cells.

Ordering Information:

Cat No.	Description	Pack Size
<a href="#">3500-096-01</a>	10X Spheroid Formation Matrix	600 μl

# Neuroscience in the Mimetix® Electrospun Scaffold

Mimetix® scaffolds mimic the extracellular matrix by providing an ideal architectural environment to support the growth of cells in 3D. They are created by electrospinning the medical-grade polymer poly(L-lactide) (PLLA) into microfibers, which are highly consistent with regard to fibre diameter and pore size: this results in excellent reproducibility of cell-based assays.

## BENEFITS

- ✓ True 3D micro-environment
- ✓ Minimal protocol adaption required to switch from 2D to 3D
- ✓ Compatible with industry-standard automated handling and imaging equipment
- ✓ High well-to-well and batch-to-batch consistency
- ✓ Scaffolds are free from animal-derived products and synthesised using medical-grade polymers.

## Mimetix Scaffold



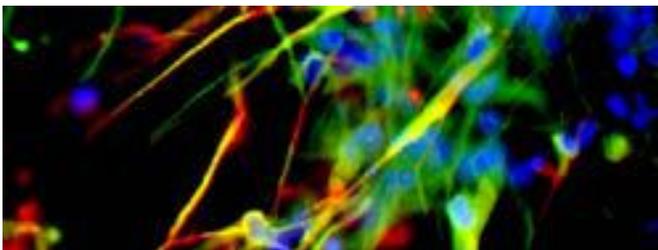
The Mimetix 96-well plate has a depth of 50  $\mu\text{m}$  with pores of 15 to 30  $\mu\text{m}$ . This is thick enough to provide the true benefits of 3D cell morphology and behaviour.

## Mimetix Aligned Scaffold®



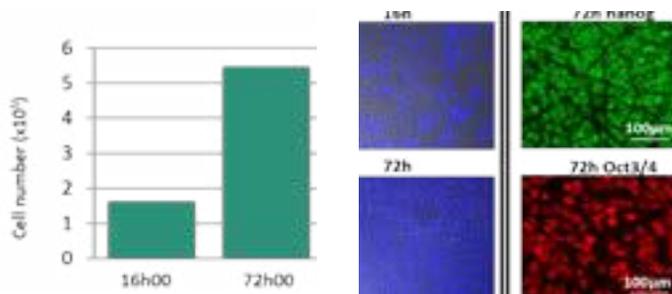
The Mimetix Aligned 96-well plate consists of 2  $\mu\text{m}$  aligned microfibres with a depth of 2 to 4  $\mu\text{m}$ . This scaffold provides a physical structure for the 3D culture of cells where orientation influences behaviour.

## Neural Differentiation in the Mimetix Scaffold

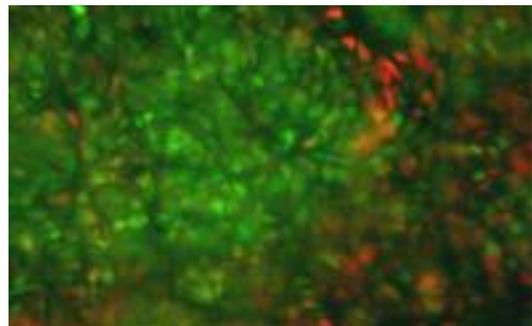


Foetal cortical stem cells differentiate into mature neurons in the Mimetix scaffold. Cells were stained after 4 weeks with  $\beta\text{III-tub}$  (green), DCX (red) and DAPI (blue), yellow staining is due to the co-expression of  $\beta\text{III-tub}$  and DCX.

Image courtesy of Lara Stevanato, ReNeuron, UK

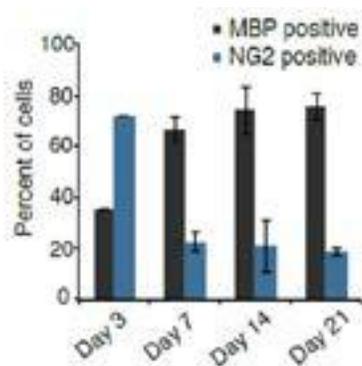
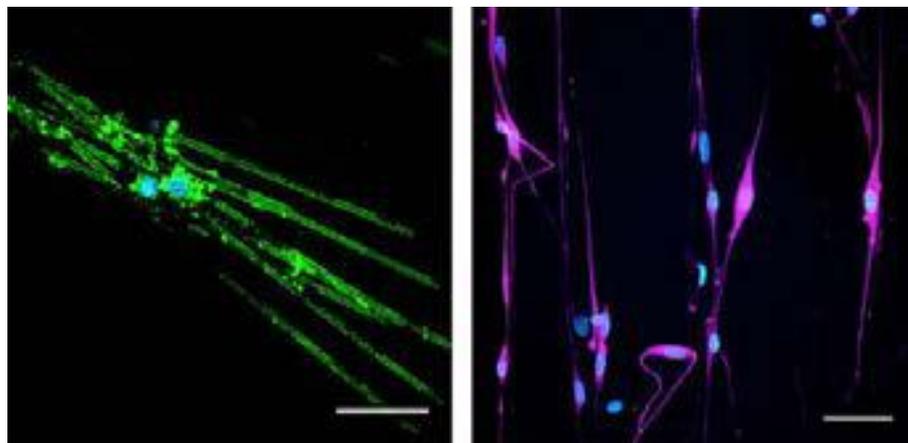


hES cells were grown for 72h in Mimetix scaffold. Cell number increases 5-fold. Pluripotency is assessed with Nanog (green) or Oct3/4 (red). Experimental work performed at KTH, Sweden



Majority of undifferentiated eSC (Oct4 expression—red) differentiated into neural progenitors at day 5 (pax6 expression—green) when cultured in bioreactor. Experimental work performed at KTH, Sweden

## Microglial cells in the Mimetix aligned scaffold



Most cortical oligodendrocyte precursor cells differentiated into oligodendrocytes, as seen by myelin basic protein (MBP) expression and a corresponding reduction in NG2 at 7 days. Cells remain differentiated for 3 weeks. More than 600 cells were counted per condition. Mean and standard deviation are shown for three experiments.

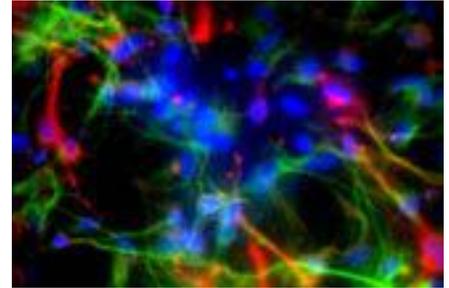
Bechler et al., 2015, *Current Biology* 25, 2411–2416

<http://dx.doi.org/10.1016/j.cub.2015.07.056>

Cat. no	Description	Pack		
		1 pack	8 packs	64 packs
Mimetix® 384-well plate	384-well plates, fixed scaffold	<a href="#">AMS.TECL-001-1X</a>	<a href="#">AMS.TECL-001-8X</a>	<a href="#">AMS.TECL-001-64X</a>
Mimetix® 96-well plate	96-well plates, fixed scaffold	<a href="#">AMS.TECL-002-1X</a>	<a href="#">AMS.TECL-002-8X</a>	<a href="#">AMS.TECL-002-64X</a>
Mimetix® 12-well plate	12-well plates, removable discs and retaining rings	<a href="#">AMS.TECL-003-1X</a>	<a href="#">AMS.TECL-003-8X</a>	<a href="#">AMS.TECL-003-64X</a>
Mimetix® 6-well plate	6-well hanging inserts	<a href="#">AMS.TECL-004-1X</a>	<a href="#">AMS.TECL-004-8X</a>	<a href="#">AMS.TECL-004-64X</a>
Mimetix® 96-well plate aligned scaffold (4um fibre diameter)	96-well plate, fixed scaffold	<a href="#">AMS.TECL-005-1X</a>	<a href="#">AMS.TECL-005-8X</a>	<a href="#">AMS.TECL-005-64X</a>
Mimetix® 12-well plate aligned scaffold (4um fibre diameter)	12-well plate, hanging inserts	<a href="#">AMS.TECL-006-1X</a>	<a href="#">AMS.TECL-006-8X</a>	<a href="#">AMS.TECL-006-64X</a>
Multiwell starter pack 1	1 x 12-well + 1 x 96-well plate	<a href="#">AMS.TECL-007-1X</a>		
Multiwell starter pack 2	1 x 384-well + 1 x 96-well plate	<a href="#">AMS.TECL-008-1X</a>		
Multiwell insert starter pack 3	1 x 12-well removable discs + 1 x 6-well plate and inserts	<a href="#">AMS.TECL-009-1X</a>		

## Study the Growth & Differentiation of Neural Tissues Using the Alvetex® Synthetic Scaffold

Alvetex® is a highly porous polystyrene scaffold designed for 3D cell culture. Cells grown in Alvetex® form a tissue-like structure that enables them to function in a more physiologically relevant manner thus maintaining their *in vivo* morphology, behavior, and responsiveness within an *in vitro* model system. These materials are readily adaptable to different types of existing tissue culture plasticware (e.g. multi-well plates, well inserts). The pre-fabricated, sterile culture device is ready to use off-the-shelf and can be handled in a similar manner as standard 2D plasticware.



### BENEFITS

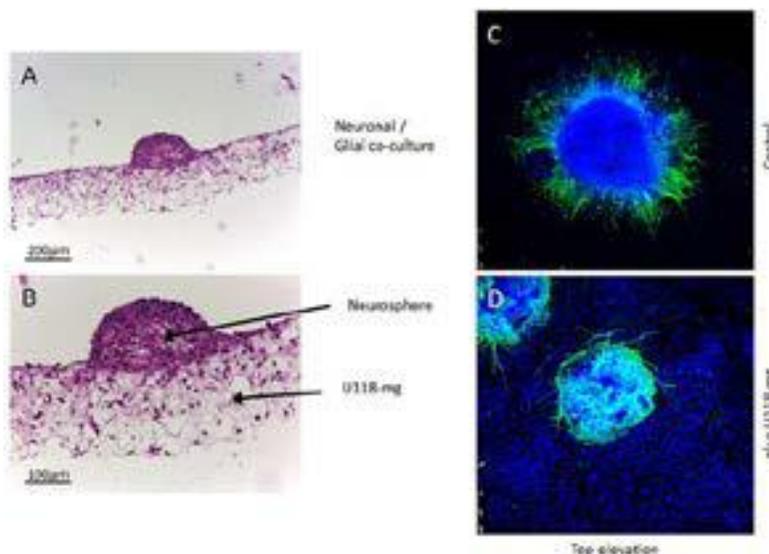
- ✓ Reproducible and robust induction of neurogenesis by human stem cells
- ✓ Creation of more physiologically relevant models for neurobiologists
- ✓ Study cell-to-cell interactions in 3D co-cultures e.g. glial cells and neurons
- ✓ Improved models of pathological conditions in the damaged nervous system
- ✓ Robust production of neurospheres and enhanced formation of neurites
- ✓ Development of unique 3D neurite outgrowth assays



Alvetex® Scaffolds				
Description	Pack size			
	1	10	80	320
12 well plate	<a href="#">AMS.AVP002</a>	<a href="#">AMS.AVP002-10</a>	<a href="#">AMS.AVP002-80</a>	<a href="#">AMS.AVP002-320</a>
24 well plate	<a href="#">AMS.AVP006</a>	<a href="#">AMS.AVP006-10</a>	<a href="#">AMS.AVP006-80</a>	<a href="#">AMS.AVP006-320</a>
96 well plate	<a href="#">AMS.AVP009</a>	<a href="#">AMS.AVP009-10</a>	<a href="#">AMS.AVP009-80</a>	<a href="#">AMS.AVP009-320</a>
384 well plate	<a href="#">AMS.AVP010-2</a>	<a href="#">AMS.AVP010-10</a>	-	-
Description	Pack Size			
	1		48	
12 well insert	<a href="#">AMS.AVP005-34</a>		<a href="#">AMS.AVP005-48</a>	
6 well insert	<a href="#">AMS.AVP004-32</a>		<a href="#">AMS.AVP004-48</a>	
well insert holders & petri dishes	<a href="#">AMS.AVP015-2</a>		-	

Studying interactions between neurons and glial in co-culture models using Alvetex® Scaffold

Co-cultures of glial cells (U118-MG) and stem cell-derived neurons were set up to study cellular interactions and the effect of glial cells on neurogenesis. First, 1 million U118-MG glial cells were seeded onto 10µg/ml laminin and poly-D-lysine coated Alvetex® Scaffold and incubated for 15 min prior to the addition of neurospheres for a further 15 min. Co-cultures were incubated for 10 days and fixed in 4% PFA prior to imaging as before. Bright field micrographs showing low (A) and high (B) magnification images of neurosphere and glial co-cultures on Alvetex® Scaffold. Confocal imaging of neurospheres from above showed neurons producing neurites in the absence of U118-MG cells (C, control) and suppression of neuritogenesis in the presence of the glial cells (D, plus U118-MG). Cells were stained with TuJ1 (green) and DAPI (blue) to show neurons and cell nuclei, respectively. Note the uniform distribution of glia cells (D, DAPI stained nuclei) and how neurites tend to wrap around the neurosphere avoiding contact with the U118-MG cells (D).



## Alvetex Strata®

Alvetex® Strata, which is a second generation of porous material, has been designed primarily to support the growth of cells and intact tissues on the surface of the membrane. Alvetex® Strata is a highly porous membrane presented in a well insert format. This product has multiple applications, including the ability to stably support intact viable tissues during cell culture and subsequent analysis.

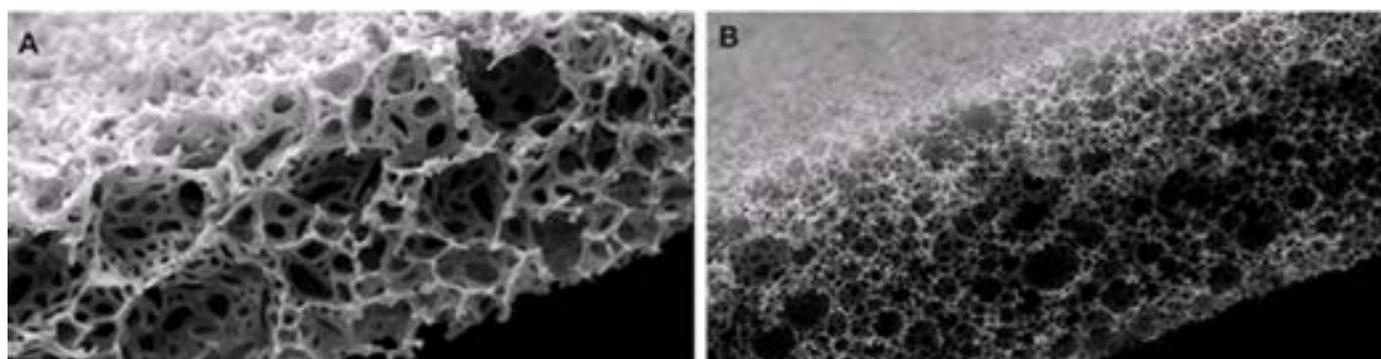
At first glance, the structure of Alvetex® Strata appears similar to Alvetex® Scaffold. However, the difference between these two materials concerns their fine structure and architecture: in Alvetex® Strata the voids and pores are significantly smaller (average 5 instead of 13 micron diameter, respectively) compared to those in Alvetex® Scaffold.

### BENEFITS

- ✓ Enhanced porosity for improved nutritional support from the medium
- ✓ Modified surface topography to improved tissue attachment
- ✓ Versatility for co-culture and construction of advanced *in vitro* models

### READ OUTS

- ✓ Imaging : histology, electron microscopy, immunohistochemistry and confocal
- ✓ Easy retrieval of DNA, RNA and protein for gene and protein expression analysis
- ✓ Simple biochemical analysis (viability/proliferation)
- ✓ Analysis of protein secretion into culture media



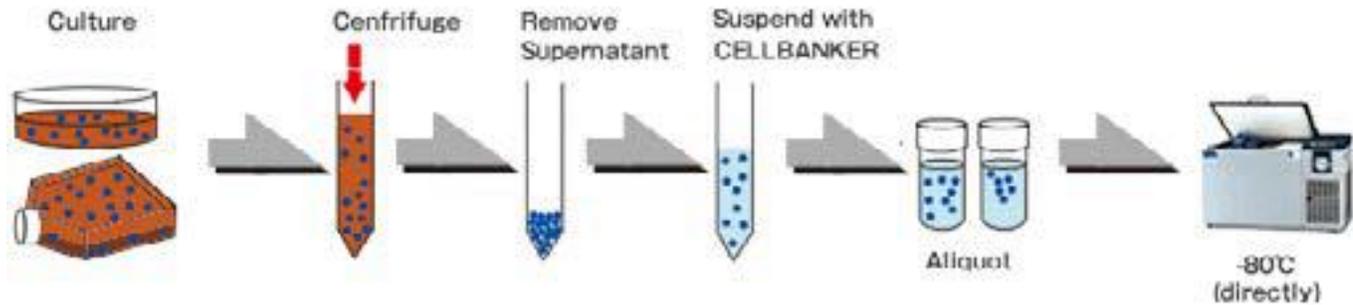
Scanning electron micrographs showing the structure of Alvetex® Scaffold (A) and Alvetex® Strata (B) porous polystyrene membranes in transverse section. Note that the size of the voids is significantly smaller in Alvetex® Strata compared to Alvetex® Scaffold. Scale bar: 100 microns.

Alvetex® Strata		
Description	Pack Size	
	12	48
12 well insert	<a href="#">AMS.STP005-12</a>	<a href="#">AMS.STP005-48</a>
6 well insert	<a href="#">AMS.STP004-12</a>	<a href="#">AMS.STP004-48</a>

# Neural Cell Cryopreservation

## Keeping your cells safe with the CELLBANKER® Series

AMSBIO supplies cutting edge cryopreservation reagents to meet the demands of your neural cell research. Our high performance and quality assured CELLBANKER® cryopreservation solutions ensure stable long-term storage of cells. CELLBANKER® is a series of easy-to-use cell freezing media with defined formulations, available in serum and serum-free formulations to successfully cryopreserve the most sensitive mammalian cells.



- ✓ **CELL-BANKER® 1** was launched in 1992 and now has a significant history of reliable, consistent and high viability recoveries post-cryopreservation. Contains serum, DMSO, glucose, salts and buffer.
- ✓ **CELLBANKER® 2** is a chemically defined serum-free cell freezing medium that allows cell cryopreservation directly at -80°C without requiring a rate controlled freezer. Contains no animal derived products and is guaranteed sterile.
- ✓ **STEM-CELLBANKER®** is a chemically defined xeno-free freezing medium optimized for stem cells and iPS cells storage as well as other valuable cells. It is free of serum and animal derived components and contains only European or US Pharmacopoeia graded ingredients. Use STEM-CELLBANKER® to achieve consistently high cell viability post-thaw, even over extended long-term storage, while maintaining cell pluripotency, normal karyotype and proliferation ability.

### BENEFITS

- ✓ Enables long term cell storage >10 years at -80°C or -196°C
- ✓ Consistent high cell viability (> 90%)
- ✓ Ready-to-use formulation with a simple protocol
- ✓ Tested on many cells
- ✓ No programmed freezer or liquid nitrogen required
- ✓ Long shelf life

### Ordering Information:

Cat No.	Description	Pack Size
<a href="#">11888</a>	CELL-BANKER® 1	100 ml
<a href="#">11891</a>	CELLBANKER® 2	1 mg
<a href="#">11897</a>	STEM-CELLBANKER®	20 ml

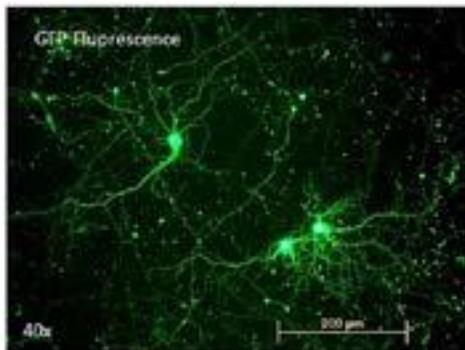
## Optimized transfection reagents tailored for neural cells!

### Neurons

DNA-In<sup>®</sup> Neuro is a new transfection reagent that consistently produces high transfection efficiencies in neurons. Neurons are efficiently transfected with minimal toxicity to support healthy post-transfected neurons, critical for performing assays on uncompromised transfected cells.

#### BENEFITS

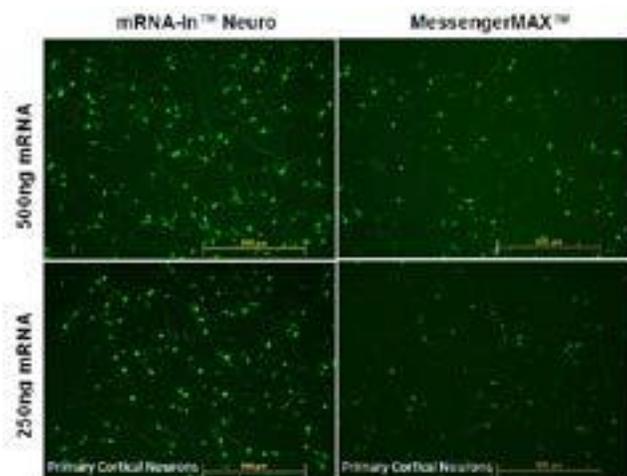
- ✓ Higher Transfection Efficiency - Two-fold or greater improvement in efficiency
- ✓ Exceptionally Low Toxicity - Maximum post-transfection neuron viability
- ✓ Highly Robust Performance - Produces consistent & reproducible results
- ✓ Quick & Easy-to-Use - An easy to follow, single-tube protocol



#### High GFP Expression in Primary Neurons -

Primary rat cortical neurons were transfected with DNA-In<sup>®</sup> Neuro Transfection Reagent and incubated overnight in complete culture media. Uniform, high GFP expression in healthy cells could be observed 48-hours post-transfection.

mRNA-In<sup>®</sup> Neuro, is a new, mRNA transfection reagent specifically designed and optimized for high efficiency mRNA delivery with exceptionally low cytotoxicity in neurons. Unlike other competitor reagents, mRNA-In<sup>®</sup> Neuro requires very low amounts of RNA to achieve maximum delivery while maintaining optimal cell viability.



#### mRNA-In<sup>®</sup> Neuro Outperforms Competitor Reagents.

mRNA-In<sup>®</sup> Neuro Transfection Reagent was compared to MessengerMax<sup>™</sup> for transfecting neurons. Primary cortical neurons in culture for 6 days were transfected with 500ng and 250ng amounts of modified mRNA and 2 $\mu$ l mRNA-In<sup>®</sup> Neuro or MessengerMax<sup>™</sup> in 24-well plates. Cells were incubated overnight in complete culture media and observed 24hr and 48hrs (not shown) post-transfection. Above images show significantly higher transfection efficiency and GFP expression in healthy neurons post transfection.

#### Ordering Information:

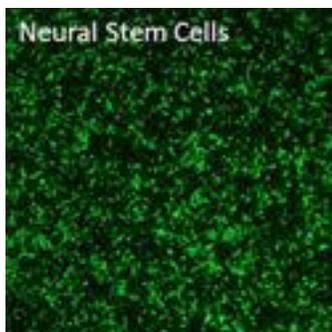
Cat No.	Description	Pack Size
<a href="#">GST-2101</a>	DNA-In <sup>®</sup> Neuro Transfection Reagent	1 ml
<a href="#">GST-2111</a>	mRNA-In <sup>®</sup> Neuro Transfection Reagent	1 ml

## Neural Stem Cells

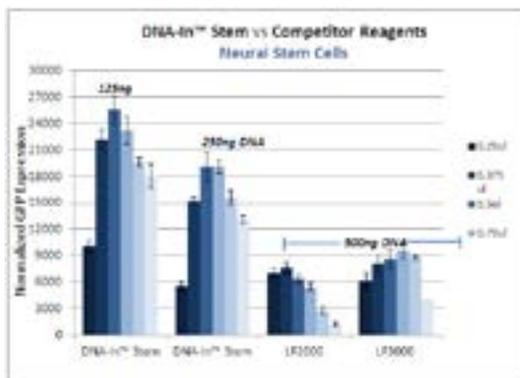
DNA-In™ Stem and mRNA-In™ Stem are next-generation transfection reagents specifically formulated for use with stem cells, including neural stem cells. mRNA-In™ Stem requires low amounts for mRNA for high transfection efficiency and maximum cell viability in stem cells.

### BENEFITS

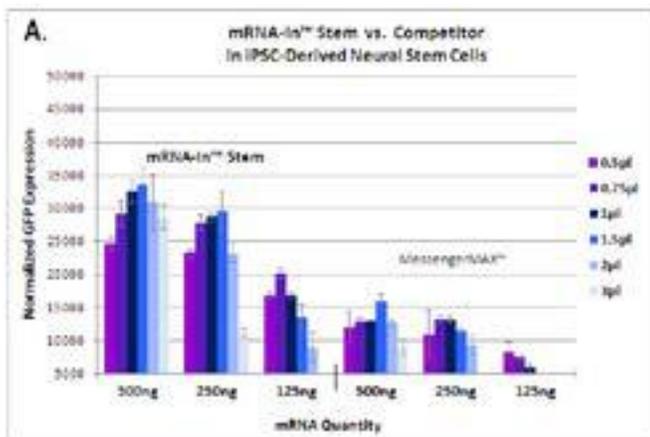
- ✓ Higher Transfection Efficiency
- ✓ Exceptionally Low Toxicity
- ✓ Consistent & reproducible results
- ✓ Quick & Easy-to-Use
- ✓ Maximum efficiency with low amounts of DNA or mRNA



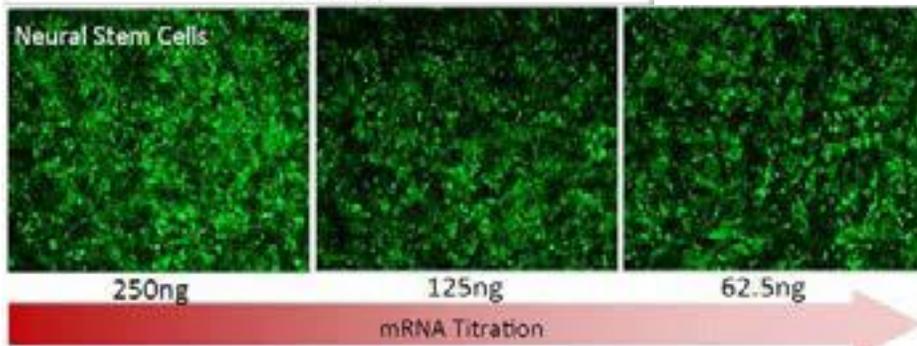
Neural Stem Cells transfected with an eGFP-expressing plasmid using DNA-In™ Stem Transfection Reagent.



DNA-In™ Stem requires up to 4X less DNA vs competitor reagents for maximum performance.



mRNA-In™ efficiently delivers mRNA for significantly higher efficiency vs MessengerMax® Reagent in stem cells. Normal human iPSC-Derived Neural Stem Cells (NSC) were transfected with either mRNA-In™ Reagent or MessengerMAX™ (Life Technologies) using various amounts of GFP-mRNA (5-methylcytosine and pseudouridine modified) were complexed with the various amounts of mRNA-In™. Cells were plated in 24-well plates to give 60-70% confluence the day of transfection. RNA/reagent complexes were added to the cells, mixed, and incubated at 37°C in 5% CO<sub>2</sub> overnight. Cells were analyzed by a fluorescence plate reader and microscopy 24 hours post-transfection. Error bars represent the standard deviation of triplicate wells. The data below shows mRNA-In™ provides significantly higher transfection efficiency using high (500ng) and low amounts (125ng) of modified mRNA.



mRNA-In™ Stem achieves maximum transfection efficiency and expression with low amounts of mRNA. Normal human iPSC-derived neural stem cells (NSCs) were plated in 24-well plates to give 60-80% confluence on the day of transfection. Low amounts (250ng to 62.5ngs) of GFP-mRNA containing 5-methylcytosine and pseudouridine were complexed with 2-3µl mRNA-In™ in Opti-MEM®. Above data shows representative images of NSCs 24-hours post-transfection.

### Ordering Information:

Cat No.	Description	Pack Size
<a href="#">GST-2131</a>	DNA-In® Stem Transfection Reagent	1 ml
<a href="#">GST-2141</a>	mRNA-In® Stem Transfection Reagent	1 ml

## Lentivirus

Lentivirus is a subfamily of the retrovirus family. Lentiviruses can deliver significant amounts of genetic information into host cells and integrate it into the cellular genome. Genetically-engineered lentiviruses are therefore used as one of the most efficient tools of gene delivery. These lentiviruses contain a viral promoter which is used to control the expression of a transgene, miRNA or shRNA but no virulence genes. This, together with several other security modifications makes them safe to use in the laboratory.

### BENEFITS

- ✓ No transfection reagent needed
- ✓ Stable gene integration in the host genome (in contrast to adenovirus) for long-term expression
- ✓ Effectively transduce most mammalian cell lines including primary or stem cells
- ✓ Integrate into non-dividing cells; Unlike retrovirus, lentivirus does not require a mitotic event for integration into the host cell genome
- ✓ Infect 'difficult-to-transfect' cell lines
- ✓ Low immunogenicity when used *in vivo*

### AMSBIO OFFERS MORE THAN 100,000 PRE-MADE LENTIVIRAL PARTICLES AND WE ARE ADDING NEW, ONES EVERY WEEK

A wide range of pre-made lentiviral particles are available off-the-shelf. Different fluorescent and/or antibiotic resistance markers as well as optional inducible or constitutive promoters are available.

- ✓ More than 500 lentiviruses expressing human or mouse genes
- ✓ Lentiviral particles expressing fluorescent proteins: GFP, RFP, CFP and YFP

### AMSBIO Lentivirus Service

- ✓ We can do it all for you, from the shRNA design or gene template acquisition to the lentiviral particles (or the stable cell line) generation.
- ✓ We will provide you with high titer lentiviral particles guaranteed. You will receive 0.5ml of ready-to-use lentivirus packaged in medium with FBS or concentrated in PBS (serum-free).
- ✓ Ready-to-use: Just add the lentivirus to the medium of your cells and you can visualise the infection of our cells in 48-72 hours.

### STABLE CELL LINES SERVICE

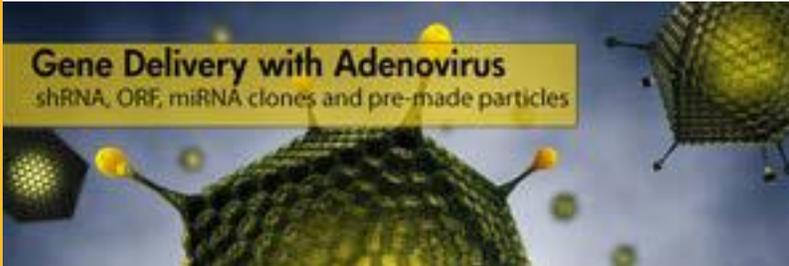
AMSBIO can generate your stable cell line of interest expressing shRNA or transgene (each available constitutive or inducible), in a very cost-effective and timely manner. Either you provide us with the host cell line and the template or we procure them for you. We will:

- ✓ Clone your shRNA or transgene into our lentiviral vector and generate the lentiviral particles
- ✓ Transduce the cell line of your interest
- ✓ Select the stably transduced, highly expressing cells (Validate the genomic integration via genomic PCR and the high-expression clone by Western Blot if applicable)
- ✓ Deliver two cryogenically preserved vials of stable cells ( $1 \times 10^6$  cells/each) in around 2 months

Learn more about AMSBIO lentivirus at : [www.amsbio.com/lentivirus.aspx](http://www.amsbio.com/lentivirus.aspx)

## Adenovirus

Adenoviruses are double-stranded DNA viruses that can infect a broad range of cell types including dividing and non-dividing cells and are, therefore, widely used vehicles for gene delivery. Our adenoviral expression vector is derived from human adenovirus type5 with the E1 and E3 genomic region deleted. Since E1 is essential for the assembly of the virus particles, our adenovirus system produces only replication-incompetent adenovirus. Adenovirus can be used to transfect a wide range of cells including primary cells and stem cells as well animal models, such as monkeys, mouse and human cells. Adenoviral transfection efficiency is often very high, and can regularly reach 100%.



### BENEFITS

- ✓ Adenoviral vector is replication deficient and safe
- ✓ Transient expression in mammalian cells
- ✓ Adenoviruses are not toxic to host cells
- ✓ Accommodate large transgenes
- ✓ Adenovirus is relatively stable

We offer a large collection of adenovirus clones for DNA, shRNA and miRNA. We also provide custom adenovirus services.

Learn more about AMSBIO adenovirus at : [www.amsbio.com/adenovirus.aspx](http://www.amsbio.com/adenovirus.aspx)

## Adeno-Associated Virus

Adeno-associated virus (AAV) is a non-enveloped, single-stranded DNA virus which is approximately 20nm in size and can infect both dividing and non-dividing cells. AAV does not cause disease and elicits a very mild immune response. Being able to infect both dividing and non-dividing cells, it incorporates its genome into that of the host cells and only replicates in the presence of a helper virus; most commonly adenovirus or herpes simplex virus.

### AAV Cloning Service:

- ✓ AAV Human cDNA ORF cloning
- ✓ AAV shRNA cloning
- ✓ AAV CRISPR

### AAV Packaging Service:

- ✓ Small Scale Crude AAV Packaging service
- ✓ Large Scale Custom AAV Packaging service



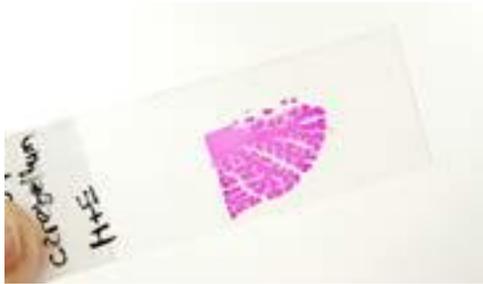
Learn more about AMSBIO adeno-associated virus at : [www.amsbio.com/Adeno-Associated\\_Virus.aspx](http://www.amsbio.com/Adeno-Associated_Virus.aspx)

## COMPARISON OF DIFFERENT VIRUS TYPES

	Adenovirus	Lentivirus	AAV
Transfection Efficiency	>90%	~ 30%	30 - 40%
Host Genome Integration	No	Yes	Yes
Packaging Capacity	Up to 34 kb	8.5 kb	4 kb
High Viral Titer	Yes	No	No

# Neural Tissues

## Extensive Neural Tissue Biorepository from Healthy and Diseased Donors



AMSBIO offers a comprehensive repository of neural tissue samples, covering multiple regions of the brain and spinal cord from many species and tissue types. Certified tissues are available as OCT frozen blocks & snap-frozen samples, FFPE blocks, FFPE tissue arrays, frozen tissue arrays, frozen tissue sections, FFPE tissue sections, FFPE tissue panels. We have a wide range of donors and provide both healthy and diseased tissue.

Also available:

Total RNA– cDNA– Genomic DNA– Total Protein –Northern Blots –Western Blots

### Human Tissue

- ✓ Adult and Fetal Normal
- ✓ Tumour and Adjacent Tissue
- ✓ Diseased tissues including Alzheimer's Disease, Parkinson's Disease and Dementia

### Multiple Species Available

- ✓ Mouse
- ✓ Rhesus Monkey
- ✓ Cynomolgus Monkey
- ✓ Marmoset
- ✓ Guinea Pig
- ✓ Cat
- ✓ Chicken
- ✓ Dog
- ✓ Horse
- ✓ Bovine
- ✓ Rat
- ✓ Rabbit
- ✓ Hamster
- ✓ Nude Mouse
- ✓ Mini Pig
- ✓ Pig



### Mouse & Rat Brain Development Series

We provide a series of tissue covering 10 stages of brain development from embryonic to mature animals. The embryonic series includes tissue from E1, E7, E14 and E21.

Search our database at [www.amsbio.com/Tissues-biorepository.aspx](http://www.amsbio.com/Tissues-biorepository.aspx)

## Tissue Dissociation

AMSBIO now offers the world's first highly purified collagenase free of any animal-based components. Using raw materials of animal origin often causes concerns regarding the introduction of potential animal-derived pathogens. Collagenase AF-1 GMP Grade is derived from *Clostridium histolyticum* grown in a medium containing carefully selected plant-based ingredients.

For research applications, non-GMP grade Collagenase NB4 Standard Grade and Collagenase NB 5 Sterile Grade are economical alternatives with comparable enzymatic properties to Collagenase NB 6 GMP Grade.

### BENEFITS

- ✓ High cell yields and viability
- ✓ Reliable lot-to-lot consistency
- ✓ TSE safe manufacturing
- ✓ Low endotoxin
- ✓ Animal-Free GMP Grade Collagenase

### Ordering Information:

Cat No.	Description	Pack Size
<a href="#">17454.01</a>	Collagenase NB4 Standard Grade	1g
<a href="#">17454.02</a>	Collagenase NB4 Standard Grade	500mg
<a href="#">17459.03</a>	Collagenase NB5 Sterile Grade	1g
<a href="#">17458.03</a>	Collagenase NB6 GMP Grade	1g
<a href="#">17457.01</a>	Collagenase Animal Free GMP Grade	≥ 2000 PZ U/Vial
<a href="#">30306.01</a>	Neutral Protease Animal Free GMP Grade	≥ 100 DMC U/Vial

## Proteoglycans & GAGs

Chondroitin Sulfate Proteoglycans (CSPGs) are involved in the inhibition of axon regeneration after CNS injuries. Much of this inhibitory activity is lost after digestion with chondroitinase. Axon guidance is influenced by the presence of Heparan Sulfate Proteoglycans (HSPGs) on the surface of axons. HSPG has also been implicated in several pathogenic features of Alzheimer's Disease, including its colocalization with amyloid plaques. There is the possibility that the Hyaluronic Acid found in high concentrations associated with some perikarya may have a special role in plasticity responses in discrete nerve cell populations. It has been reported that soluble Glycosaminoglycans (GAGs) might be used to support neural differentiation of HS competent cells and that the mechanisms underlying this activity might provide useful information about the signaling pathways critical for loss of pluripotency and early lineage commitment.

AMSBIO is committed to developing an innovative and quality product range for Proteoglycan and GAG research. Our products in this area include:

- ✓ Chondroitin Sulfate, Dermatan Sulfate, Heparan Sulfate, Keratan Sulfate, Hyaluronic Acid,
- ✓ Poly-, oligo- and disaccharide standards
- ✓ Chondroitinases and other GAG degrading enzymes
- ✓ Monoclonal antibodies and Hyaluronic Acid Binding Protein
- ✓ Fluorescent labelled GAGs

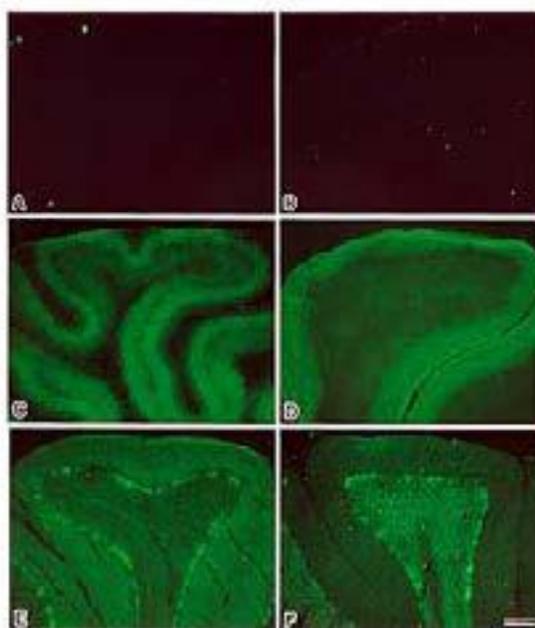
## Gangliosides

Gangliosides are galactose- containing cerebroside found in central nervous system tissues. Ganglioside accumulations can lead pathologies including generalized gangliosidosis, Tay-Sachs disease, Sandhoff disease to GM2 activator deficiency.

It has been reported that GM1 ganglioside, may improve symptoms and delay disease progression in Parkinson's disease.

AMSBIO supplies a range of antibodies, purified gangliosides and ELISA kits for gangliosides.

Indirect Immunofluorescence Analysis of GQ1b Expression in Postnatal Rat Cerebellum



(A. 1 day, B 5 days, C. 10 days, D. 20 days, E, 30 days, F. 80 days)

Contact us if you would like to receive more information about our glycobiology products. We're happy to help!



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