

Products for Stem Cell Verification



THE IMPORTANCE OF STEM CELL VERIFICATION

The defining characteristics of stem cells are their abilities to self-renew and to differentiate into multiple lineages. Stem cell research studies most often require weeks of cell culture before an experimental hypothesis can be tested. Therefore, the ability to verify that the starting cell population is healthy and undifferentiated is an important methodological step that can reduce experimental variability, improve data consistency, and provide valuable insight that may prevent weeks of wasted effort and reagents.

R&D Systems provides a wide selection of flow cytometry kits and antibody panels to completely characterize potency status using established stem cell markers, including our new GloLIVE™ antibodies for live cell staining (see back page). In addition, we offer functional identification kits to evaluate potency by assessing the ability of stem cells to differentiate into appropriate cell lineages.

Functional Identification Kits for Stem Cell Potency Verification

STEM CELL SUBTYPE	DIFFERENTIATED DERIVATIVES VERIFIED
Embryonic & Induced Pluripotent Stem Cells	Ectoderm, mesoderm, & endoderm
Mesenchymal Stem Cells	Adipocytes, chondrocytes, & osteocytes
Neural Stem Cells	Astrocytes, neurons, & oligodendrocytes
Hematopoietic Stem Cells	Granulocytes, macrophages, & erythrocytes

- ✓ Expand healthy, undifferentiated stem cells
- ✓ Verify differentiation potential
- ✓ Characterize stem cell markers

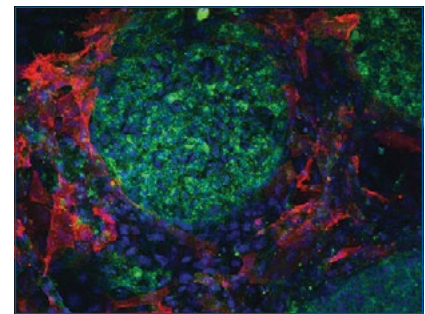
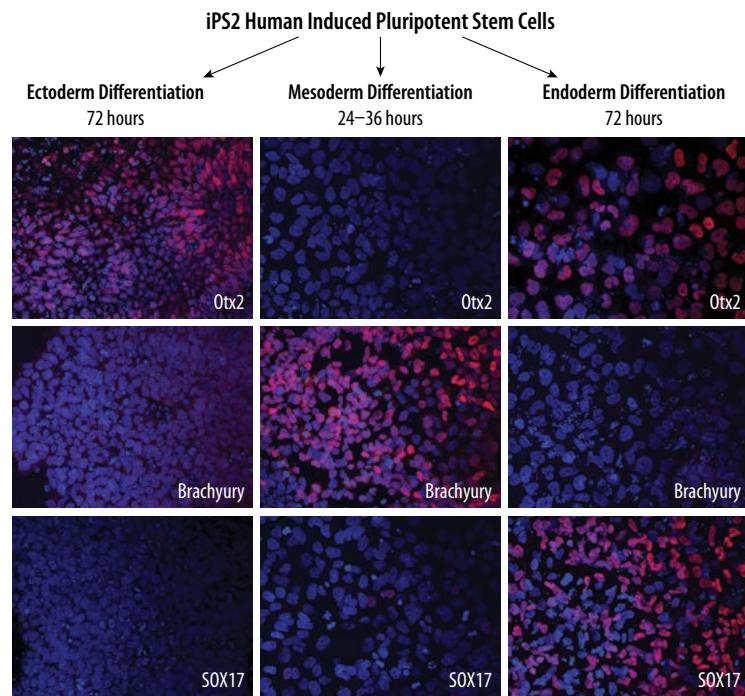
Find the Right Tools at:
www.RnDSystems.com/StemCells

Embryonic & Induced Pluripotent Stem Cells

Pluripotent Stem Cell Functional Identification Kit

Media supplements and growth factors can be used to verify the ability of human pluripotent stem cells to differentiate into ectoderm, mesoderm, and endoderm in only 5 days. The kit also includes antibodies to characterize the three cell types and confirm the pluripotency status of the starting cell population.

PRODUCT	KIT CONTENTS	CATALOG #
Human Pluripotent Stem Cell Functional Identification Kit	Differentiation Base Media Supplement; Endoderm, Ectoderm, and Mesoderm Differentiation Supplements; Goat Anti-Human Brachyury, Goat Anti-Human Otx2, and Goat Anti-Human SOX17 Antibodies. Enough media for the differentiation of one 24-well plate per lineage.	SC027



Verification of Pluripotency in Live Human Induced Pluripotent Stem Cells. iPS2 human induced pluripotent stem cells were cultured on Irradiated Mouse Embryonic Fibroblasts (Catalog # PSC001) and labeled with antibodies included in the Human Pluripotent Stem Cell Live Cell Imaging Kit (Catalog # SC023). Pluripotency in live human stem cell colonies was verified using a NorthernLights (NL)493-conjugated Mouse Anti-Human SSEA-4 Monoclonal Antibody (green) and a NL557-conjugated Mouse Anti-Human SSEA-1 Monoclonal Antibody (red). The nuclei were counterstained with Hoechst 33342 (blue). *The kit also contains a NL557-conjugated Mouse Anti-Human TRA-1-60(R) Monoclonal Antibody.*

Verification of Induced Pluripotent Stem Cell Pluripotency. iPS2 human induced pluripotent stem cells were differentiated to ectoderm, mesoderm, and endoderm using the media supplements included in the Human Pluripotent Stem Cell Functional Identification Kit (Catalog # SC027). The kit also contains Goat Anti-Human Otx2 (ectoderm), Goat Anti-Human Brachyury (mesoderm), and Goat Anti-Human SOX17 (endoderm) Antigen Affinity-purified Polyclonal Antibodies for the confirmation of differentiation status. The cells were stained using the NorthernLights™ 557-conjugated Donkey Anti-Goat IgG Secondary Antibody (Catalog #NL001; red), and the nuclei were counterstained with DAPI (blue).

Discover More Tools for
 Pluripotent Stem Cell Research at:
www.RnDSystems.com/ESiPS

Embryonic & Induced Pluripotent Stem Cells, continued

Live Pluripotent Stem Cell Imaging Kit

Three azide-free stem cell marker antibodies conjugated to NorthernLights (NL) fluorochromes can be used for single-step, immunocytochemical staining to verify the pluripotency of live human stem cells in 30 minutes. Following staining, positive colony selection, and plating of pluripotent stem cells, the cells continue in culture without adverse effects on cell proliferation or stemness.

PRODUCT	KIT CONTENTS	CATALOG #
Human Pluripotent Stem Cell Live Cell Imaging Kit	NL557-conjugated Mouse Anti-Human SSEA-1, NL493-conjugated Mouse Anti-Human SSEA-4, and NL557-conjugated Mouse Anti-Human TRA-1-60(R) Monoclonal Antibodies. Enough reagents for 25 assays (500 μ L).	SC023

Human Pluripotent Stem Cell Array

R&D Systems Proteome Profiler™ Arrays are screening tools that simultaneously detect the relative levels of multiple marker proteins in each sample. This array contains 8 nitrocellulose membranes spotted with 15 different stem cell and derivative cell marker antibodies and requires no specialized equipment.

PRODUCT	KIT CONTENTS	CATALOG #
Human Pluripotent Stem Cell Array Kit	Eight membranes spotted in duplicate with antibodies against E-Cadherin, α -Fetoprotein, GATA-4, Goosecoid, HCG, HNF-3 β /FoxA2, Nanog, Oct-3/4, Otx2, PDX-1/IPF1, Snail, SOX2, SOX17, TP63/TP73L, and VEGF R2/KDR/Flk-1. Enough materials to analyze 8 samples.	ARY010

Multi-Color Flow Cytometry Kit for Pluripotent Stem Cells

Human or mouse pluripotent stem cell marker expression can be verified using four fluorochrome-conjugated monoclonal antibodies.

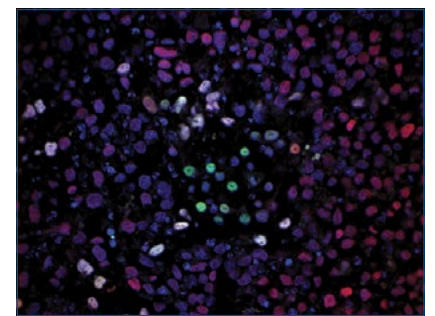
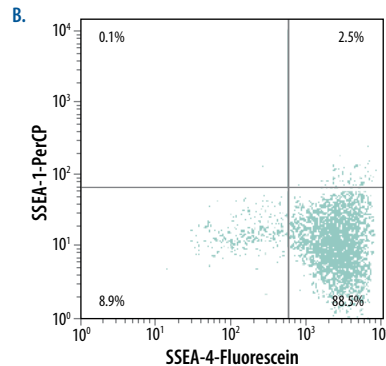
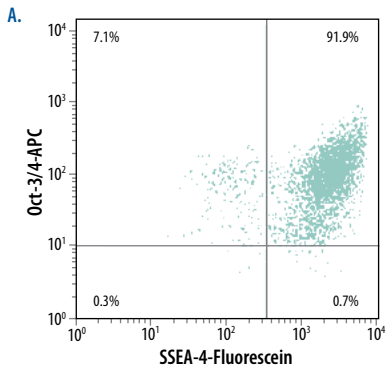
PRODUCT	KIT CONTENTS	CATALOG #
Human/Mouse Embryonic Stem Cell 4-Color Flow Cytometry Kit	4 conjugated antibodies: SSEA-1-PerCP (Clone MC-480), SSEA-4-Fluorescein (Clone MC-813-70), Oct-3/4-APC (Clone 240408), and SOX2-PE (Clone 245610). Enough reagents for 25 tests.	FMC001

Multi-Color Flow Cytometry Kits also contain appropriate staining buffers and specific isotype controls.

Marker Panels, Primer Pairs, & Immunocytochemistry Kits for Pluripotent Stem Cells

Tools to assess the undifferentiated/pluripotent status of human, mouse, and rat pluripotent stem cells.

PRODUCT	KIT CONTENTS	CATALOG #
Human Embryonic Stem Cell Marker Antibody Panel	25 μ g each of antibodies to Alkaline Phosphatase, Nanog, Oct-3/4, SSEA-1, and SSEA-4. Enough reagents for 8 immunocytochemistry samples (300 μ L) or 25 flow cytometry samples.	SC008
Human Embryonic Stem Cell Marker Antibody Panel Plus	25 μ g each of antibodies to CD9, E-Cadherin, Nanog, Oct-3/4, Podocalyxin, SOX2, SSEA-1, and SSEA-4. Enough reagents for 8 immunocytochemistry samples (300 μ L) or 25 flow cytometry samples.	SC009
Human Pluripotent Stem Cell Assessment Primer Pair Panel	Primer pairs for human AFP, Brachyury, DPPA5/ESG1, GAPDH, GATA-4, HNF-3 β /FoxA2, Nanog, Nestin, Oct-3/4, Otx2, PDX-1/IPF1, SOX2, SOX17, TP63/TP73L, and Stella. Enough reagents for 25 reactions.	SC012
Mouse/Rat Pluripotent Stem Cell Assessment Primer Pair Panel	Primer pairs for mouse/rat AFP, Brachyury, DPPA5/ESG1, GAPDH, GATA-4, HNF-3 β /FoxA2, Nanog, Nestin, Oct-3/4, Otx2, PDX-1/IPF1, SOX2, SOX17, TP63/TP73L, and Stella. Enough reagents for 25 reactions.	SC015
Human Pluripotent Stem Cell 3-Color Immunocytochemistry Kit	NL557-conjugated Goat Anti-Human SOX2, NL637-conjugated Goat Anti-Human Oct-3/4, and NL493-conjugated Goat Anti-Human Nanog. Enough reagents for 25 samples (50 μ L).	SC021
Human Three Germ Layer 3-Color Immunocytochemistry Kit	NL493-conjugated Goat Anti-Human SOX1, NL557-conjugated Goat Anti-Human Otx-2, NL557-conjugated Goat Anti-Human Brachyury, NL637-conjugated Goat Anti-Human HAND1, NL493-conjugated Goat Anti-Human GATA-4, and NL637-conjugated Goat Anti-Human SOX17. Enough reagents for 25 samples (50 μ L).	SC022



Verification of Human Embryonic Stem Cell Pluripotency by Multi-Color Flow Cytometry. BG01V human embryonic stem cells were stained using reagents included in the Human/Mouse Embryonic Stem Cell Multi-Color Flow Cytometry Kit (Catalog # FMC001). Cells were simultaneously analyzed for expression of pluripotency markers including Oct-3/4, SSEA-1, and SSEA-4. A. Flow cytometry data show that 91.9% of the BG01V human embryonic stem cell population are positive for both Oct-3/4 and SSEA-4 expression. B. Flow cytometry data show that 88.5% of the BG01V human embryonic stem cell population are positive for SSEA-4 and negative for SSEA-1, a phenotype consistent with human embryonic stem cells.

Random Differentiation within a BG01V Human Embryonic Stem Cell-derived Embryoid Body. BG01V human embryonic stem cell-derived embryoid bodies were cultured on plates coated with Cultrex® Stem Cell Qualified Basement Membrane Extract (Catalog # 3434-005-02). Random differentiation was detected by simultaneous 3-color staining using three fluorochrome-conjugated antibodies provided in the Human Three Germ Layer 3-Color Immunocytochemistry Kit (Catalog # SC022). Ectoderm derivatives were detected with NorthernLights (NL)557-conjugated Otx2 (red), mesoderm differentiated cells with NL637-conjugated HAND1 (pseudocolored white), and endoderm derivatives with NL493-conjugated GATA-4 (green). The nuclei were counterstained with DAPI (blue).

Mesenchymal Stem Cells

Mesenchymal Stem Cell Functional Identification Kits

Mesenchymal Stem Cell Functional Identification Kits contain specially formulated Adipogenic, Chondrogenic, and Osteogenic Media Supplements and associated marker antibodies that can be used to verify the ability of MSC populations to differentiate into the appropriate lineages.

PRODUCT	KIT CONTENTS	CATALOG #
Human Mesenchymal Stem Cell Functional Identification Kit	Adipogenic, Chondrogenic, and Osteogenic Differentiation Supplement; ITS Supplement; Goat Anti-Human Aggrecan, Mouse Anti-Human Osteocalcin, and Goat Anti-Mouse FABP4 Antibodies.	SC006
Mouse Mesenchymal Stem Cell Functional Identification Kit	Adipogenic Supplement, Chondrogenic Supplement, Osteogenic Supplement, ITS Supplement; Sheep Anti-Mouse Collagen II, Goat Anti-Mouse Osteopontin, and Goat Anti-Mouse FABP4 Antibodies.	SC010
Rat Mesenchymal Stem Cell Functional Identification Kit	Adipogenic Supplement, Chondrogenic Supplement, Osteogenic Supplement, ITS Supplement; Goat Anti-Human Aggrecan, Mouse Anti-Human Osteocalcin, and Goat Anti-Mouse FABP4 Antibodies.	SC020

MSC Functional Identification Kits contain enough reagents for the differentiation of 16 wells of a 24-well plate for adipogenic and osteogenic lineages and 10 chondrocyte pellets.

Multi-Color Flow Cytometry Kits for Mesenchymal Stem Cells

Kits to simultaneously verify the expression of MSC multipotency markers using four fluorochrome-conjugated monoclonal antibodies.

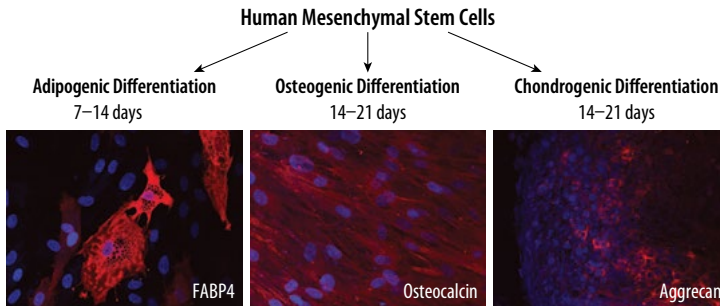
PRODUCT	KIT CONTENTS	CATALOG #
Human Multipotent Mesenchymal Stromal Cell 4-Color Flow Cytometry Kit	4 conjugated antibodies: CD45-PE, CD90-APC, CD146-Fluorescein, and CD105-PerCP. Enough reagents for 25 tests.	FMC002
Mouse Multipotent Mesenchymal Stromal Cell 4-Color Flow Cytometry Kit	4 conjugated antibodies: CD29-PE, CD45-PerCP, CD105-Fluorescein, and Sca-1-APC. Enough reagents for 25 tests.	FMC003

Multi-Color Flow Cytometry Kits also contain appropriate staining buffers and specific isotype controls.

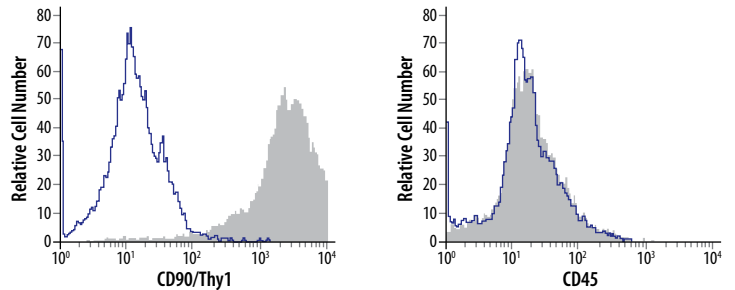
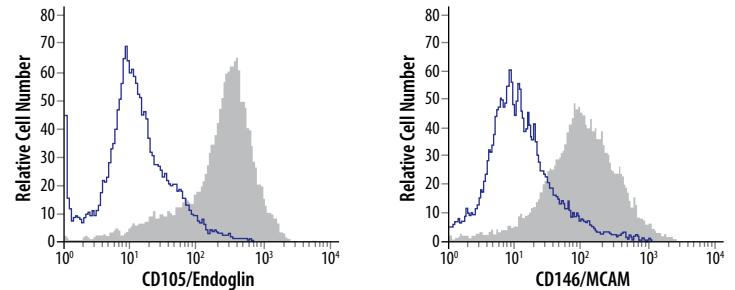
Marker Panels for Mesenchymal Stem Cells

Antibody panels to verify MSC identity by flow cytometry using positive and negative surface markers.

PRODUCT	KIT CONTENTS	CATALOG #
Human Multipotent Mesenchymal Stromal Cell Marker Antibody Panel	25 µg each of antibodies to CD19, CD44, CD45, CD90, CD105, CD106, CD146, CD166, and Stro-1. Enough reagents to process 25 samples.	SC017
Mouse Multipotent Mesenchymal Stromal Cell Marker Antibody Panel	25 µg each of antibodies to CD11b, CD29, CD44, CD45, CD73, CD105, CD106, and Sca-1. Enough reagents to process 25 samples.	SC018



Verification of Human Mesenchymal Stem Cell Multipotency. Human mesenchymal stem cells were cultured in StemXVivo™ Mesenchymal Stem Cell Expansion Media (Catalog # CCM004) and differentiation was induced as indicated using the media supplements included in the Human Mesenchymal Stem Cell Functional Identification Kit (Catalog # SC006). The kit also contains a Goat Anti-Mouse FABP4 Antigen Affinity-purified Polyclonal Antibody (adipocytes), a Mouse Anti-Human Osteocalcin Monoclonal Antibody (osteocytes), and a Goat Anti-Human Aggrecan Antigen Affinity-purified Polyclonal Antibody (chondrocytes) for the confirmation of differentiation status. The cells were stained using the NorthernLights 557-conjugated Donkey Anti-Goat (Catalog # NL001; red) or Anti-Mouse (Catalog # NL007; red) Secondary Antibody, and the nuclei were counterstained with DAPI (blue).



Characterization of Human Mesenchymal Stem Cells by Multi-Color Flow Cytometry. Human mesenchymal stem cell (MSC) multipotency was verified using monoclonal antibodies included in the Human Multipotent Mesenchymal Stromal Cell 4-Color Flow Cytometry Kit (Catalog # FMC002). MSCs were simultaneously stained with the positive markers, PerCP-conjugated anti-CD105/Endoglin, CF5-conjugated anti-CD146/MCAM, and APC-conjugated anti-CD90/Thy1, and the negative marker, PE-conjugated anti-CD45 (filled histograms) or the corresponding isotype control (open histograms).

Discover More Tools for
Mesenchymal Stem Cell Research at:
www.RnDSystems.com/MSc

Neural Stem Cells

Neural Progenitor Cell Functional Identification Kit

A kit containing a specially formulated media supplement that can be used to verify the ability of neural progenitor cells (NPCs) to differentiate into astrocytes, neurons, and oligodendrocytes. The kit also includes antibodies to characterize NPCs and their differentiated derivatives.

PRODUCT	KIT CONTENTS	CATALOG #
Human/Mouse/Rat Neural Lineage Functional Identification Kit	Neural Maintenance Supplement; Neural Differentiation Supplement; Fibronectin; Goat Anti-Rat Nestin, Sheep Anti-Human GFAP, Mouse Anti-Neuron-specific β -III Tubulin, and Anti-Oligodendrocyte Marker O4 Antibodies. Enough media for the differentiation of two 24-well plates.	SC028

Neural Progenitor Cell Marker Kit

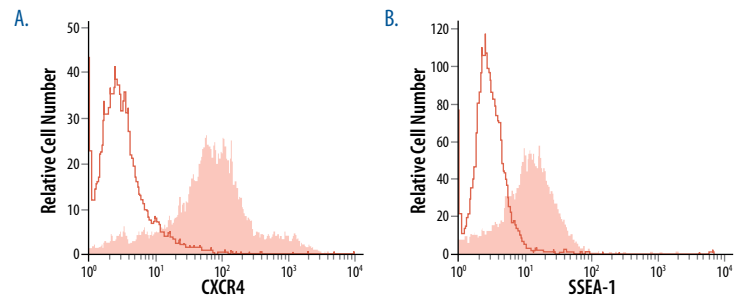
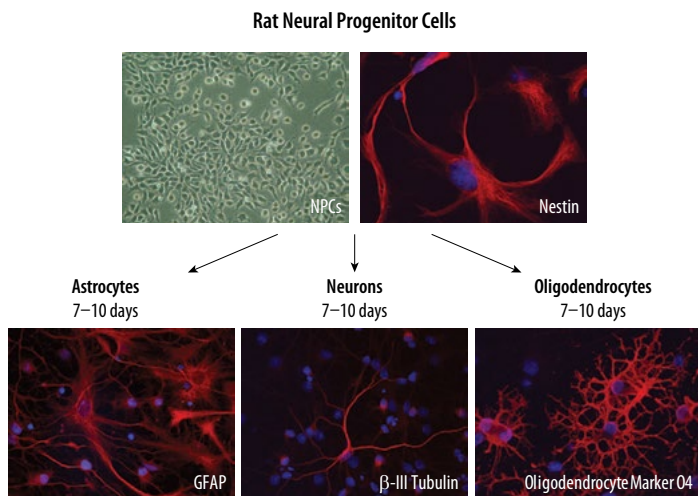
The Human/Mouse/Rat Neural Progenitor Cell Marker Antibody Panel is designed for the identification and characterization of human, mouse, or rat neural progenitor cells by marker expression using either immunocytochemistry or flow cytometry techniques.

PRODUCT	KIT CONTENTS	CATALOG #
Human/Mouse/Rat Neural Progenitor Cell Marker Antibody Panel	25 μ g each of antibodies to Human CXCR4, Human Musashi-1, Rat Nestin, Rat Notch-2, Human SOX1, Human/Mouse SSEA-1, Human/Mouse SOX2, and Human Vimentin. Enough reagents for 25 assays.	SC025

Neural Multi-Color Immunocytochemistry Kit

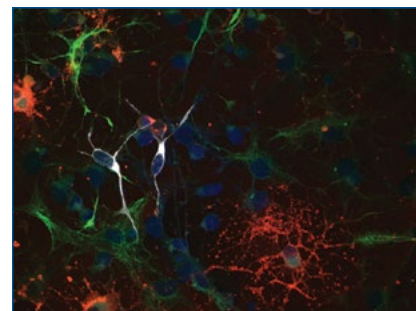
A kit containing three fluorochrome-conjugated primary antibodies that can be used together for single-step immunocytochemical staining of human, mouse, or rat neural cell types. The antibodies included in the kit specifically stain astrocytes, neurons, and oligodendrocytes.

PRODUCT	KIT CONTENTS	CATALOG #
Human/Mouse/Rat Neural 3-Color Immunocytochemistry Kit	NL493-conjugated Anti-GFAP, NL637-conjugated Anti- β -III Tubulin, and NL557-conjugated Anti-Oligodendrocyte Marker O4. Enough reagents for 25 assays (50 μ L).	SC024



Detection of Neural Cell Progenitor Markers CXCR4 and SSEA-1 by Flow Cytometry. Cells were stained with antibodies included in the Human/Mouse/Rat Neural Progenitor Cell Marker Antibody Panel (Catalog # SC025). **A.** CXCR4 was detected in undifferentiated Mouse Cortical Stem Cells (Catalog # NSC002) using a Mouse Anti-Human CXCR4 Monoclonal Antibody (filled histogram) or a mouse IgG_{2a} isotype control (open histogram). **B.** SSEA-1 was detected in undifferentiated Rat Cortical Stem Cells (Catalog # NSC001) using a Mouse Anti-Human/Mouse SSEA-1 Monoclonal Antibody (filled histogram) or a mouse IgM isotype control (open histogram). Cells were stained using PE-conjugated secondary antibodies. This panel also includes primary antibodies to detect Musashi-1, Nestin, Notch-1, SOX1, SOX2, and Vimentin.

Verification of Neural Progenitor Cell Multipotency. Rat neural progenitor cells (NPCs) were cultured in media containing neural maintenance supplement (top panel). Differentiation towards neural lineages was induced as indicated using the media supplement included in the Human/Mouse/Rat Neural Lineage Functional Identification Kit (Catalog # SC028; bottom panel). The kit also contains a Goat Anti-Rat Nestin Antigen Affinity-purified Polyclonal Antibody (NPCs), a Sheep Anti-Human GFAP Antigen Affinity-purified Polyclonal Antibody (astrocytes), a Mouse Anti-Neuron-specific β -III Tubulin Monoclonal Antibody (neurons), and a Mouse Anti-Oligodendrocyte Marker O4 Monoclonal Antibody (oligodendrocytes) for the confirmation of differentiation status. The cells were stained using the NorthernLights 557-conjugated Donkey Anti-Goat (Catalog # NL001; red), Anti-Sheep (Catalog # NL010; red), or Anti-Mouse (Catalog # NL007; red) Secondary Antibody, and the nuclei were counterstained with DAPI (blue).



Analysis of Neural Cells Differentiated from Neural Progenitor Cells. GFAP, β -III Tubulin, and Oligodendrocyte Marker O4 were simultaneously detected in 7 day differentiated Rat Cortical Stem Cells (Catalog # NSC001) using the Human/Mouse/Rat Neural 3-Color Immunocytochemistry Kit (Catalog # SC024). Proteins were detected using antibodies included in the kit: astrocytes were stained with a NorthernLights 557-conjugated Sheep Anti-GFAP Antigen Affinity-purified Polyclonal Antibody (green), neurons were stained with a NL637-conjugated Mouse Anti-Neuron-specific β -III Tubulin Monoclonal Antibody (pseudocolored white), and oligodendrocytes were stained with a NL557-conjugated Mouse Anti-Oligodendrocyte Marker O4 Monoclonal Antibody (red). The nuclei were counterstained with DAPI (blue).

Discover More Tools for
Neural Stem Cell Research at:
www.RnDSystems.com/NSC

Hematopoietic Stem Cells

Multi-Color Flow Cytometry Kit for Hematopoietic Stem Cells

A kit to simultaneously verify the expression of HSC multipotency markers using three fluorochrome-conjugated antibodies.

PRODUCT	KIT CONTENTS	CATALOG #
Mouse Hematopoietic Progenitor Cell 3-Color Flow Kit	3 conjugated antibodies: CD48-PE (Rat IgG ₁ , Clone 331504), CD150-APC (Rat IgG _{2a} , Clone 459911), and mouse CD244-Fluorescein (Goat IgG). Enough reagents for 25 tests.	FMC005

Multi-Color Flow Cytometry Kits also contain appropriate staining buffers and specific isotype controls.

Methylcellulose-based Reagents for Colony Forming Cell Assays

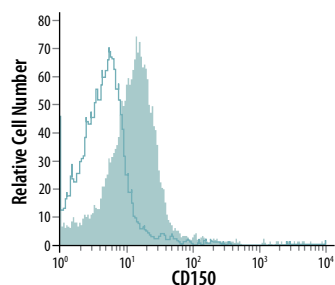
The colony forming cell (CFC) assay is the standard *in vitro* assay for quantifying clonogenic progenitors present in human, murine, and primate bone marrow, umbilical cord blood, peripheral blood, and mobilized peripheral blood. This assay relies on the ability of hematopoietic progenitors to proliferate and differentiate into distinct colonies in a semi-solid media in response to cytokine stimulation. Hematopoietic colony forming assays may be used to evaluate potential toxic effects of new compounds and to determine maximum tolerated doses (MTD) and inhibitory concentration values (IC₅₀).

PRODUCT	CATALOG #	COLONIES SUPPORTED BY METHYLCELLULOSE PRODUCTS						
		CFU-E	BFU-E	CFU-G	CFU-M	CFU-GM	CFU-GEMM	Pre-B
StemXVivo Methylcellulose Concentrate Solution that contains 2.8% methylcellulose in water.	HSC011*	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Methylcellulose Stock Solution Solution that contains 3% methylcellulose in Iscove's MDM and can be used for both human and mouse HSC research.	HSC001*	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Human Methylcellulose Base Media Media that contains all of the basic components required to perform human CFC assays, except the cytokines, allowing researchers to customize the media to their specific research needs.	HSC002*	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Human Methylcellulose Serum-Free Base Media Serum-free media that contains all of the basic components, except the cytokines, required to perform human CFC assays.	HSC002SF*	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Human Methylcellulose Complete Media Specifically formulated media supplemented with recombinant human GM-CSF, IL-3, SCF, and Epo. Suitable for routine assays of human clonogenic hematopoietic progenitors from human bone marrow, peripheral blood, cord blood, leukopheresis products, and purified CD34 ⁺ cells.	HSC003	+	+	+	+	+	+	-
Human Methylcellulose Complete Media without Epo Specifically formulated media supplemented with recombinant human GM-CSF, IL-3, and SCF. This media is also suitable for routine assays of human clonogenic hematopoietic progenitors similar to Catalog # HSC003.	HSC004	-	-	+	+	+	-	-
Human Methylcellulose Enriched Media Enriched media supplemented with recombinant human G-CSF, GM-CSF, IL-3, IL-6, SCF, and Epo. This medium is optimized for CFC assays using purified CD34 ⁺ cells at the end of the long-term culture-initiating cell (LTC-IC) assay.	HSC005	+	+	+	+	+	+	-
Human Methylcellulose Serum-Free Enriched Media Specially formulated serum-free media supplemented with recombinant human GM-CSF, G-CSF, IL-3, IL-6, SCF, and Epo. Optimized for CFC assays of human clonogenic hematopoietic progenitors similar to Catalog # HSC005.	HSC005SF	+	+	+	+	+	+	-
Human Methylcellulose Serum-Free Enriched Media without Epo Specially formulated serum-free media supplemented with recombinant human GM-CSF, G-CSF, IL-3, IL-6, and SCF. This media is suitable for routine assays of human clonogenic hematopoietic progenitors similar to Catalog # HSC005SF.	HSC010SF	-	-	+	+	+	-	-
Mouse Methylcellulose Base Media Media that contains all of the basic components required to perform mouse CFC assays, except the cytokines, allowing researchers to customize the media to their specific research needs.	HSC006*	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mouse Methylcellulose Complete Media Specifically formulated media supplemented with recombinant mouse IL-3, IL-6, SCF, and recombinant human Epo. Suitable for routine assays of mouse clonogenic hematopoietic progenitors from mouse bone marrow, peripheral blood, spleen, and fetal liver.	HSC007	+	+	+	+	+	+	-
Mouse Methylcellulose Complete Media without Epo Specifically formulated media supplemented with recombinant mouse IL-3, IL-6, and SCF. This media is also suitable for routine assays of mouse clonogenic hematopoietic progenitors similar to Catalog # HSC007.	HSC008	-	-	+	+	+	-	-
Mouse Methylcellulose Complete Media for Pre-B Cells Specifically formulated media supplemented with recombinant mouse IL-7. This media is optimized for the enumeration of mouse pre-B progenitor cells.	HSC009	-	-	-	-	-	-	+
Rat Methylcellulose Complete Media without Epo Specifically formulated media supplemented with recombinant rat GM-CSF, IL-3, and SCF. This medium is optimized for the enumeration of colony-forming myeloid progenitors.	HSC012	-	-	+	+	+	-	-

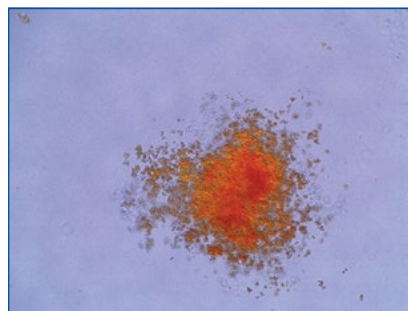
*Base media do not contain any cytokines and will not support colony growth unless conditioned media, cytokines, or other culture supplements are added.

KEY: CFU-E: Colony forming unit-erythroid BFU-E: Burst forming unit-erythroid CFU-G: Colony forming unit-granulocyte CFU-M: Colony forming unit-macrophage
CFU-GM: Colony forming unit-granulocyte, macrophage CFU-GEMM: Colony forming unit-granulocyte, erythrocyte, macrophage, megakaryocyte Pre-B: Pre-B progenitor cell

Hematopoietic Stem Cells, continued



Verification of Mouse HSC Identity using Multi-Color Flow Cytometry. Mouse bone marrow cells were stained using reagents supplied in the Mouse Hematopoietic Progenitor Cell 3-Color Flow Kit (Catalog # FMC005). The cells were stained with an APC-conjugated Rat Anti-Mouse CD150 Monoclonal Antibody (filled histogram) or a rat IgG_{2a} isotype control antibody (open histogram). The kit also contains a PE-conjugated Rat Anti-Mouse CD48 Monoclonal Antibody and a CF5-conjugated Goat Anti-Mouse CD244 Antigen Affinity-purified Polyclonal Antibody.



Mouse Colony Forming Cell Assays on Bone Marrow Cells. The colony forming cell (CFC) assay was performed on mouse bone marrow cells cultured for 8 days using Mouse Methylcellulose Complete Media (Catalog # HSC007). Image shows a colony of burst forming unit-erythroid cells (BFU-E) with significant red coloration, which aids in the ease of scoring.

Discover More Tools for
Hematopoietic Stem Cell Research at:
www.RnDSystems.com/HSC

Peer-reviewed References for R&D Systems Stem Cell Verification-related Products

1. Plaff, N. *et al.* (2013) A ubiquitous chromatin opening element (UCOE) prevents transgene silencing in pluripotent stem cells and their differentiated progeny. *Stem Cells* [Epub ahead of print].
Mouse Methylcellulose Complete Media (Catalog # HSC007)
Sample: Mouse induced pluripotent stem cells following hematopoietic differentiation
Application: Hematopoietic progenitor cell differentiation potential
2. Ball, S.G. *et al.* (2012) Inhibition of platelet-derived growth factor receptor signaling regulates Oct4 and Nanog expression, cell shape, and mesenchymal stem cell potency. *Stem Cells* 30:548.
Human Pluripotent Stem Cell Array Kit (Catalog # ARY010)
Sample: Human bone marrow-derived mesenchymal stem cells
Application: Characterization of stem cell markers
3. Chartoff, E. *et al.* (2011) Detection of intranasally delivered bone marrow-derived mesenchymal stromal cells in the lesioned mouse brain: A cautionary report. *Stem Cells Int.* Article ID:586586.
Mouse Multipotent Mesenchymal Stromal Cell Marker Antibody Panel (Catalog # SC018)
Contains antibodies against CD11b, CD29, CD44, CD45, CD73, CD105, CD106, and Sca-1.
Sample: Mouse EGFP-expressing mesenchymal stromal cells
Application: Characterization of MSC Markers
4. Donovan, L.K. *et al.* (2012) A prominin-1-rich pediatric glioblastoma: biologic behavior is determined by oxygen tension-modulated CD133 expression but not accompanied by underlying molecular profiles. *Transl. Oncol.* 5:141.
Human/Mouse/Rat Neural Lineage Functional Identification Kit (Catalog # SC028)
Sample: Human glioblastoma-derived cancer stem cells
Application: Verification of multilineage potential
5. Asumda, F.Z. & P.B. Chase (2011) Age-related changes in rat bone-marrow mesenchymal stem cell plasticity. *BMC Cell Bio.* 12:44.
Mouse Mesenchymal Stem Cell Functional Identification Kit (Catalog # SC010)
Sample: Rat bone marrow-derived mesenchymal stem cells
Application: Differentiation and lineage detection by immunocytochemistry
6. Raynaud, C.M. *et al.* (2013) Human embryonic stem cell derived mesenchymal progenitors express cardiac markers but do not form contractile cardiomyocytes. *PLoS One* 8:e54524.
Human Mesenchymal Stem Cell Functional Identification Kit (Catalog # SC006)
Sample: Human embryonic stem cell- & human bone marrow-derived mesenchymal stem cells
Application: Verification of MSC multilineage differentiation potential
7. Szablowska-Gadomska, I. *et al.* (2012) Treatment with small molecules is an important milestone towards the induction of pluripotency in neural stem cells derived from human cord blood. *Acta Neurobiol. Exp.* 72:337.
Human Pluripotent Stem Cell Functional Identification Kit (Catalog # SC027)
Sample: Human induced pluripotent stem cells
Application: Verification of iPS cell pluripotency
8. Zhu, X.-Y. *et al.* (2013) Mesenchymal stem cells and endothelial progenitor cells decrease renal injury in experimental swine renal artery stenosis through different mechanisms. *Stem Cells* 31:117.
Human Mesenchymal Stem Cell Functional Identification Kit (Catalog # SC006)
Sample: Adipose tissue-derived mesenchymal stem cells
Application: Verification of MSC multilineage differentiation potential
9. Zibara, K. *et al.* (2012) Acellular bone marrow extracts significantly enhance engraftment levels of human hematopoietic stem cells in mouse xenograft transplantation models. *PLoS One* 7:e40140.
Human Methylcellulose Base Media (Catalog # HSC002)
Human Methylcellulose Complete Media (Catalog # HSC003)
Human Methylcellulose Complete Media Without Epo (Catalog # HSC004)
Sample: Human cord blood-derived mononuclear cells
Application: Hematopoietic progenitor cell differentiation potential

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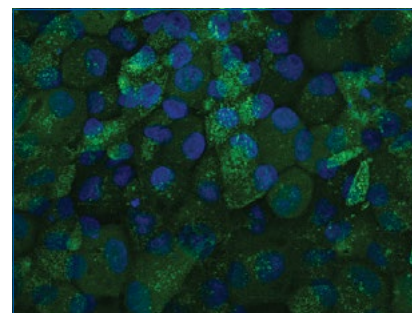
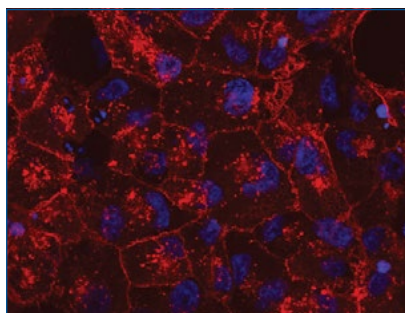
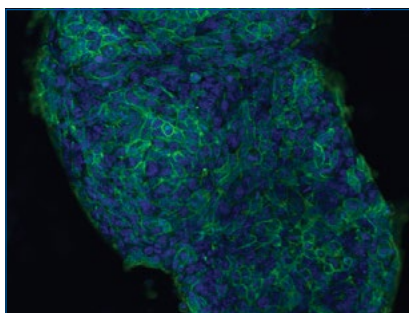
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NEW!

GloLIVE Monoclonal Antibodies to Assess Pluripotency in LIVE Cells

Azide-free, stem cell marker antibodies conjugated to NorthernLights (NL) fluorochromes that can be used for single-step, direct immunocytochemical (ICC) staining of live, unfixed pluripotent stem cells. Incubation with GloLIVE antibodies permits continued cell culture with no adverse effects on cell proliferation or stemness following the staining procedure. Each antibody is supplied as a 50X concentrate.

DESCRIPTION	HUMAN STEM CELLS	MOUSE STEM CELLS	CONJUGATED TO	CATALOG #
Human/Mouse SSEA-1 (Clone MC-480), Mouse IgM	Negative Marker	Positive Marker	NL557 (red)	NLLC2155R
Human/Mouse SSEA-1 (Clone MC-480), Mouse IgM	Negative Marker	Positive Marker	NL493 (green)	NLLC2155G
Human/Mouse SSEA-4 (Clone MC-813-70), Mouse IgG ₃	Positive Marker	Negative Marker	NL557 (red)	NLLC1435R
Human/Mouse SSEA-4 (Clone MC-813-70), Mouse IgG ₃	Positive Marker	Negative Marker	NL493 (green)	NLLC1435G
Human TRA-1-60(R) (Clone TRA-1-60), Mouse IgM	Positive Marker	N/A	NL557 (red)	NLLC4770R
Human TRA-1-60(R) (Clone TRA-1-60), Mouse IgM	Positive Marker	N/A	NL493 (green)	NLLC4770G



Detection of SSEA-1 in Live Mouse Embryonic Stem Cells. D3 mouse embryonic stem cells were grown on irradiated mouse embryonic fibroblasts (Catalog # PSC001), and live D3 cells were stained using a GloLIVE NL493-conjugated Mouse Anti-Human/Mouse SSEA-1 Monoclonal Antibody (Catalog # NLLC2155G; green). The nuclei were counterstained with Hoechst 33342 (blue). Positive staining for SSEA-1 in mouse stem cells is an indicator of pluripotency.

Detection of SSEA-4 in Live Human Embryonic Stem Cells. The stem cell marker SSEA-4 was visualized in live BG01V human embryonic stem cells using a GloLIVE NL557-conjugated Mouse Anti-Human/Mouse SSEA-4 Monoclonal Antibody (Catalog # NLLC1435R; red). The nuclei were counterstained with Hoechst 33342 (blue). Positive staining for SSEA-4 in human stem cells is an indicator of pluripotency.

Detection of TRA-1-60(R) in Live Human Embryonic Stem Cells. The stem cell marker TRA-1-60(R) was visualized in live BG01V human embryonic stem cells using a GloLIVE NL493-conjugated Mouse Anti-Human TRA-1-60(R) Monoclonal Antibody (Catalog # NLLC4770G; green). The nuclei were counterstained with Hoechst 33342 (blue). Positive staining for TRA-1-60(R) in human stem cells is an indicator of pluripotency.

Learn More about Live Cell Staining at:
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