

Schwann Cells (iPSC-derived, Normal)

SKU: 40HU-024

PRODUCT DESCRIPTION

Schwann cells are a type of glial cell found in the peripheral nervous system (PNS). These cells are essential for the myelination of peripheral axons. There are two main types of Schwann cells: myelinating and non-myelinating. Myelinating Schwann cells wrap around a single axon to form a myelin sheath, while non-myelinating Schwann cells support multiple small-diameter axons without forming myelin. In addition to their insulating role, Schwann cells are active participants in nerve development, maintenance, and repair ^[1].

In pathological conditions such as peripheral neuropathies and Charcot-Marie-Tooth disease, Schwann cell dysfunction contributes to disease progression ^[2], making them a target of interest for therapeutic intervention. Moreover, their regenerative potential is being explored in biomedical applications, including nerve grafts and tissue engineering ^[3].

Product Details

Catalog Number: 40HU-024

Organism: *Homo Sapiens*, Human

Cell Type: Schwann Cells

Tissue: N/A

Disease: N/A

Package Size: 0.5 x 10⁶ cells/vial

Passage Number: P0

Growth Properties: Adherent

Associated Media: Schwann Cells Maintenance Medium (MD-0124)

Storage Conditions & Shipment

Product Format/Shipped: Cryopreserved

Storage: Liquid Nitrogen

PRODUCT SHEET

For Research Use Only

iXCells Biotechnologies USA, Inc.
United States

www.ixcellsbiotech.com

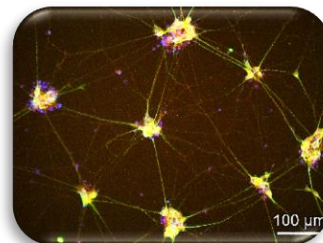
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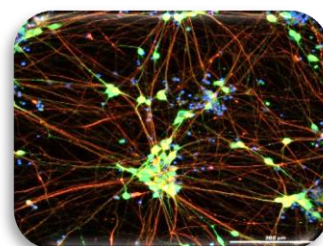
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RELATED PRODUCTS



Human Motor Neurons (iPSC-derived, Normal)

SKU: 40HU-005



Human Sensory Neurons (iPSC-derived, Normal)

SKU: 40HU-013

Overview of Schwann Cells (iPSC-derived)

iXCells Biotechnologies is proud to provide highly pure, fully differentiated and functional human iPSC-derived Schwann Cells that display typical morphology (Figure 1) and express key markers e.g. p75NTR, NCAM, GFAP and S100 β (Figure 2) as observed by ICC, and SOX10 and MTZ as observed by qPCR (Figure 3). Our iPSC-derived Schwann Cells display high purity, with >90% of the cell expressing the specific Schwann Markers p75NTR and NCAM as assessed by flow cytometry (Figure 3). Finally, Schwann Cells can be co-cultured with Motor Neurons (SKU: 40HU-005) to generate myelinated axons, and an increase of MBP expression was observed over time (Figure 4).

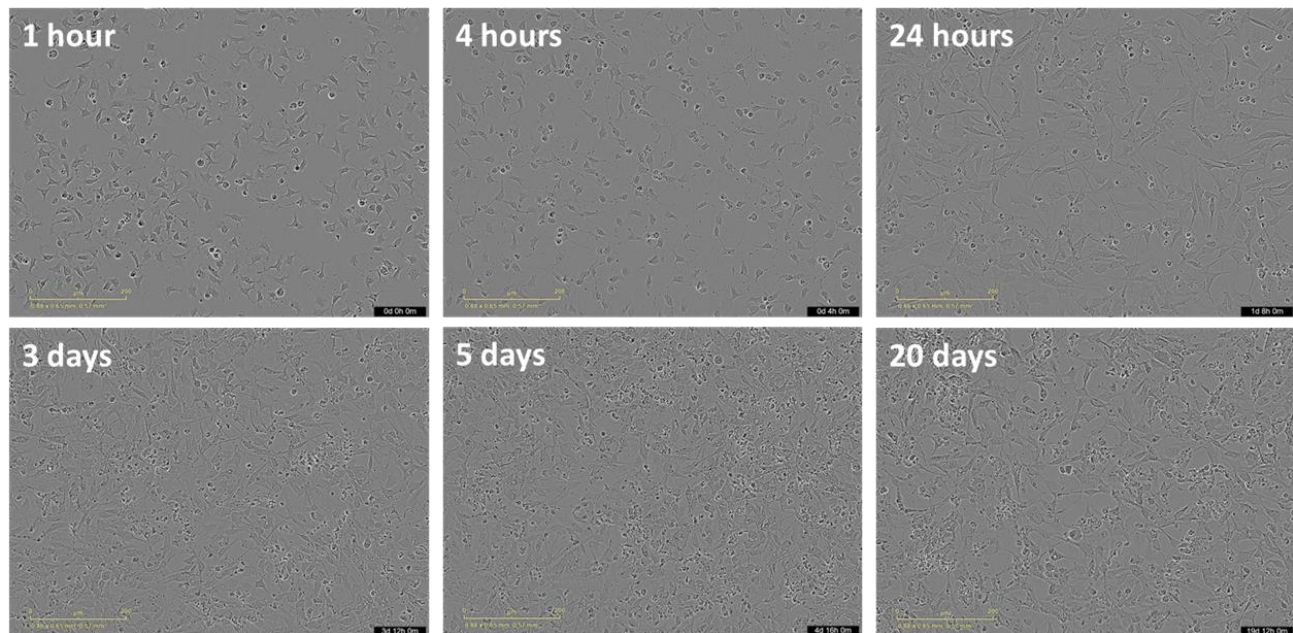


Figure 1. Schwann cells (iPSC-derived) were recovered in pLO/Matrigel coated 48-well plate at a density of 50,000 viable cells/well. The cell morphology was monitored in real-time using Essen BioScience IncuCyte® S3. Phase contrast images are shown at 1 hour, 4 hours, 1 day, 3 days, 5 days and 20 days post thawing. Cells were passaged at day 11 at 1:3 dilution, cells will stop proliferating when high confluency. Scale bar: 200 μ m.

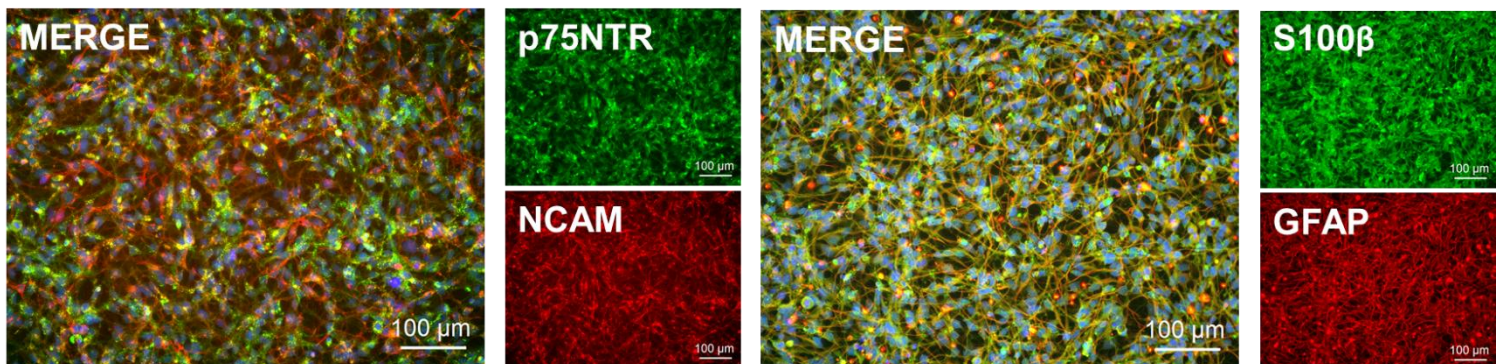


Figure 2. Schwann cells (iPSC-derived) were recovered in a pLO/Matrigel coated 48-well plate at a density of 50,000 viable cells/well. Cells were fixed at day 5, and immunostaining shows the expression of key Schwann Cell markers; p75NTR and NCAM (left), S100 β and GFAP (right). Scale bar: 100 μ m.

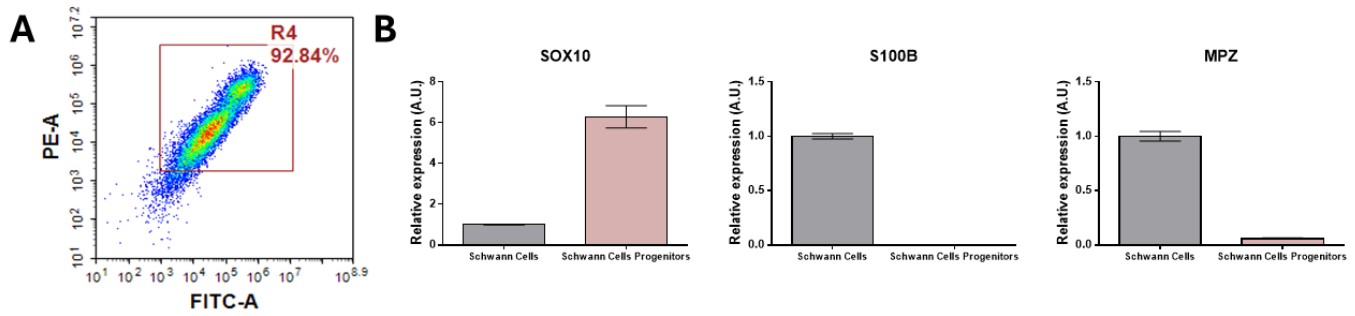


Figure 3. Schwann cells (iPSC-derived) were recovered in a pLO/Matrigel coated 48-well plate at a density of 50,000 viable cells/well, and harvested at day 5 of culture. **A)** Flow cytometry was used to quantify the percentage of Schwann cells expressing the P75NTR (PE) and NCAM (FITC) markers. **B)** Quantification of RNA expression of the indicated genes by quantitative PCR. Comparison was made against Schwann Cell Progenitors (SCP) harvested during differentiation. SOX10 is a SCP marker, S100 β and MPZ are markers of Schwann Cell maturation.

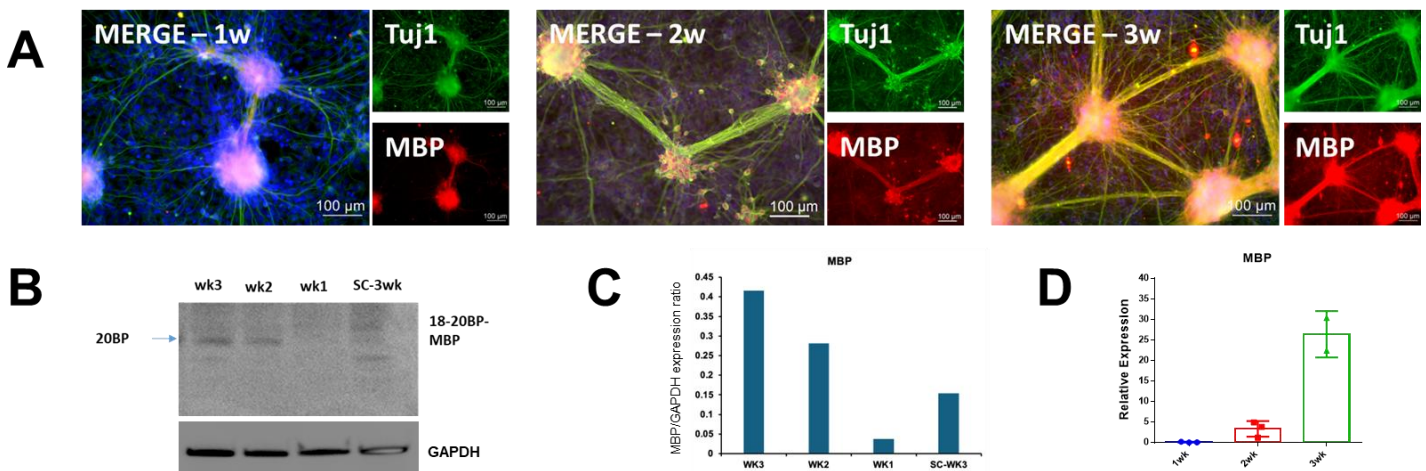


Figure 4. A) Co-culture of Motor Neurons and Schwann Cells at 1:1 ratio in a PDL/MG coated 48 well plate. The cells were fixed at the indicated time and stained with anti-TUJ1 (green) and anti-MBP (red). Scale bar: 100 μ m. **B)** Representative image of Western Blot of MN-SC co-culture lysates against MBP protein. **C)** Bands in the Western Blot were quantified by densitometry and normalized to GAPDH expression, wk1, wk2 and wk3 correspond to co-culture samples at 1, 2 and 3 weeks of culture, sc-wk3 corresponds to Schwann Cell monoculture at 3 weeks. **D)** Cells were harvested, and RNA was isolated. A RT-qPCR was performed to check the expression of MBP at different time points. GAPDH was used as housekeeping gene, and iPSCs as a reference.

QuickStart Guide – Protocols

NOTE: CELLS MUST BE CULTURED IN A 37°C, 5% CO₂ INCUBATOR. CELLS ARE ONLY WARRANTED IF IXCELLS MEDIA AND REAGENTS ARE USED AND THE RECOMMENDED PROTOCOLS ARE FOLLOWED.

This procedure describes the steps required for thawing and plating hiPSC-Derived Schwann Cells using iXCells™ Schwann Cells Maintenance Medium (Cat# MD-0124).

Monoculture of hiPSC-Derived Schwann Cells

The following protocol is based on 48-well plate format

1. Prepare the coating vessel before thawing the cells. We recommend coating with Poly-L-Ornithine (PLO) and Matrigel. Coat the plates with Poly-L-ornithine solution (10 µg/mL; Sigma, P4957) in water overnight in the incubator, wash twice with water the next day, then add Matrigel GFR membrane matrix (80 µg/mL Corning Cat#354264 in DMEM/F12; Thermo, 11320082) in a 37°C incubator for at least 2 hours. Aspirate the Matrigel just before seeding the cells.

Note: Upon receipt of the frozen cells, it is recommended to thaw the cells and initiate the culture immediately to retain the highest cell viability.

2. To thaw the cells, put the vial in 37°C water bath with gentle agitation for ~1-2 minutes. Keep the cap out of water to minimize the risk of contamination.
3. Pipette the cells into a 15 mL conical tube with 5 mL **Schwann Cells Maintenance Medium (Cat# MD-0124)**.
4. Centrifuge at 500xg for 6 minutes at room temperature.
5. Remove the supernatant and re-suspend the cells in Schwann Cells Maintenance Medium **supplemented with 10µM Y-27632 (Cat#MD-0025)**.
6. Seed the cells on precoated plate at the desired density. Incubate in 37°C CO₂ incubator overnight.

Note: We recommend seeding between 50k and 100k cells per cm² depending on the application. Confluency lower than 50% may cause slow proliferation and cell death. Cell debris may be observed after cell recovery.

7. Perform a full media change after 24h with Schwann Cells Maintenance Medium without Y-27632 (Cat#MD-0025).

Note: All liquid exchanges should be performed as gently as possible to avoid disruption of cultures. The goal is to always leave ~50 µL of liquid remaining in the well so pipet tips do not disrupt the culture.

8. Perform half medium change with fresh Schwann Cells Maintenance Medium every other day. Do this by removing half of the media in the well first, and adding the same amount of fresh media afterwards.

Co-culture of hiPSC-Derived Schwann Cells with Motor Neurons

The following protocol is based on 48-well plate format

1. Prepare the coating vessel before thawing the cells. We recommend coating with Poly-D-Lysine (PDL) and Matrigel. Coat the plates with Poly-D-Lysine solution (10 µg/mL; Sigma-Aldrich, Cat# A-003-E) in water overnight in the incubator, wash twice with water the next day, then add Matrigel GFR membrane matrix (80 µg/mL Corning Cat#354264 in DMEM/F12; Thermo, 11320082) in a 37°C incubator for at least 2 hours. Aspirate the Matrigel just before seeding the cells.
2. Thaw the Schwann Cells as described previously. We recommend adding **Motor Neurons (Cat# 40HU-005)** at least 72h post-plating of the Schwann Cells.
3. Thaw the Motor Neurons as described in their datasheet, and add them on top of the Schwann Cell culture, at a density of 1:1 or 1:2 (Schwann Cells : Motor Neurons), with **Motor Neuron Culture Medium (Cat# MD-0022A)** supplemented with 200 ng/mL NRG1. **DO NOT SUPPLEMENT WITH Motor Neuron Culture Medium B at any stage.**
4. Perform a full media change after 24h with Motor Neuron Culture Medium supplemented with 200 ng/mL NRG1.
5. Perform half medium change with fresh Motor Neuron Culture Medium supplemented with 200 ng/mL NRG1 every 3-4 days. Do this by removing half of the media in the well first, and adding the same amount of fresh media afterwards.

Note: Penicillin-Streptomycin, Antibiotics and antimycotics, or other antibiotics are optional in the culture media. iXCells in house tests were performed under antibiotic-free condition for ≥ 3 days by following the recommended protocol, and no bacterial or fungi contamination was observed during the culture period.

References

- [1] Oliveira, J. T., Yanick, C., Wein, N., & Gomez Limia, C. E. (2023). Neuron-Schwann cell interactions in peripheral nervous system homeostasis, disease, and preclinical treatment. *Frontiers in cellular neuroscience*, 17, 1248922.
- [2] Stassart, R. M., Möbius, W., Nave, K. A., & Edgar, J. M. (2018). The Axon-Myelin Unit in Development and Degenerative Disease. *Frontiers in neuroscience*, 12, 467.
- [3] Mazuelas, H., Uriarte-Arrazola, I., Fernández-Rodríguez, J., Magallón-Lorenz, M., Villanueva, A., Lázaro, C., Gel, B., Serra, E., & Carrió, M. (2023). Generation of human iPSC-derived neurofibromaspheres for in vitro and in vivo uses. *STAR protocols*, 4(2), 102198.

Disclaimers

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