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Human Neural Stem Cells (iPSC-derived)

Catalog Number	40HU-001; 40HU-007	**Cell Number**	2.0 million cells/vial
Species	*Homo sapiens*	**Storage Temperature**	Liquid nitrogen

Product Description

Neural stem cells (NSCs) are self-renewing, multipotent cells that generate the main phenotype of the nervous system. They primarily differentiate into neurons, astrocytes, and oligodendrocytes [1]. The recent discovery of induced pluripotent stem cells (iPSCs) not only overcomes the ethical and logistical issues associated with human embryonic stem cells, but also provides a flexible platform for generating various differentiated cell types from diseased individuals. iPSC-derived NSCs are a potentially valuable source of *in vitro* models for complex, polygenic human diseases, and are potentially useful for drug discovery and cell-based therapy applications [2].

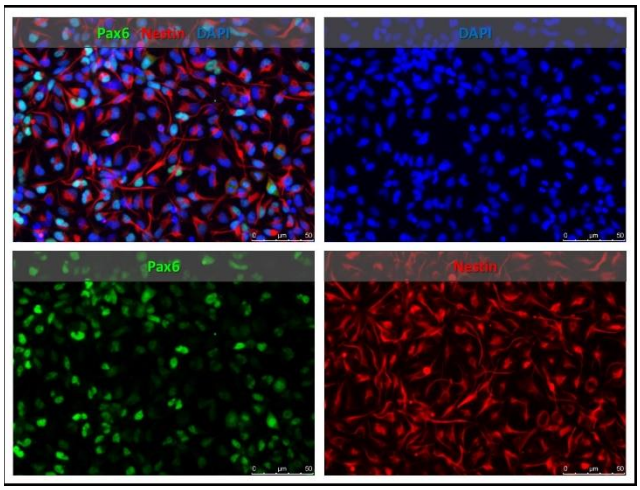

Figure 1. iPSC-derived NSCs express Nestin and Pax6.

iXCells Biotechnologies provides high quality human neural stem cells (NSCs) derived from normal or diseased iPS cell lines. These cells express typical markers of neural stem and progenitor cells, e.g. Nestin, Pax6 and Sox1 (Figure 1 and Figure 2), with the purity higher than 97% (Figure 3). The cells have been fully characterized for their self-renewal and multi-potency. The iPSC-derived NSCs can be differentiated into astrocytes or motor neurons (Figure 4). Cells can further expand for 3-5 passages in Human Neural Stem Cell Growth Medium (Cat# MD-0024), but they are not recommended for extensive expansion, because the purity of the neural stem cell population may decrease.

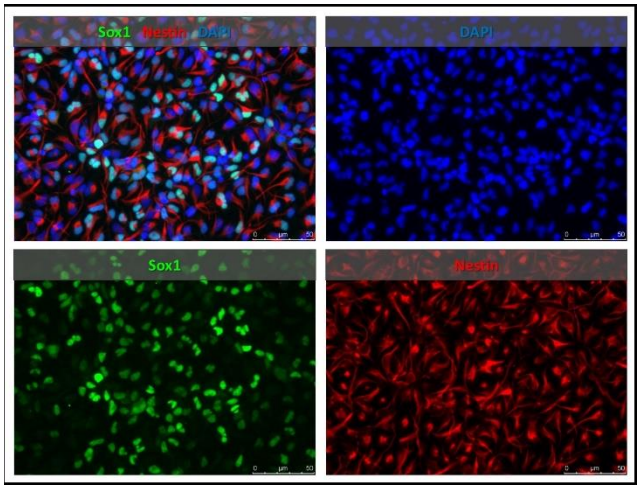

Figure 2. iPSC-derived NSCs express Nestin and Sox1.

All the cells provided by iXCells are negative for mycoplasma, bacteria, yeast, and fungi. HIV-1, hepatitis B and hepatitis C. The basic donor information (gender / age / race) is provided for each cell lot purchased.

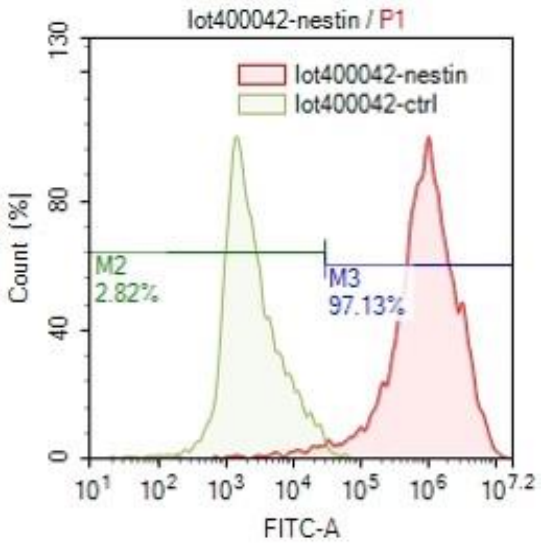

Figure 3. More than 97% of the NSCs are Nestin positive.

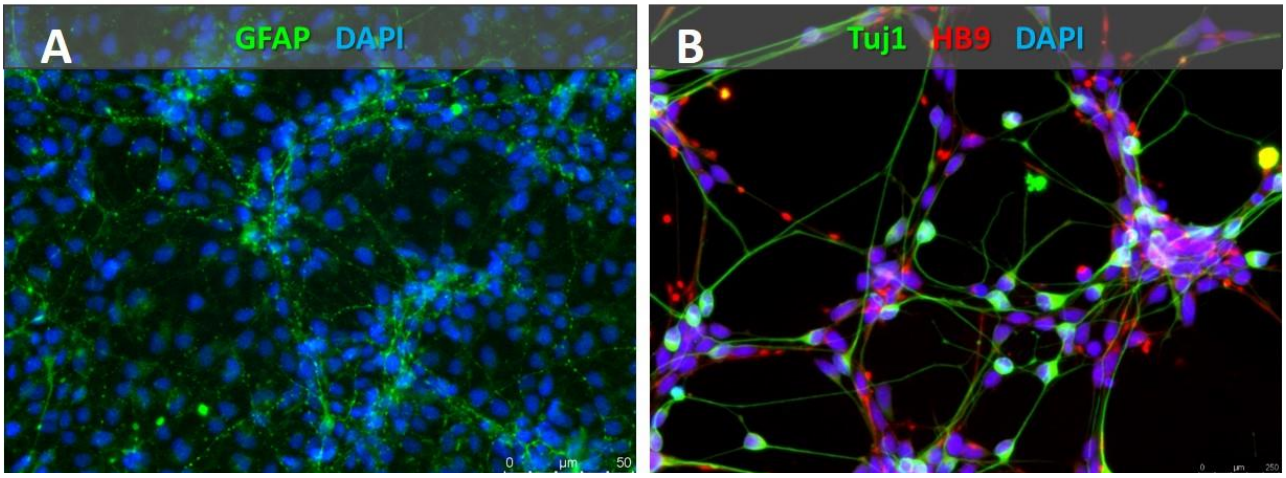

Figure 4. iPSC-derived NSCs can be differentiated into GFAP$^+$ astrocyte (A) or HB9$^+$motor neurons (B).

Product Details

Tissue Origin	Human Neural Stem Cells Derived from iPSCs (Normal, diseased)
Package Size	2.0 million cells/vial
Shipped	Cryopreserved
Storage	Liquid nitrogen
Growth Properties	Adherent
Media	Human Neural Stem Cell Growth Medium (Cat# MD-0024)

Protocols

Thawing of Frozen Cells

1. Upon receipt of the frozen Human iPSC-Derived Neural Stem Cells (hiPSC-NSCs), it is recommended to thaw the cells and initiate the culture immediately in order to retain the highest cell viability.
2. Prepare Cultrex, Matrigel coated plates 1-2 hours before thawing the cells.
3. To thaw the cells, put the vial in 37°C water bath with gentle agitation for ~2 minutes. Keep the cap out of water to minimize the risk of contamination.
4. Pipette the cells into a 15 mL conical tube with 5 mL fresh **Human Neural Stem Cell Growth Medium** (Cat# MD-0024).
5. Centrifuge at 200 g for 5 minutes at room temperature.
6. Remove the supernatant and re-suspend the cells in Human Neural Stem Cell Growth Medium supplemented with 10µM Y27632. Count the cell number.
7. Seed the cells on coated plates at a density of 10,000-50,000 cells per cm^2 based on the application. Put the culture in the 37°C CO_2 incubator.
8. The next day, change to media without Y27632. Change media every other day until the cells are 80-90% confluent. Passage the cells when they reach confluency.
9. The hiPSC-NSCs can be expanded for 3-5 passages and banked for future use. Please note that as the passage number Increases, random differentiation may occur.

   Safety Precaution: *it is highly recommended that protective gloves and clothing should be used when handling frozen vials.*

Subculture of Neural Stem Cells

1. Passage the hiPSC-NSCs when the cells reach 80-90% confluency.
2. Prepare Cultrex coated plates the day before.
3. Remove the media from the cells. Wash the cells once with D-PBS.
4. Add Accutase to the cells and incubate the cells in 37°C CO_2 incubator for 3-5 minutes.
5. Add two volumes of Human Neural Stem Cell Growth Medium. Detach the cells by gently pipetting up and down several times. Collect the cells into a 15 mL conical tube.
6. Centrifuge at 200 g for 5 minutes at room temperature.
7. Remove the supernatant and re-suspend the cells in Human Neural Stem Cell Growth Medium with or without 10µM Y27632. Count the cell number.
10. Seed the cells on Cultrex-coated plates at the desired density. It is recommended to seed the cells at the density of 10,000-50,000 cells per cm^2 based on the application. Put the culture in the 37°C CO_2 incubator.
11. Change media every other day. Passage the cells when the culture reaches 80-90% confluency.

References

[1] Alenzi, F; Bahkali, A (2011). "Stem cells: Biology and clinical potential". *African Journal of Biotechnology* 10 (86): 19929–40.

[2] Dolmetsch R, Geschwind DH. (2011) “The human brain in a dish: the promise of iPSC-derived neurons”. *Cell*. 145(6):831-4.

Disclaimers

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