



## ReNcell VM Kit

**CATALOG NUMBER:** SCC010

**KIT CONTENTS:** **ReNcell VM Immortalized cells (SCC008)**, > 1 X 10<sup>6</sup> viable cells upon thawing  
**ReNcell NSC Maintenance Medium (SCM005)**, 500 mL  
**ReNcell NSC Freezing Medium (SCM007)**, 50 mL

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### DESCRIPTION:

ReNcell VM Immortalized cells (SCC008): ReNcell VM is an immortalized human neural progenitor cell line with the ability to readily differentiate into neurons and glial cells. ReNcell VM was derived from the ventral mesencephalon region of human fetal brain tissue. Immortalized by retroviral transduction with the v-myc oncogene, this cell line grows rapidly as a monolayer on laminin with a doubling time of 20-30 hours. Karyotype analyses indicate that the ReNcell VM retains a normal diploid karyotype in culture even after prolonged passage (>45 passages). ReNcell VM was developed by the ReNeuron Group plc, a biotech company that specializes in using human somatic stem cells for therapeutics. In experiments performed by the ReNeuron Group plc, ReNcell VM can be differentiated *in vitro* to a high level of human dopaminergic neurons. Neurons differentiated from ReNcell VM have furthermore been shown to be electrophysiologically active. ReNcell VM may be used for a variety of research applications such as studies of neurotoxicity, neurogenesis, electrophysiology, neurotransmitter and receptor functions. Each lot of ReNcell VM cells has been validated for high level of expression of Nestin and Sox 2 and for their self-renewal and multi-lineage differentiation capacities (please refer to datasheet figures). Cells also display normal karyotype as assessed by chromosome spread and tested negative for mycoplasma.

ReNcell NSC Maintenance Medium (SCM005): ReNcell Neural Stem Cell (NSC) Maintenance Medium is a defined serum-free, growth factor-free medium that has been optimized for the growth and *in vitro* differentiation of ReNcell immortalized human neural progenitor cells. When used in conjunction with FGF and EGF, the maintenance medium will allow for the proliferation of ReNcell immortalized VM and CX neural stem cells. Withdrawal of the growth factors from ReNcell NSC Maintenance Medium will result in the spontaneous differentiation of ReNcell immortalized neural progenitor cells.

*Composition:* ReNcell NSC Maintenance Medium contains DMEM/F12 w/o HEPES, L-glutamine, human serum albumin, human transferrin, putrescine dihydrochloride, human recombinant insulin, L-thyroxine, tri-iodo-thyronine, progesterone, sodium selenite, heparin, and corticosterone.

ReNcell NSC Freezing Medium (SCM007): ReNcell NSC Freezing Medium is qualified for use with ReNcell immortalized human neural progenitor cell lines, CX (MILLIPORE Catalog No. SCC007) and VM (MILLIPORE Catalog No. SCC008) cultured in serum-free conditions with ReNcell NSC Maintenance Medium (MILLIPORE Catalog No. SCM005). The optimized formulation allows for consistent cryopreservation and high viability upon thawing and plating.

*Composition:* Serum-free formulation. Contains 10% DMSO

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*For Research Use Only; not for use in diagnostic procedures. ReNcell Immortalized Cells have been isolated in a legal and ethical manner compliant with local informed consent procedures.*

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#### **KIT COMPONENTS:**

1. > 1x10<sup>6</sup> viable ReNcell VM cells: (MILLIPORE Cat. No. SCC008) derived from 10-week human ventral mesencephalon brain tissue, cryopreserved. Store in liquid nitrogen.
2. ReNcell NSC Maintenance Medium (SCM005), 500 mLs
3. ReNcell NSC Freezing Medium (SCM007), 50 mLs

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#### **MATERIALS REQUIRED BUT NOT SUPPLIED:**

1. Basic fibroblast growth factor (bFGF; FGF-2; Specific Activity  $\geq 2 \times 10^6$  Units/mg. MILLIPORE Cat. No. GF003)
2. Epidermal growth factor (EGF; Specific Activity  $\geq 1 \times 10^7$  Units/mg; MILLIPORE® Cat. No. GF001)
3. Laminin (Sigma Cat. No. L-2020)
4. DMEM/F12 w/o HEPES, w/ L-Glutamine (MILLIPORE Cat. No. DF-042-B)
5. Accutase™ (MILLIPORE Cat. No. SCR005)
6. Tissue culture-ware
7. Phosphate-Buffered Saline (1X PBS) (MILLIPORE Cat. No. BSS-1005-B)
8. Fixative (e.g. 4% Paraformaldehyde in 1X PBS)
9. Blocking Solution (5% normal donkey serum, 0.3% Triton X-100 in 1X PBS)
10. Primary and secondary antibodies
11. 4'-6-Diamidino-2-phenylindole (DAPI) / PBS solution
12. Anti-fading mounting solution (DABCO/PVA)
13. Hemacytometer
14. Microscope

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#### **STORAGE:**

**CELLS:** When stored at the recommended storage conditions (liquid nitrogen), ReNcell VM cells are stable up to the expiration date. Do not expose to elevated temperatures. Discard any remaining reagents after the expiration date. We recommend that the cells be used within ten passages.

**MAINTENANCE MEDIUM:** Store at -20°C until ready to use. Upon thawing, this media should be stored at 2-8°C and given a 1-month expiration dating.

**FREEZING MEDIUM:** Store at -20°C. Refer to lot expiration date on label.

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#### **PREPARATION OF COATED FLASKS:**

We recommend coating tissue culture plastic- or glasswares that are used to culture ReNcell VM cells with laminin. Tissue culture flasks should be coated on the same day that the ReNcell VM cells are thawed from liquid nitrogen or on the same day that the cells need to be passage. The following procedure is recommended:

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1. Thaw the laminin in the morning at 2-8°C. Dilute laminin with DMEM/F12 (MILLIPORE Cat. No. DF-042-B) to 20 µg/mL.
2. Add enough of the diluted laminin solution to cover the whole surface of the tissue culture-ware. Use 3 mL volume for 6-cm plates and 6.5 mL volume for 10-cm plates and T75 flasks. Incubate in a 37°C, 5% CO<sub>2</sub> incubator for at least 4 hours.
3. Just before use, aspirate the laminin solution in the coated flasks and rinse the flasks once with 1X PBS.
4. Prepare the Complete ReNcell NSC Medium by adding 20 ng/mL FGF-2 and 20 ng/mL EGF (final concentrations) to ReNcell NSC Maintenance Medium (MILLIPORE Cat. No. SCM005).
5. Add 10 mL of the freshly made Complete ReNcell NSC Medium to the laminin-coated T75 flasks. Incubate in a 37°C, 5% CO<sub>2</sub> incubator. The laminin-coated flasks are now ready to receive the cells.

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#### THAWING OF CELLS:

1. Do not thaw the cells until the recommended medium and appropriately coated laminin plasticware and/or glassware are on hand.
2. Remove the vial of ReNcell VM cells from liquid nitrogen and incubate in a 37°C water bath. Closely monitor until the cells are completely thawed. Maximum cell viability is dependent on the rapid and complete thawing of frozen cells. **IMPORTANT: Do not vortex the cells.**
3. As soon as the cells are completely thawed, disinfect the outside of the vial with 70% ethanol. Proceed immediately to the next step.
4. In a laminar flow hood, use a 1 or 2 mL pipette to transfer the cells to a sterile 15 mL conical tube. Be careful to not introduce any bubbles during the transfer process.
5. Using a 10 mL pipette, slowly add dropwise 9 mL of ReNcell NSC Maintenance Medium (MILLIPORE Cat. No. SCM005) (pre-warmed to 37°C) to the 15 mL conical tube. **IMPORTANT: Do not add the whole volume of medium at once to the cells. This may result in decreased cell viability due to osmotic shock.**
6. Gently mix the cell suspension by slow pipeting up and down twice. Be careful to not introduce any bubbles. **IMPORTANT: Do not vortex the cells.**
7. Centrifuge the tube at 300 x g for 3-5 minutes to pellet the cells.
8. Decant as much of the supernatant as possible. Steps 4-8 are necessary to remove residual cryopreservative (DMSO).
9. Resuspend the cells in a total volume of 5 mL of ReNcell NSC Maintenance Medium (MILLIPORE® Cat. No. SCM005) (pre-warmed to 37°C) containing freshly added 20 ng/mL FGF-2 and 20 ng/mL EGF.  
**Note:** FGF-2 and EGF should always be added fresh to the ReNcell NSC Maintenance Medium.
10. Plate the cell mixture onto the laminin-coated T75 tissue culture flask that was pre-incubated in the 37°C incubator. The laminin coated T75 flask should already have 10 mL of Complete ReNcell Neural Stem Cell Medium (i.e. ReNcell NSC Maintenance Medium containing 20 ng/mL FGF-2 and 20 ng/mL EGF).
11. Incubate the cells at 37°C in a 5% CO<sub>2</sub> humidified incubator.
12. The next day, exchange the medium with fresh ReNcell NSC Maintenance Medium (MILLIPORE Cat. No. SCM005) (pre-warmed to 37°C) containing 20 ng/mL FGF-2 and 20 ng/mL EGF. Exchange with fresh medium containing FGF-2 and EGF every other day thereafter.
13. When the cells are approximately 80% confluent, they can be dissociated with Accutase™ and passaged or alternatively frozen for later use.

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#### SUBCULTURING:

1. Prepare fresh laminin-coated flasks (refer to Preparation of Coated Flasks).

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2. Carefully remove the medium from the laminin-coated T75 flasks containing the confluent layer of ReNcell VM cells.
3. Rinse the flask once with 1X PBS. **Note:** Add the PBS slowly from the side to avoid detaching the cells.
4. Aspirate the PBS.
5. Apply 3-5 mL of Accutase™ and incubate in a 37°C incubator for 3-5 minutes.
6. Inspect the plate and ensure the complete detachment of cells by gently tapping the side of the flask with the palm of your hand.
7. Apply 5 mL of ReNcell NSC Maintenance Medium (MILLIPORE Cat. No. SCM005) (pre-warmed to 37°C) to the flask.
8. Gently rotate the flask to mix the cell suspension. Transfer the dissociated cells to a 15 mL conical tube.
9. Centrifuge the tube at 300 x g for 3-5 minutes to pellet the cells.
10. Discard the supernatant.
11. Apply 2 mL of ReNcell NSC Maintenance Medium (MILLIPORE Cat. No. SCM005) containing 20 ng/mL FGF-2 and 20 ng/mL EGF to the conical tube and resuspend the cells thoroughly. **Note:** Do not vortex the cells.
12. Count the number of cells using a hemacytometer.
13. Plate the cells to the desired density into the appropriate fresh laminin-coated flasks, plates or wells in ReNcell NSC Maintenance Medium (MILLIPORE Cat. No. SCM005) containing 20 ng/mL FGF-2 and 20 ng/mL EGF. It is recommended that the cells be plated at ~1.5 million cells on laminin coated T75 flasks.
14. The next day, exchange the medium with fresh ReNcell NSC Maintenance Medium (MILLIPORE® Cat. No. SCM005) containing 20 ng/mL FGF-2 and 20 ng/mL EGF. Exchange with fresh medium containing FGF-2 and EGF every other day thereafter. The cells should be ready for passaging or harvesting 2 to 3 days after this step.

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#### DIFFERENTIATION (FOR 8-WELL CHAMBER SLIDES):

1. The 8-well chamber slides should be coated with 20 µg/mL laminin (please refer to the section on Preparation of Coated Flasks).
2. Plate out 30,000 cells per well into an appropriately coated 8-well chamber slide in ReNcell NSC Maintenance Medium (MILLIPORE Cat. No. SCM005) containing 20 ng/mL FGF-2 and 20 ng/mL EGF. Total volume per well = 0.5 – 0.75 mL. At this density the cells should be ~50% - 60% confluent by the next day. **Note:** To prevent overgrowth of the cells by the end of the two-week differentiation protocol, it is best to avoid plating too many cells.
3. The next day, initiate differentiation by removing the medium from each well and replacing with fresh ReNcell NSC Maintenance Medium (MILLIPORE® Cat. No. SCM005) that does not contain FGF-2 and EGF. **Note:** *Differentiation is initiated by withdrawing the growth factors so FGF or EGF should not be added to the basal medium.*
4. Replace with fresh ReNcell NSC Maintenance Medium (MILLIPORE Cat. No. SCM005) every 2-3 days for two weeks. **Note:** *It is important that FGF or EGF not be present in the basal medium.*
5. After two weeks, the cells can be fixed with 4% paraformaldehyde and stained with the desired antibodies.

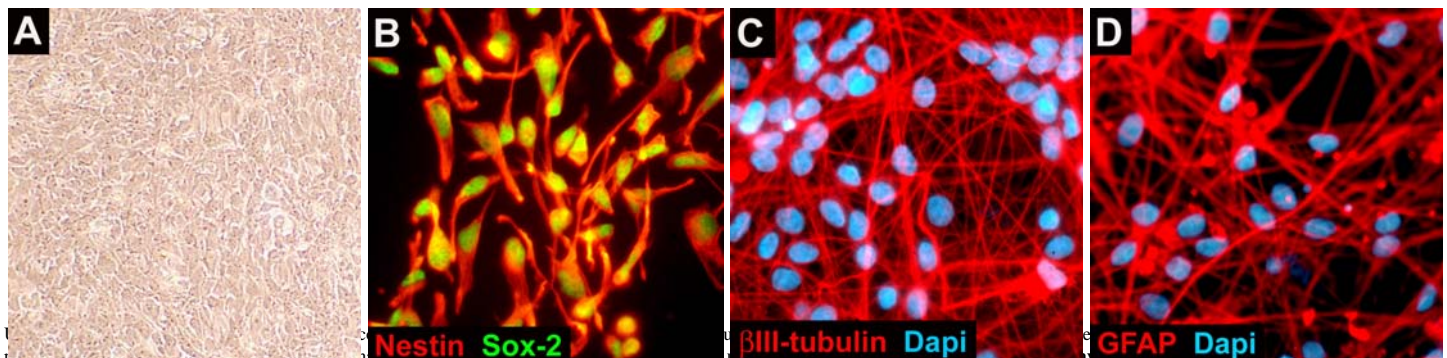
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### CRYOPRESERVATION OF RENCELL VM using ReNcell Freezing Medium (SCM007)

1. Thaw cell culture freezing medium completely and mix well by gently swirling bottle. Keep freezing medium on ice during use.
2. Cells to be frozen should be in late log phase growth.
3. Monolayers will need to be dissociated. After dissociation, cells are resuspended in ReNcell NSC Maintenance Medium (Catalog No. SCM005) and counted to determine viability and number.
4. Centrifuge cells at 1300 rpm for 3 min. Remove the medium above the pellet.
5. Resuspend the cells in cell culture freezing medium at a concentration of  $\sim 4 \times 10^6$  cells/mL. Freeze 1 mL of cells/vial. After the cells have been resuspended and aliquoted into appropriate cryogenic storage vials, they can be placed in a freezing container and the normal freeze down procedure should be started within five minutes.
6. Cells must be stored at or below  $-80^{\circ}\text{C}$ . For long term storage the cells should be stored in ultra-low temperature freezer ( $-150^{\circ}\text{C}$ ), or in liquid nitrogen ( $-196^{\circ}\text{C}$ ).
7. Thawing of cryopreserved cells should be as follows:
  - a. Thaw cells quickly in a  $37^{\circ}\text{C}$  water bath.
  - b. Dilute one vial of cells into 10 mL of prewarmed ReNcell NSC Maintenance Medium.
  - c. Gently mix the cells in the growth medium.
  - d. Gently pellet the cells and remove the medium above the pellet.
  - e. Resuspend the cells in ReNcell NSC Maintenance Medium with the appropriate concentration of FGF-2 and EGF and plate into the appropriate vessel.

### CHARACTERIZATION OF ReNcell VM IMMORTALIZED CELL LINE (SCC008):



humans or animals.

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ReNcell VM cells (MILLIPORE Cat. No. SCC008) are grown as monolayers **(A)** and express NSC markers, Nestin **(B, red)** and Sox-2 **(B, green)**. ReNcell VM cells are able to differentiate into neurons ( $\beta$ III-tubulin; **C**) and glial cells (GFAP; **D**). For color images, please go to [www.millipore.com](http://www.millipore.com)

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