

General Instructions for Culturing

Human Lung Microvascular Endothelial Cells (HLMVEC)

Be sure to wear face protection mask and gloves when retrieving cryovials from the liquid nitrogen storage tank. The dramatic temperature change from the tank to the room could cause any trapped liquid nitrogen in the cryovials to burst and cause injury.

Open all the packages immediately upon arrival and examine each component for shipping damage. Notify Cell Applications, Inc. or your distributor immediately if there is any problem.

I. STORAGE

A. CRYOPRESERVED VIALS (540-05)

Store the cryovials in a liquid nitrogen storage tank immediately upon arrival.

B. PROLIFERATING FLASKS (541-25, -75)

1. Examine under a microscope to check if all the cells are attached to the bottom of the flask. If not, notify CAI or your distributor immediately.
2. Decontaminate the exterior of the flask with 70% alcohol.
3. Place the sealed flask in a 37°C, 5% CO₂ humidified incubator for 2 hours as shipped.
4. In a sterile Biological Safety Cabinet, open the cap of the flask very slowly and carefully.
5. Remove the Transport Medium by aspiration. Add fresh Growth Medium: 5 ml for a T-25 flask and 15 ml for a T-75 flask.
6. Place the flask in a 37°C, 5% CO₂ humidified incubator with loosened cap to allow gas exchange.
7. Change medium every other day.

C. GROWTH MEDIUM (111-500)

Store the Growth Medium at 4°C in the dark immediately upon arrival.

D. EXTRACELLULAR MATRIX PROTEIN COATED FLASKS (121-25-02)

Store at 4°C.

E. ATTACHMENT FACTOR SOLUTION (123-100)

Store at 4°C.

F. SUBCULTURE REAGENT KIT (090K)

Store at -20°C immediately upon arrival.
Store at 4°C after thawing.

II. PREPARATION FOR CULTURING

1. Make sure the Class II Biological Safety Cabinet, with HEPA filtered laminar airflow, is in proper working condition.
2. Clean the Biological Safety Cabinet with 70% alcohol to ensure it is sterile.
3. Turn the Biological Safety Cabinet blower on for 10 min. before cell culture work.
4. Make sure all serological pipettes, pipette tips and reagent solutions are sterile.
5. Follow the standard sterilization technique and safety rules:
 - a. Do not pipette with mouth.
 - b. Always wear gloves and safety glasses when working with human cells even though all the strains have been tested negative for HIV, Hepatitis B and Hepatitis C.
 - c. Handle all cell culture work in a sterile hood.

III. CULTURING HLMVEC

A. PREPARING CELL CULTURE FLASKS FOR CULTURING HLMVEC

1. Take the Extracellular Matrix Protein Coated Flasks and Microvascular Endothelial Cell Growth Medium from the refrigerator. Decontaminate the bottle with 70% alcohol in a sterile hood.
2. Prepare two pre-coated T-25 flasks for culturing HLMVEC by pipetting 7.5 ml of Microvascular Endothelial Cell Growth Medium* to a T-25 flask.

* Use Corning and Grenier flasks for best results.

* Keep the medium to surface area ratio at 1-1.5 ml per 5 cm².

For example,
5-7.5 ml for a T-25 flask or a 60 mm tissue culture dish.
15 ml for a T-75 flask or a 100 mm tissue culture dish.

B. THAWING AND PLATING HLMVEC

1. Remove the cryopreserved vial of HLMVEC from the liquid nitrogen storage tank using proper protection for your eyes and hands.

2. Turn the vial cap a quarter turn to release any liquid nitrogen that may be trapped in the threads, then re-tighten the cap.
 3. Thaw the cells quickly by placing the lower half of the vial in a 37°C water bath and watch the vial closely during the thawing process.
 4. Take the vial out of the water bath when only small amount of ice left in the vial. Do not let cells thaw completely.
 5. Decontaminate the vial exterior with 70% alcohol in a sterile Biological Safety Cabinet.
 6. Remove the vial cap carefully. Do not touch the rim of the cap or the vial.
 7. Resuspend the cells in the vial by gently pipetting the cells 5 times with a 2 ml pipette. Be careful not to pipette too vigorously as to cause foaming.
 8. Pipette 0.5 ml of the cell suspension from the vial into each T-25 flask containing 7.5 ml of Microvascular Endothelial Cell Growth Medium.
 9. Cap the flask and rock gently to evenly distribute the cells.
 10. Place the T-25 flask in a 37°C, 5% CO₂ humidified incubator. Loosen the cap to allow gas exchange. For best results, do not disturb the culture for 24 hours after inoculation.
 11. Change to fresh Microvascular Endothelial Cell Growth Medium after 24 hours or overnight to remove all traces of DMSO.
 12. Change Microvascular Endothelial Cell Growth Medium every other day until the cells reach 60% confluent.
 13. Double the Microvascular Endothelial Cell Growth Medium volume when the culture is >60% confluent or for weekend feedings.
 14. Subculture the cells when the HLMVEC reach 80% confluent.
3. Add 7.5 ml of Attachment Factor Solution* to a T-75 flask and rock the flask gently to distribute the solution evenly to cover the whole culture surface.
 4. Coat the culture ware for 30 minutes at 37°C or 2 hours (overnight is OK) at room temperature.
 5. Remove the Attachment Factor Solution by aspiration in a sterile hood.
 6. The coated flask can be used immediately or stored at 4°C for up to one month.
 7. Prepare the coated flask for subculturing by pipetting 15 ml of Microvascular Endothelial Cell Growth Medium into this coated T-75 flask and wait for seeding.

*The coating concentration is 1 ml per 10cm² surface area of culture ware.

2.5 ml for coating a T-25 flask or a 60mm culture dish

7.5 ml for coating a T-75 flask or a 100mm culture dish

C. SUBCULTURING HLMVEC

Trypsinize Cells at Room Temperature. Do Not Warm Any Reagents to 37°C.

1. Remove the medium from culture flasks by aspiration.
2. Wash the monolayer of cells with HBSS and remove the solution by aspiration.
3. Pipette 2.5 ml of Trypsin/EDTA Solution into the T-25 flask. Rock the flask gently to ensure the solution covers all the cells.
4. Remove 1.5 ml of the solution immediately.
5. Re-cap the flask tightly and monitor the trypsinization progress at room temperature under an inverted microscope. It usually takes about 45 seconds for the cells to become rounded but still attached to the flask. (When rounded cells detach by themselves without hitting, it means the cells are over trypsinized.)
6. Release the rounded cells from the culture surface by hitting the side of the flask against your palm until most of the cells are detached.
7. Pipette 5 ml of Trypsin Neutralizing Solution to the flask to inhibit further tryptic activity.
8. Transfer the cell suspension from the flask to a 50 ml sterile conical tube.
9. Rinse the flask with an additional 5 ml of Trypsin Neutralizing Solution and transfer the solution into the same conical tube.
10. Examine the T-25 flask under a microscope. If there are >20% cells left in the flask, repeat Steps 2-9.
11. Centrifuge the conical tube at 220 x g for 5 minutes to pellet the cells.
12. Aspirate the supernatant from the tube without disturbing the cell pellet.
13. Break-up the cell pellet by flicking the tip of the conical tube with your finger or by scraping the conical tube against an Eppendorf micro centrifuge tube rack.
14. Resuspend the cells in 5 ml of Microvascular Endothelial Cell Growth Medium and gently pipette the cells to distribute the cells evenly in the medium.
15. Count the cells with a hemocytometer or cell counter. Inoculate at 10,000 cells per cm² for rapid growth, or at 6,000 cells per cm² for regular subculturing.

IV. SUBCULTURING HLMVEC

A. PREPARING SUBCULTURE REAGENTS

1. Remove the Subculture Reagent Kit from the -20°C freezer and thaw overnight in a refrigerator.
2. Make sure all the subculture reagents are thawed. Swirl each bottle gently several times to form homogeneous solutions.
3. Store all the subculture reagents at 4°C for future use. The activity of Trypsin/EDTA Solution will be stable for 2 weeks when stored at 4°C.
4. Aliquot Trypsin/EDTA solution and store the unused portion at -20°C if only portion of the Trypsin/EDTA is needed.

B. PREPARING CULTURE FLASK

1. Swirl the Attachment Factor Solution bottle a few times to form a homogenous solution. If the solution is gelled, warm up in 56°C water bath for 10 minutes and swirl the bottle to mix the solution.
2. Decontaminate the bottle with 70% alcohol in a sterile hood.