

## Human Microvascular Endothelial Cells, adult dermis (HMVECad)

Cat. no. C-011-5C

Quantity:  $\geq 500,000$  viable cells/vial

### Product Description

HMVECad are human microvascular endothelial cells isolated from adult dermis. Each vial of this product contains  $\geq 5 \times 10^5$  viable cells that are cryopreserved at the end of the tertiary culture stage in a medium containing 10% DMSO. Each lot of cells is tested using immunohistochemical methods for the presence of von Willebrand factor (vWf), CD31 antigen, and CD36 antigen and for the absence of  $\alpha$ -actin. The uptake of Dil-Ac-LDL is also confirmed. An independent laboratory tests the cells for the presence of Hepatitis B, Hepatitis C, and HIV-1 viruses and mycoplasma. These agents were not detected. In our laboratory, each lot of cells is performance tested by culturing the cells through multiple passages in Medium 131 supplemented with Microvascular Growth Supplement (MVGS) in the absence of antibiotics and antimycotics. During this culture period, no contamination by bacteria, yeast, or fungi was detected. Upon thawing, the cells are guaranteed to be  $\geq 70\%$  viable and to have a potential of  $\geq 16$  population doublings when handled according to the directions provided in this document. For recommended precautions to be taken when handling human cells, please read the caution statement.

### Intended Use

Cryopreserved HMVECad are intended for use by researchers investigating the molecular and biochemical basis of various normal and disease processes. **This product is for research use only. Not for use in animals, humans, or diagnostic procedures.**

### Storage and Stability

Cryopreserved HMVECad should arrive frozen on dry ice. If the cells are not to be used immediately, prepare a space for storage of the vial in the vapor phase of a liquid nitrogen freezer. While wearing protective eyewear, gloves, and a laboratory coat, remove the vial from its shipping container and place immediately in the liquid nitrogen freezer. Although the viability of cryopreserved cells decreases with time in storage, useful cultures can usually be established even after 2 years of storage at liquid nitrogen temperatures.

### Caution

Although cryopreserved cells have been tested for the presence of various hazardous agents, diagnostic tests are not necessarily 100% accurate. In addition, human cells may harbor other known or unknown agents or organisms which could be harmful to your health or cause fatal illness. The user should treat all human cells as potential pathogens. Wear protective clothing and eyewear. Practice appropriate disposal techniques for potentially pathogenic or biohazardous materials. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

### Initiating Cultures from Cryopreserved Cells

We recommend seeding cells recovered from cryopreservation at a density of  $5.0 \times 10^3$  viable cells/cm<sup>2</sup>. For example, four 25 cm<sup>2</sup> tissue culture flasks can usually be established from one vial containing  $\geq 5 \times 10^5$  HMVECad. The procedure given below is a sample protocol for establishing cultures from the contents of one vial.

**Note:** We recommend using culture surfaces that have been coated with Attachment Factor (Cat. no. S-006-100) before use. Please refer to the instructions provided with the Attachment Factor for coating culture surfaces.

1. Prepare a bottle of supplemented Medium 131 (Cat. no. M-131-500) according to the instructions that accompany that product.
2. Remove a vial of HMVECad from liquid nitrogen storage, taking care to protect hands and eyes.
3. Dip the lower half of the vial into a 37°C water bath to thaw.
4. When the contents of the vial have thawed, wipe the outside of the vial with disinfecting solution and move to a Class II, type A laminar flow culture hood.
5. Open the vial and pipet the suspension up and down with a 1 ml pipette to disperse the cells.
6. Remove 20  $\mu$ l from the vial and dilute the cell suspension in 20  $\mu$ l trypan blue solution (Invitrogen Cat. no. 15250-061).
7. Using a hemacytometer, determine the number of viable cells per ml.
8. Dilute the contents of the vial (1 ml) to a concentration of  $2.5 \times 10^4$  viable cells/ml using the supplemented medium from step 1, above.
9. Add 5 ml of cell suspension to each Attachment Factor-coated 25 cm<sup>2</sup> culture flask.
10. Following inoculation, swirl the medium in the flasks to distribute the cells. HMVECad attach to culture surfaces quickly, and if the medium is not distributed immediately following inoculation, the cells may grow in uneven patterns.
11. Incubate the cultures in a 37°C, 5% CO<sub>2</sub>/95% air, humidified cell culture incubator. For best results, do not disturb the culture for at least 24 hours after the culture has been initiated.

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## Maintaining Stock Cultures

1. Change the culture medium to freshly supplemented Medium 131, 24 to 36 hours after establishing a secondary culture from cryopreserved cells. For subsequent subcultures, change the medium 48 hours after establishing the subculture.
2. Change the medium every other day thereafter, until the culture is approximately 80% confluent.
3. We recommend subculturing the cells once the culture reaches 80% confluency. However, if cell densities in excess of 80% are desired, change the medium every day once the cells exceed 80% confluency.

### Notes

- To achieve the highest cell densities, change the culture medium every day as the cultures approach confluency. For rapidly proliferating subcultures, HMVECad should be subcultured before the culture becomes confluent. The number of subcultures (passages) that can be achieved will vary with the starting cell density and the methods employed by individual investigators.
- HMVECad cultures seeded at  $5.0 \times 10^3$  cells/cm<sup>2</sup> from cryopreserved cells should reach 80% confluency in 5-6 days. In this culture, most of the cells should have an epithelioid morphology, and be associated with each other in colonies. Some irregularly sized and shaped cells may be observed.

## Subculture of HMVECad

View the culture under a microscope to ascertain the condition of the culture (i.e., confluence, mitotic activity). This protocol is designed for the subculture of one 25 cm<sup>2</sup> culture flask. If different-sized culture vessels are to be used, reagent volumes should be adjusted accordingly.

1. Assemble subculture reagents and materials:
  - Medium 131 supplemented with MVGS
  - Trypsin/EDTA solution (Cat. no. R-001-100)
  - Trypsin Neutralizer solution (Cat. no. R-002-100)
  - Culture vessels (not provided)
  - Sterile pipettes (not provided)
  - Sterile 15 ml conical tubes (not provided)

**Note:** Do not warm the reagents prior to use.

2. Prepare new culture vessels by coating with Attachment Factor (provided with Medium 131) per the instructions included with the product.
3. Remove all of the culture medium from the flask.
4. Add 3 ml of Trypsin/EDTA solution to the flask. Rock the flask to ensure that the entire surface is covered.

5. Immediately remove all 3 ml of the Trypsin/EDTA solution.
6. Add 1 ml of fresh Trypsin/EDTA solution to the flask.
7. View the culture under a microscope. Incubate the cells at room temperature until the cells have become completely round, approximately 4-6 minutes.
8. Rap the flask gently to dislodge the cells from the surface of the flask.
9. Add 3 ml of Trypsin Neutralizer solution to the flask and transfer the detached cells to a sterile 15 ml conical tube.
10. Add 3 ml additional Trypsin Neutralizer solution to the flask and pipet the solution over the flask surface several times to remove any remaining cells. Add this solution to the 15 ml conical tube.
11. Centrifuge the cells at  $180 \times g$  for 7 minutes. Observe the cell pellet.
12. Remove the supernatant from the tube, being careful not to dislodge the cell pellet.
13. Resuspend the cell pellet in 4 ml supplemented Medium 131. Pipet the cells up and down with a 10 ml pipette to ensure a homogeneous cell suspension.
14. Determine the concentration of cells in the suspension.
15. Dilute the cells in supplemented Medium 131 and seed new culture vessels with  $5.0 \times 10^3$  cells/cm<sup>2</sup>.
16. Incubate the cultures in a 37°C, 5% CO<sub>2</sub>/95% air, humidified cell culture incubator.

### Notes

- Damage to cultured HMVECad can occur during trypsinization. This damage may result from exposure of the cells to the Trypsin/EDTA solution for excessive lengths of time, trypsinization at temperatures exceeding room temperature and/or excessive mechanical agitation. Check to make sure that the temperature of trypsinization is appropriate and, if necessary, alter the incubation time of the procedure.
- Another common source of damage is centrifugation at excessive g forces. Check to make sure that the speed of the centrifuge is appropriate. One manifestation of cellular damage that may be evident after centrifugation is strings of cells (and debris) that do not pellet in the bottom of the tube. This is due to the presence of DNA from lysed cells in the solution. If this condition exists, the cell pellet may be lost upon aspiration of the supernatant containing the DNA strings. In many cases, viable cells can be rescued by pipetting the cells (and DNA) up and down in a 10 ml pipette to shear the DNA, and centrifuging the suspension again.

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