

**SOP:** Propagation of primary Human Umbilical Vein Endothelial Cells  
(HUVECs; Lonza Biosciences)  
**Date modified:** 8/27/08  
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**Ordering Information**

Primary Human Umbilical Vein Endothelial Cells (HUVECs) may be ordered either as frozen ampules or as starter cultures. The former contain  $\sim 0.5-1 \times 10^5$  cells; the latter are initiated at Lonza and sent in a T225 flask containing  $6-7 \times 10^6$  cells.

For all orders, provide (1) Reservation #; (2) Contract/quotation #; (3) Individual (Lot #); and (4) Item #s, as follows:

Reservation number: ~~RZ-495718~~ 3122124 (Updated 7/22/08)  
Contract number: P101416  
Individual H1: Lot #7F3239 - Male, Caucasian,  
154 amps available, 0 amps available (7/22/08)  
  
Individual H2: Lot #7F3771 - Male, African American  
144 amps available, 38 amps available (7/22/08)

To order frozen ampules + media:

Name: HUVEC – Umbilical Vein Endo Cells  
Item #: CC-2517 (HUVEC in EGM® - Cryopreserved ampule)  
CC-3162 (EGM-2 BulletKit = CC-3156 + CC-4176)

To order starter cultures:

Name: HUVEC – Umbilical Vein Endo Cells  
Item #: CC2501T225 (HUVECs in EGM® T-225 Flask)  
CC-3162 (EGM-2 BulletKit = CC-3156 + CC-4176)

**Notes:**

The number of BulletKits purchased depends on the target number of cells to be generated. A rule of thumb is 10 BulletKits for every initial T225 flask of cells. It is strongly recommended to purchase all of the media that will be required for a complete expansion series (see below), since media supply may be erratic.

## **Materials List**

1. Cell-type specific medium (BulletKits – Lonza Biosciences)
2. T225 culture flasks
3. Graduated pipets (1, 5, 25mL)
4. Pen-strep solution (if required; Lonza typically supplies antibiotics)
5. Hemocytometer
6. Micropipet w/ P20 tips
7. Microscope

## **Procedure**

### **A. Receipt of proliferating cells**

- 1) Equilibrate for 3-4 hours in 37°C, 5% CO<sub>2</sub> humidified incubator.
- 2) Remove shipping medium. Replace with fresh medium and return to incubator.

### **B. Sub-culture**

- 1) Propagate cells until density reaches 70-80% confluence.
- 2) Decant medium.
- 3) Wash cells with warm 1X PBS.
- 4) Add 8mLs of Accutase and return to incubator for 10-15 minutes.
- 5) Immediately remove cells and pellet at 500 xg for 3 minutes (4°C)
- 6) Wash cells 2X with 1X PBS.
- 7) Gently re-suspend cell pellet in warm medium.
- 8) Count cells with hemocytometer.
- 9) Add warmed medium to flasks.
- 10) Seed flasks at **5,000 cells/cm<sup>2</sup>**
- 11) Record each subculture event as a passage

### **C. Maintenance**

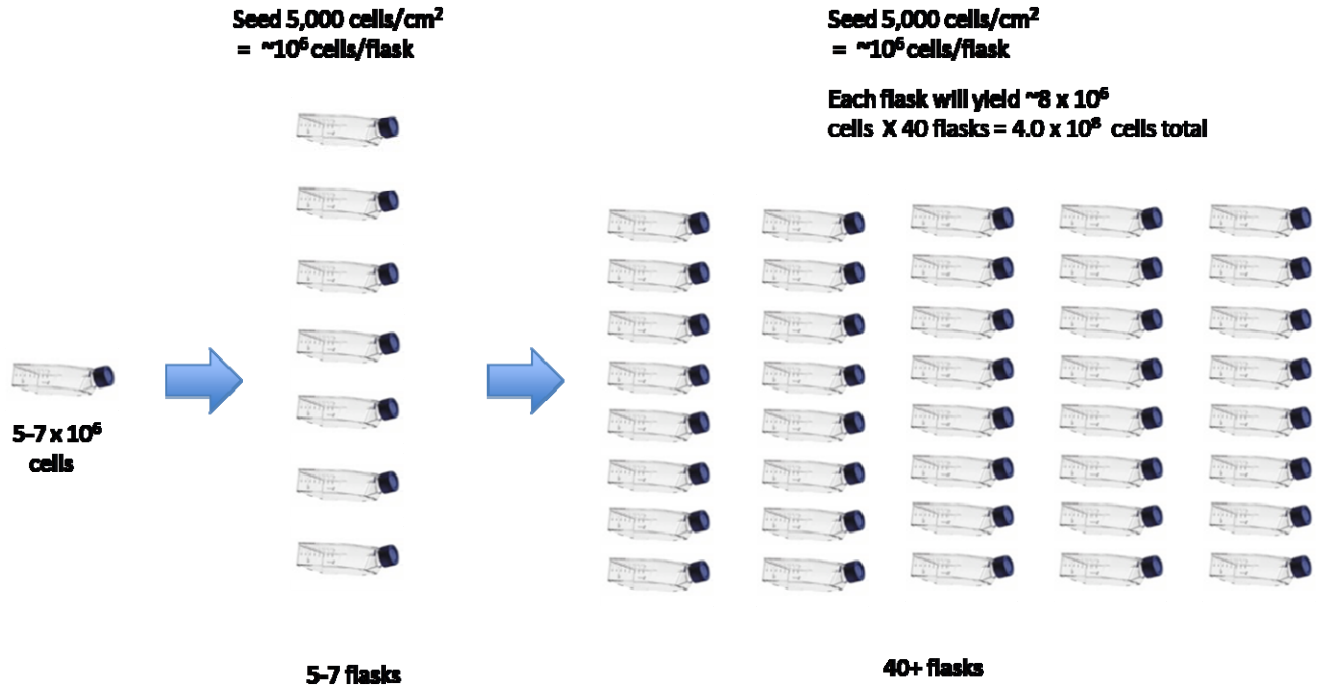
- 1) Change media the day after seeding and every OTHER day thereafter.
- 2) Increase media volume as confluency increases (volumes assume the use of
- 3) T225 flasks):
  - a. 25 % = 1mL/5 cm<sup>2</sup>
  - b. 25-45% = 1.5mL/ 5 cm<sup>2</sup>
  - c. 45%+ = 2mL/ 5 cm<sup>2</sup>
- 4) Per the above an exemplary schedule might be:
  - a. day 1, plate into T225: use 50 mls of media.
  - b. day 2, change media, use 50 mls of media
  - c. day 4, change media, use 100 mls of media (if confluency is >50%)
  - d. day 6, change media, use 100 mls of media (or harvest if ready)
  - e. day 7 or 8 (harvest when cells reach 6 x 10<sup>6</sup> cells/flask)

### **D. Harvest**

- 1) Pass cells 3-4 times until the desired cell number is achieved (primary cells will senesce after 4-5 passages).
- 2) Remove cells from flasks according to protocol described above under 'subculturing'
- 3) Examine viability using trypan blue staining (SOP)

**Exemplary Expansion**

The diagram below illustrates an exemplary expansion of HUVECs from a Lonza starter culture:



- The initial T225 flask received from Lonza will have ~6 x 10<sup>6</sup> cells; this will then be split and seeded at ~3,500 cells/cm<sup>2</sup>; each new T225 flask will therefore be seeded with ~750K cells.
- The initial flask will yield up to 7-8 daughter flasks depending on how large of an expansion is targeted.
- Once these flasks have reached the target density again, they can be split and seeded into up to 40 flasks.
- The 40 granddaughter flasks will each yield ~6 x 10<sup>6</sup> cells, providing a total theoretical yield of 2.5x10<sup>8</sup> cells.

**Media requirements:** Each flask will require ~50mL of medium with additional medium for feedings during the doubling/expansion process.