

# Endothelial cells (large vessel)

## Instruction manual

Product	Size	Catalog number
Human Umbilical Vein Endothelial Cells (HUVEC) single donor	500,000 cryopreserved cells 500,000 proliferating cells	C-12200 C-12250
Human Umbilical Vein Endothelial Cells (HUVEC) pooled	500,000 cryopreserved cells 500,000 proliferating cells	C-12203 C-12253
Human Umbilical Vein Endothelial Cells (HUVEC) isolated in Growth Medium 2, single donor	500,000 cryopreserved cells 500,000 proliferating cells	C-12206 C-12207
Human Umbilical Vein Endothelial Cells (HUVEC) isolated in Growth Medium 2, pooled	500,000 cryopreserved cells 500,000 proliferating cells	C-12208 C-12209
Human Umbilical Vein Endothelial Cells (HUVEC) pre-screened	500,000 cryopreserved cells 500,000 proliferating cells	C-12205 C-12255
Human Umbilical Artery Endothelial Cells (HUAEC)	500,000 cryopreserved cells 500,000 proliferating cells	C-12202 C-12252
Human Aortic Endothelial Cells (HAoEC)	500,000 cryopreserved cells 500,000 proliferating cells	C-12271 C-12272
Human Coronary Artery Endothelial Cells (HCAEC)	500,000 cryopreserved cells 500,000 proliferating cells	C-12221 C-12222
Human Pulmonary Artery Endothelial Cells (HPAEC)	500,000 cryopreserved cells 500,000 proliferating cells	C-12241 C-12242
Human Saphenous Vein Endothelial Cells (HSAVEC)	500,000 cryopreserved cells 500,000 proliferating cells	C-12231 C-12232

### Product description

Our endothelial cells from large vessels are available from different locations, e.g. umbilical vein, umbilical artery, aorta, coronary artery, pulmonary artery, and saphenous vein.

Additionally, our Human Umbilical Vein Endothelial Cells (HUVEC) are isolated in standard Endothelial Cell Growth Medium and also in Endothelial Cell Growth Medium 2. The cells are supplied either from single donors or from pooled donors (from up to four different umbilical cords). Furthermore, HUVEC are available pre-screened for vascular endothelial growth factor (VEGF) response.

Shortly after isolation, all our Human Umbilical Vein Endothelial Cells are cryopreserved using our proprietary, animal-component free, and protein-free cryopreservation medium (for details, please refer to the Certificate of Analysis).

Each cryovial contains more than 500,000 viable cells after thawing. Thawing and seeding

results in passage 1 or passage 2, respectively (see page 5).

Proliferating cell cultures are made from cryopreserved cells that have been thawed and cultured for three days at PromoCell.

### Quality control

We perform rigid quality control tests for each lot of Endothelial Cells from large vessels.

The cells are tested for cell morphology, adherence rate, and cell viability. Flow cytometric analyses for cell-type specific markers, e.g. CD31 and Dil-Ac-LDL uptake (see page 5) are also carried out for each lot. Growth performance is tested through multiple passages up to 15 population doublings (PD) under culture conditions without antibiotics or antimycotics.

In addition, all cells have been tested for the absence of HIV-1, HIV-2, HBV, HCV, HTLV-1, HTLV-2 and microbial contaminants (fungi, bacteria, and mycoplasma).

### Intended use

Our Endothelial Cells from large vessels are for *in vitro* research use only and not for diagnostic or therapeutic procedures.

### Warning

Although tested negative for HIV-1, HIV-2, HBV, HCV, HTLV-1, and HTLV-2, the cells – like all products of human origin – should be handled as potentially infectious. No test procedure can completely guarantee the absence of infectious agents.

*Follow appropriate safety precautions.*

*After delivery, cryopreserved cells should be stored in liquid nitrogen or seeded directly (see page 2). Proliferating cells must be processed immediately (see page 3).*

# Protocol for cryopreserved cells

Straight after arrival, store the cryopreserved cells in liquid nitrogen, or seed them immediately.

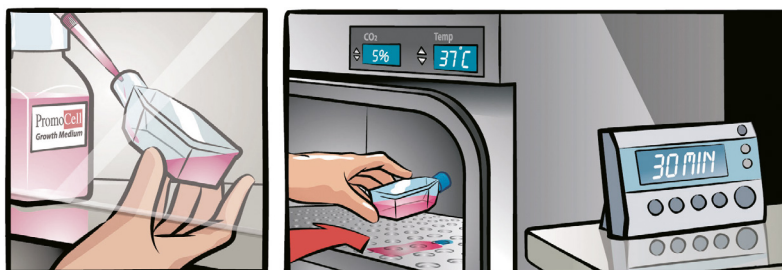
**Note:** Storage at  $-80^{\circ}\text{C}$  is not sufficient for cell preservation and causes irreversible cell damage.

*Use aseptic techniques and a laminar flow bench.*

1

## Prepare the medium

Calculate the required culture surface area according to the plating density (see page 5) and the lot-specific cell numbers stated on the certificate of analysis. Fill the appropriate volume of PromoCell Growth Medium (at least 9 ml per vial of cells) in cell culture vessels. Place the vessels in an incubator ( $37^{\circ}\text{C}$ , 5%  $\text{CO}_2$ ) for 30 minutes.



2

## Thaw the cells

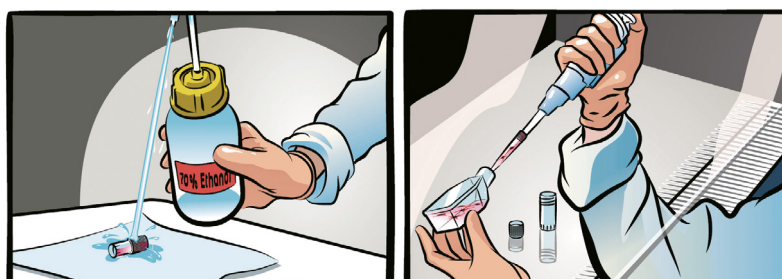
Remove the cryovial from the liquid nitrogen container and immediately place it on dry ice – even for short transportation. Under a laminar flow bench, briefly twist the cap a quarter turn to relieve pressure, then retighten. Immerse the vial in a water bath ( $37^{\circ}\text{C}$ ) up to the height of the screw cap for 2 minutes. Ensure that no water enters the thread of the screw cap.



3

## Disinfect the vial and seed the cells

Thoroughly rinse the cryovial with 70% ethanol under a laminar flow bench. Then, aspirate the excess ethanol from the thread area of the screw cap. Open the vial and transfer the cells to a cell culture vessel containing the pre-warmed medium from step 1.



4

## Incubate the cells

Place the vessel in an incubator ( $37^{\circ}\text{C}$ , 5%  $\text{CO}_2$ ) for cell attachment. Replace the medium after 16–24 hours and every two to three days thereafter. The cells should be sub-cultured, according to the sub-cultivation protocol (see page 4), once they have reached 70–90% confluency.



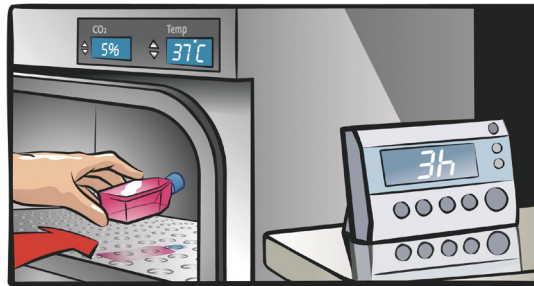
# Protocol for proliferating cells

Start immediately after delivery.  
Use aseptic techniques and a laminar flow bench.

1

## Incubate the cells

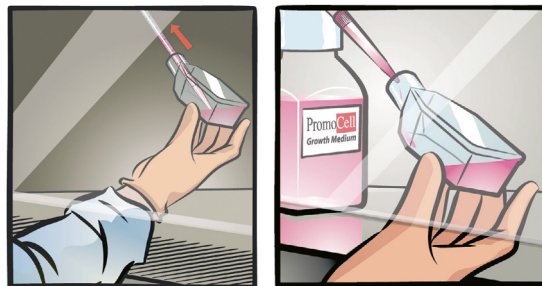
Unpack the culture vessel, do not open the cap, and immediately place it in an incubator (37°C, 5% CO<sub>2</sub>) for 3 hours to allow the cells to recover from transportation.



2

## Replace the transport medium

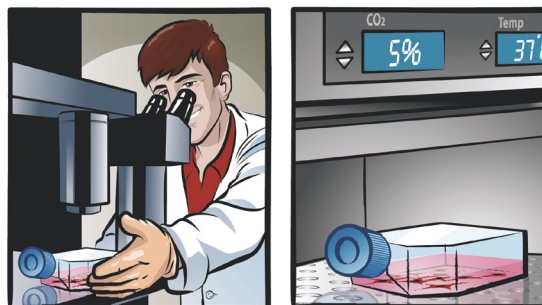
Carefully open the vessel, rinse the inner side of the lid with 70% ethanol, and let air dry. Aspirate the transport medium from the vessel. Add 10 ml of the appropriate PromoCell cell growth medium.



3

## Check and incubate the cells

Check the cell density. Open the cap half a turn and place the vessel in an incubator (37°C, 5% CO<sub>2</sub>). Change the medium every two to three days. The cells should be subcultured, according to the subcultivation cells protocol (see page 4), once they have reached >70% confluency.



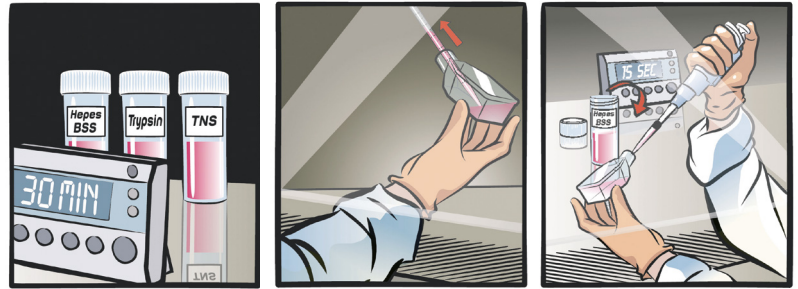
# Subcultivation protocol

Use aseptic techniques and a laminar flow bench.

1

## Prepare the reagents and wash the cells

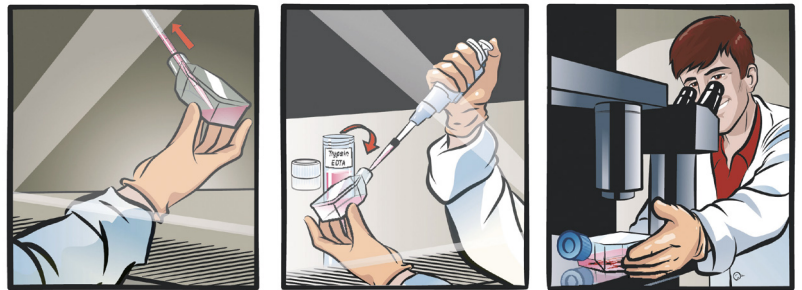
Place the PromoCell DetachKit at room temperature for at least 30 minutes to adjust the temperature of the reagents. Carefully aspirate the medium from the culture vessel. Add 100  $\mu$ l Hepes BSS Solution per  $\text{cm}^2$  of vessel surface to wash the cells and agitate the vessel carefully for 15 seconds.



2

## Detach the cells

Carefully aspirate the Hepes BSS from the culture vessel. Add 100  $\mu$ l Trypsin/EDTA Solution per  $\text{cm}^2$  of vessel surface. Note: We recommend detaching the cells at room temperature. Close the vessel and examine the cells under a microscope. When the cells start to detach, gently tap the side of the vessel to loosen the remaining cells.



3

## Neutralize the trypsin and harvest the cells

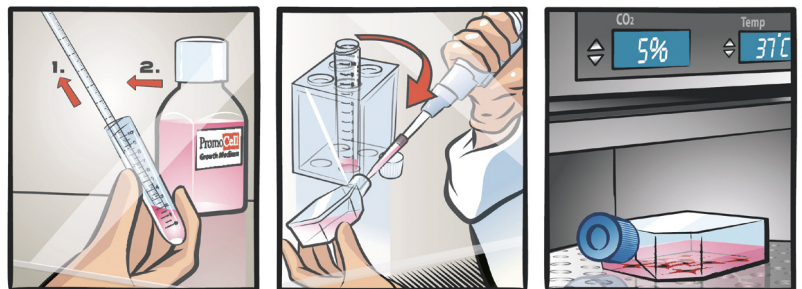
Add 100  $\mu$ l Trypsin Neutralization Solution per  $\text{cm}^2$  of vessel surface and gently agitate. Carefully aspirate the cell suspension and transfer it to a centrifugation tube. Spin down the cells for 3 minutes at 220 x g.



4

## Incubate the cells

Discard the supernatant (step 1), add 1 ml of the appropriate PromoCell Cell Growth Medium (step 2), and re-suspend the cells by carefully pipetting up and down. Plate the cells according to the recommended seeding density in new cell culture vessels containing prewarmed PromoCell Cell Growth Medium. Place the vessels in an incubator (37°C, 5% CO<sub>2</sub>) and change the media every two to three days.





## Specifications

Product	Recommended culture media*	Plating density	Passage after thawing	Marker	Population doublings
Human Umbilical Vein Endothelial Cells (HUVEC), single donor	C-22010 C-22011	5,000–10,000 cells per cm <sup>2</sup>	P1	CD31 <sup>+</sup> Dil-Ac-LDL uptake <sup>+</sup>	> 15
Human Umbilical Vein Endothelial Cells (HUVEC), pooled	C-22010 C-22011	5,000–10,000 cells per cm <sup>2</sup>	P1	CD31 <sup>+</sup> Dil-Ac-LDL uptake <sup>+</sup>	> 15
Human Umbilical Vein Endothelial Cells (HUVEC) isolated in Growth Medium 2, single donor	C-22011	5,000–10,000 cells per cm <sup>2</sup>	P1	CD31 <sup>+</sup> Dil-Ac-LDL uptake <sup>+</sup>	> 15
Human Umbilical Vein Endothelial Cells (HUVEC) isolated in Growth Medium 2, pooled	C-22011	5,000–10,000 cells per cm <sup>2</sup>	P1	CD31 <sup>+</sup> Dil-Ac-LDL uptake <sup>+</sup>	> 15
Human Umbilical Vein Endothelial Cells (HUVEC), pre-screened	C-22010 C-22011	5,000–10,000 cells per cm <sup>2</sup>	P1	CD31 <sup>+</sup> Dil-Ac-LDL uptake <sup>+</sup> VEGF response	> 15
Human Umbilical Artery Endothelial Cells (HUAEC)	C-22010 C-22011	5,000–10,000 cells per cm <sup>2</sup>	P1	CD31 <sup>+</sup> Dil-Ac-LDL uptake <sup>+</sup>	> 15
Human Aortic Endothelial Cells (HAoEC)	C-22020 C-22022	5,000–10,000 cells per cm <sup>2</sup>	P2	CD31 <sup>+</sup> Dil-Ac-LDL uptake <sup>+</sup>	> 15
Human Coronary Artery Endothelial Cells (HCAEC)	C-22020 C-22022	5,000–10,000 cells per cm <sup>2</sup>	P3	CD31 <sup>+</sup> Dil-Ac-LDL uptake <sup>+</sup>	> 15
Human Pulmonary Artery Endothelial Cells (HPAEC)	C-22010 C-22011	5,000–10,000 cells per cm <sup>2</sup>	P2	CD31 <sup>+</sup> Dil-Ac-LDL uptake <sup>+</sup>	> 15
Human Saphenous Vein Endothelial Cells (HSaVEC)	C-22010 C-22011	5,000–10,000 cells per cm <sup>2</sup>	P2	CD31 <sup>+</sup> Dil-Ac-LDL uptake <sup>+</sup>	> 15

\*The catalog numbers in this table are for media in ready-to-use packaging.

## Related products

Product	Size	Catalog number
Endothelial Cell Growth Medium (Ready-to-use)	500 ml	C-22010
Endothelial Cell Growth Medium Kit	500 ml	C-22110
Endothelial Cell Basal Medium	500 ml	C-22210
Endothelial Cell Basal Medium, phenol red-free	500 ml	C-22215
Endothelial Cell Growth Medium SupplementMix	for 500 ml	C-39215
Endothelial Cell Growth Medium SupplementPack	for 500 ml	C-39210
Endothelial Cell Growth Medium 2 (Ready-to-use)	500 ml	C-22011
Endothelial Cell Growth Medium 2 Kit	500 ml	C-22111
Endothelial Cell Basal Medium 2	500 ml	C-22211

Endothelial Cell Basal Medium 2, phenol red-free	500 ml	C-22216
Endothelial Cell Growth Medium 2 SupplementMix	for 500 ml	C-39216
Endothelial Cell Growth Medium 2 SupplementPack	for 500 ml	C-39211
Endothelial Cell Growth Medium MV (Ready-to-use)	500ml	C-22020
Endothelial Cell Growth Medium MV Kit	500 ml	C-22120
Endothelial Cell Growth Medium MV 2 (Ready-to-use)	500 ml	C-22022
Endothelial Cell Growth Medium MV 2 Kit	500 ml	C-22121
DetachKit	30 ml 125 ml 250 ml	C-41200 C-41210 C-41220
Cryo-SFM Plus	30 ml 125 ml	C-29920 C-29922
HUVEC single donor Pellet	1 million cells per pellet	C-14010
HUVEC pooled Pellet	1 million cells per pellet	C-14011
HUVEC Growth Medium 2 single donor Pellet	1 million cells per pellet	C-14008
HUVEC Growth Medium 2 pooled Pellet	1 million cells per pellet	C-14009
HUVEC pre-screened Pellet	1 million cells per pellet	C-14012
HUAEC Pellet	1 million cells per pellet	C-14013
HAoEC Pellet	1 million cells per pellet	C-14023
HCAEC Pellet	1 million cells per pellet	C-14022
HPAEC Pellet	1 million cells per pellet	C-14024
HSaVEC Pellet	1 million cells per pellet	C-14025

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