**Product sheet**

# HUVEC, single donor | 300605

## General information

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| **Description** | Human Umbilical Vein Endothelial Cells (HUVECs) are primary cells derived from the endothelial layer of veins in the human umbilical cord. HUVECs are a pivotal model in vascular biology research due to their capacity to closely replicate many aspects of endothelial cell biology in vivo. These cells are extensively utilized to study endothelial functions, including angiogenesis, inflammation, and mechanisms of vascular permeability.<br><br>HUVECs display several critical endothelial markers, such as von Willebrand factor, CD31, and endothelial nitric oxide synthase (eNOS), which affirm their endothelial origin and functionality. They are also capable of forming tube-like structures when cultured on Matrigel, demonstrating their potential for angiogenesis studies.<br><br>The ability of HUVECs to respond to cytokines and growth factors makes them an excellent system for exploring cellular responses associated with vascular diseases such as atherosclerosis, hypertension, and thrombosis. Moreover, their reaction to shear stress can be studied in dynamic flow models, providing insights into the effects of blood flow on endothelial behavior.<br><br>In pharmacological research, HUVECs are commonly employed to evaluate the efficacy and toxicity of vascular-targeting agents. Their straightforward isolation and the relative ease of culturing make them a valuable tool in both academic research and pharmaceutical development. These attributes underline the significance of HUVECs in advancing our understanding of vascular health and disease. |
| **Organism** | Human |
| **Tissue** | Umbilical vein |
| **Applications** | Human Umbilical Vein Endothelial Cells (HUVECs) are widely used in various biomedical research areas because they can quickly proliferate and differentiate into different types of endothelial cells, which line blood vessels. HUVECs have many research and drug discovery applications, including wound healing, angiogenesis, tissue engineering, inflammation, oncology, pharmacology, vascular modeling, and transfection. |
| **Synonyms** | Human Umbilical Vein Endothelial Cells |

## Characteristics

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| **Ethnicity** | Caucasian |
| **Morphology** | Endothelial |
| **Cell type** | Primary cells |
| **Growth properties** | Monolayer, adherent |

## Regulatory Data

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| **Citation** | HUVEC, pooled (Cytion catalog number 300605) |
| **Biosafety level** | 1 |
| **NCBI_TaxID** | 9606 |

## Biomolecular Data

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| **Protein expression** | Cytosplasmic VWF/ Factor VIII > 95% positive by immunofluorescence. Cytoplasmic uptake of Di-I-Ac-LDL > 95% positive by immunofluorescence. Cytoplasmic PECAM1 > 95% positive by immunofluorescence |
| **Viruses** | Negative for HIV-1, HBV, and HCV |

## Handling

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| **Culture Medium** | Endothelial Cell Growth Medium (PromoCell article number C-22010) |
| **Dissociation Reagent** | Accutase |
| **Subculturing** | Remove the old medium from the adherent cells and wash them with PBS that lacks calcium and magnesium. For T25 flasks, use 3-5 ml of PBS, and for T75 flasks, use 5-10 ml. Then, cover the cells completely with Accutase, using 1-2 ml for T25 flasks and 2.5 ml for T75 flasks. Let the cells incubate at room temperature for 8-10 minutes to detach them. After incubation, gently mix the cells with 10 ml of medium to resuspend them, then centrifuge at 300xg for 3 minutes. Discard the supernatant, resuspend the cells in fresh medium, and transfer them into new flasks that already contain fresh medium. |
| **Fluid renewal** | Every 2 to 3 days |
| **Freeze medium** | As a cryopreservation medium, we use complete growth medium (including FBS) + 10% DMSO for adequate post-thaw viability, or CM-1 (Cytion catalog number 800100), which includes optimized osmoprotectants and metabolic stabilizers to enhance recovery and reduce cryo-induced stress. |

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| **Thawing and Culturing Cells** | 1. Confirm that the vial remains deeply frozen upon delivery, as cells are shipped on dry ice to maintain optimal temperatures during transit.<br>2. Upon receipt, either store the cryovial immediately at temperatures below -150°C to ensure the preservation of cellular integrity, or proceed to step 3 if immediate culturing is required.<br>3. For immediate culturing, swiftly thaw the vial by immersing it in a 37°C water bath with clean water and an antimicrobial agent, agitating gently for 40-60 seconds until a small ice clump remains.<br>4. Perform all subsequent steps under sterile conditions in a flow hood, disinfecting the cryovial with 70% ethanol before opening.<br>5. Carefully open the disinfected vial and transfer the cell suspension into a 15 ml centrifuge tube containing 8 ml of room-temperature culture medium, mixing gently.<br>6. Centrifuge the mixture at 300 x g for 3 minutes to separate the cells and carefully discard the supernatant containing residual freezing medium.<br>7. Gently resuspend the cell pellet in 10 ml of fresh culture medium. For adherent cells, divide the suspension between two T25 culture flasks; for suspension cultures, transfer all the medium into one T25 flask to promote effective cell interaction and growth.<br>8. Adhere to established subculture protocols for continued growth and maintenance of the cell line, ensuring reliable experimental outcomes. |
| **Incubation Atmosphere** | 37°C, 5% $CO_2$, humidified atmosphere. |
| **Shipping Conditions** | Cryopreserved cell lines are shipped on dry ice in validated, insulated packaging with sufficient refrigerant to maintain approximately −78 °C throughout transit. On receipt, inspect the container immediately and transfer vials without delay to appropriate storage. |
| **Storage Conditions** | For long-term preservation, place vials in vapor-phase liquid nitrogen at about −150 to −196 °C. Storage at −80 °C is acceptable only as a short interim step before transfer to liquid nitrogen. |

## Quality Control & Molecular Analysis

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| **Sterility** | Mycoplasma contamination is excluded using both PCR-based assays and luminescence-based mycoplasma detection methods.<br><br>To ensure there is no bacterial, fungal, or yeast contamination, cell cultures are subjected to daily visual inspections. |