

ANGIOGENESIS RESOURCES

FUNCTIONAL MODELS OF THE CARDIOVASCULAR SYSTEM

Insufficient blood supply to the heart and other tissues resulting from inadequate new blood vessel growth (angiogenesis) is a critical feature of many cardiovascular diseases. Conditions such as coronary artery disease, complications of diabetes, peripheral arterial disease, and stroke are all areas of study involving angiogenesis. Conversely, angiogenesis plays a key role in the growth and spread of cancer. Tumors cause new blood vessels to form by giving off signals that promote angiogenesis. The resulting new blood vessels “feed” growing tumors allowing cancer cells to spread and metastasize. ATCC® provides a single-use angiogenesis screening kit, hTERT-immortalized cardiovascular cells, primary cardiovascular cells, gel substrate, as well as media and supplements for *in vitro* models to promote scientific discovery in these disease states.

ANGIO-READY™, A TOOL FOR HIGH-THROUGHPUT ANGIOGENESIS STUDIES

Angio-Ready™ was engineered at ATCC to provide researchers with a method to measure the growth of new blood vessels¹. This system offers features such as:

- Minimal cell culture
- High-throughput screening
- Stain-free monitoring
- Live cell imaging
- Substrate-free growth and differentiation
- Data collection possible within three days
- Sensitive to angiogenesis inhibitors
- Heterogeneous capillary architecture

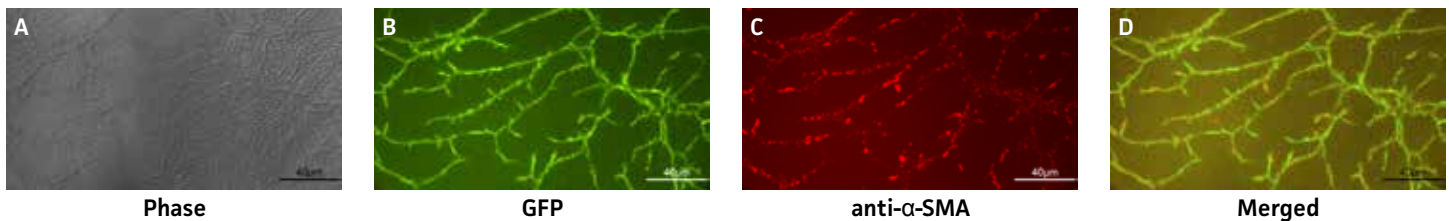


Figure 1. Establishment of TeloHAEC-GFP and hTERT-MSC co-culture angiogenesis. TeloHAEC-GFPs co-cultured with hTERT-MSCs for 7 days in the optimized angiogenesis medium displayed A) 3D tubule structures and B) a long branching organization B) that exhibited immuno-reactivity to an α -SMA antibody, which D) co-localized with the TeloHAEC-GFP.

Angio-Ready™ Angiogenesis Assay System Components	ATCC® No.
Angio-Ready™ Angiogenesis Assay System (cells, media, and supplement for two 96 well plates) Two 1 mL vials Angio-Ready™ Cells 200 mL bottle Angio-Ready™ Angiogenesis Medium 1 mL vial rhVEGF	ACS-2001-2™
Angio-Ready™ Angiogenesis Assay System (cells, media, and supplement for ten 96 well plates) Ten 1 mL vials Angio-Ready™ Cells Five 200 mL bottles Angio-Ready™ Angiogenesis Medium Five 1 mL vials rhVEGF	ACS-2001-10™
Available separately	
200 mL bottle Angio-Ready™ Angiogenesis Medium with 1 mL vial rhVEGF Supplement (media and supplement for two 96 well plates)	ACS-2008

Table 1. Materials included in the Angio-Ready™ Angiogenesis Assay System.

WELL CHARACTERIZED, HIGH PERFORMANCE PRIMARY AND hTERT-IMMORTALIZED PRIMARY CELLS

ATCC primary cardiovascular cells are consistently isolated and processed, minimizing the variation between individual vials as well as production lots. By contrast, hTERT-immortalized cells provide minimal lot variation due to their clonal nature, yet retain many of their physiological properties. Both cell types may contribute to the formation of vascular structures *in vitro*^{2,3}. Specification and characterization for each lot of cardiovascular cells includes:

- Provided at passage 2 (primary cells)
- At least 5 x 10⁵ viable cells per vial
- Normal cell morphology
- Tested for appropriate endothelial and smooth muscle cell-specific markers:
 - Von Willebrand factor
 - VE-cadherin
 - Alpha smooth muscle actin
 - LDL uptake
- Primary cells are capable of greater than 15 population doublings
- hTERT-immortalized cells are capable of greater than 25 population doublings
- Greater than 70% post-thaw viability
- Gender, age, ethnicity, and cause of death information available (primary cells)
- Negative for bacteria, yeast, fungi, viruses, and mycoplasma

Cell Type	Description	ATCC® No.	Growth Kit	Basal Media
Primary Endothelial	Aortic Endothelial Cells	PCS-100-011™	Endothelial Cell Growth Kit-BBE (ATCC® PCS-100-040™) or Endothelial Cell Growth Kit-VEGF (ATCC® PCS-100-041™)	Vascular Cell Basal Medium (ATCC® PCS-100-030™)
	Coronary Artery Endothelial	PCS-100-020™		
	Umbilical Vein Endothelial	PCS-100-010™		
	Umbilical Vein Endothelial; Pooled	PCS-100-013™		
	Dermal Microvascular Endothelial; Neonatal	PCS-110-010™	Microvascular Endothelial Cell Growth Kit-BBE (ATCC® PCS-110-040™) or Microvascular Endothelial Cell Growth Kit-VEGF (ATCC® PCS-110-041™)	
	Pulmonary Artery Endothelial Cells	PCS-100-022™		
hTERT-immortalized Endothelial	Aortic Endothelial Cells (TeloHAEC)	CRL-4052™	Endothelial Cell Growth Kit-VEGF (ATCC® PCS-100-041)	
	TeloHAEC-GFP	CRL-4054™		
	NFκB-TIME	CRL-4049™	Microvascular Endothelial Cell Growth Kit-BBE (ATCC® PCS-110-040™) or Microvascular Endothelial Cell Growth Kit-VEGF (ATCC® PCS-110-041™)	
	Microvascular Endothelial Cells (TIME)	CRL-4025™		
TIME-GFP	CRL-4045™			
Primary Smooth Muscle	Aortic Smooth Muscle Cells	PCS-100-012™	Vascular Smooth Muscle Cell Growth Kit (ATCC® PCS-100-042™)	
	Coronary Artery Smooth Muscle Cells	PCS-100-021™		
	Pulmonary Artery Smooth Muscle Cells	PCS-100-023™		
N/A	CellMatrix Basement Membrane Gel	ACS-3035™	N/A	N/A

Table 2. Table 2. ATCC® Primary and hTERT-immortalized cardiovascular cells

REFERENCES

1. Zhou C, Shapiro BS. *In vitro* Angiogenesis Assay Using the ATCC® Angio-Ready™ System. Application Note Number 19, 2016.
2. CellMatrix Basement Membrane Gel supports *in vitro* angiogenesis assays. Application Note Number 4, 2015.
3. Hotchkiss KA, *et al.* Inhibition of endothelial cell function *in vitro* and angiogenesis *in vivo* by docetaxel: Association with impaired repositioning of the microtubule organizing center. *Mol Cancer Ther* 1(13): 1191-1200, 2002.

For ATCC Angiogenesis Resources explore www.atcc.org/angio

PHONE

800.638.6597
703.365.2700

EMAIL

SalesRep@atcc.org

WEB

www.atcc.org



10801 University Blvd.
Manassas, VA 20110

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