

Materials List for:

An In Vitro 3D Model and Computational Pipeline to Quantify the Vasculogenic Potential of iPSC-Derived Endothelial Progenitors

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Materials

Name	Company	Catalog Number	Comments
μ-Slide Angiogenesis	Ibidi	N/A	A flat, glass bottom tissue-culture plate with side walls enables facile confocal imaging
96 well, round bottom, ultra low attachment microplate, sterile	Corning	7007	Prevents the binding of cell-laden collagen hydrogels to the cell culture dish
Accutase	STEMCELL Technologies	7920	Gentle cell detachment solution; does not degrade extracellular epitopes vital for FACS
Advanced DMEM/F12	Thermo Scientific	12634010	The base media for iPSC-EP differentiation.
Barnstead GenPure xCAD Plus	Thermo Fisher Scientific	50136165	Water purification system; others can be readily substituted
Bovine Serum Albumin solution, 7.5% in DPBS, sterile-filtered, BioXtra, suitable for cell culture	Fisher Scientific	A8412	To preserve cell viability when FACS sorting
CD34-PE, human (clone: AC136)	Miltenyi Biotec	130-098-140	Antibody used for FACS isolation of iPSC-EPs
CHIR99021	LC Laboratories	C-6556	Induces the formation of mesoderm from pluripotent stem cells
Collagen I Rat Tail High Protein 100 mg	VWR	354249	Main component of the 3D microenvironment
Conical centrifuge tubes (15/50 mL)	Fisher Scientific	14-959-49D/A	Used to store and mix relatively large volumes of reagents and cell culture media
DAPI (4',6-Diamidino-2-Phenylindole, Dihydrochloride)	Thermo Fisher Scientific	D1306	To counterstain and visualize cell nuclei
DMEM/F12	Thermo Fisher Scientific	11320-082	For dilution of Matrigel and thawing of pluripotent stem cells
Dulbecco's phosphate-buffered saline (DPBS)	ThermoFisher	14190-250	To wash monolayer cultures
EDTA	Sigma-Aldrich	E8008	For passaging of pluripotent stem cell colonies and to prevent cell aggregation when FACS sorting
Endothelial Cell Growth Medium 2	PromoCell	C-22011	Promotes endothelial cell viability and proliferation
Essential 8 Medium	Thermo Fisher Scientific	A1517001	For maintenance of pluripotent stem cells
Glycine, BioUltra, for molecular biology, >=99.0% (NT)	Sigma-Aldrich	50046	Neutralizes remaining detergent

L-Ascorbic acid 2-phosphate sesquimagnesium salt hydrate, >=95%	Sigma-Aldrich	A8960	Component of iPSC-EP differentiation medium
MATLAB	MathWorks	1.8.0_152	Multi-paradigm numerical computing environment (free available at most academic institutions)
Matrigel Matrix GFR PhenolRF Mouse 10 mL (gelatinous protein mixture)	Fisher Scientific	356231	Diluted in DMEM/F12 to coat plates for iPSC-EP differentiation
Medium-199 10X	Thermo Fisher Scientific	1825015	Used to balance final hydrogel osmolarity and pH
Microcentrifuge tubes (1.7 mL)	VWR	87003-294	Stores small volumes of reagents
Phosphate-buffered saline (PBS)	Sigma-Aldrich	P3813	The main ingredient of the immunostaining solutions
Penicillin-Streptomycin (10,000 U/mL)	Thermo Fisher Scientific	15140122	Antibiotic used after sorting to remove possible contamination from FACS instrument
Recombinant Human VEGF 165 Protein	R&D Systems	293-VE	Mitogen that stimulates endothelial cell proliferation and tubulogenesis
Rhodamine phalloidin	Thermo Fisher Scientific	R415	To identify F-actin deposition and therefore outline the borders of the vascular networks
Triton X-100 (nonionic surfactant)	Sigma-Aldrich	X-100	Detergent used to gently permeabilize cells
Tween-20 (emulsifying reagent)	Fisher Scientific	BP337	Increases the binding specificity of the added antibodies
VE-Cadherin (F-8)	Santa Cruz Biotechnology	sc-9989	To identify 3D endothelial lumen in collagen hydrogels
Vitronectin	ThermoFisher	A14700	For maintenance of pluripotent stem cells
Y-27632	Selleck Chemicals	S1049	Preserves pluripotent stem cell and iPSC-EP viability when dissociated and re-seeded