

# In vitro endothelial spheroid sprouting assay for angiogenesis

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# **Contact person**

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# **Organisation**

Name of the organisation Ghent University (UGent)

**Department** Morphology

**Country** Belgium

Geographical Area Flemish Region

#### **SCOPE OF THE METHOD**

The Method relates to	Animal health, Human health
The Method is situated in	Basic Research
Type of method	In vitro - Ex vivo
Species from which cells/tissues/organs are derived	Human
Type of cells/tissues/organs	endotelial

#### **DESCRIPTION**

## **Method keywords**

collagen

endothelial

sprouting

spheroids

## Scientific area keywords

angiogenesis

tip cell

endothelial sprouts

sprouting angiogenesis

## **Method description**

This method evaluates sprouting propensity of endothelial cells in a collagen matrix. The effect of proangiogenic growth factors or co-cultured cells can be measured by quantifying the amount of vascular
sprouts that form on endothelial spheroids. Endothelial spheroids are obtained by growing endothelial
cells in hanging drops, which forces the cells to adhere to each other. The peripheral cells acquire a
flat phenotype, similar to the flattened endothelial wall of blood vessels. After generation of the
spheroids, they are embedded in a collagen matrix in which endothelial growth factors or specific cell
types can be embedded. Finally the amount of endothelial sprouts is quantified as a measure of the
endothelial sprouting propensity.

#### Lab equipment

Biosafety cabinet;

CO2 incubator;

Inverted microscope.

#### **Method status**

Internally validated

PROS, CONS & FUTURE POTENTIAL

**Advantages** 

The method is simple and the vascular sprouts share multiple morphological characteristics of

vascular tip cells in vivo.

Challenges

The model is limited to evaluating sprout propensity, which is only the first step in the angiogenic

cascade. The subsequent steps of tubule and network formation cannot be evaluated.

**Modifications** 

Spheroids can also be made from a mix of cells. We have performed this with hepatic cancer cells and

this lead to a core of cancer cells surrounded by a flattened endothelial layer, similar to an inside out

blood vessel.

REFERENCES, ASSOCIATED DOCUMENTS AND OTHER INFORMATION

References

Ffisterer, L. Korff, T. (2016) Spheroid-Based In Vitro Angiogenesis model. Methods Mol Biol;

1430:167-77 doi: 10.1007/978-1-4939-3628-1\_11

Links

An alternative spheroid sprouting protocol

Coordinated by









