

## Differentiation of human mesenchymal stem cells into vascular endothelial cells

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**Objective:** The objective of the study is to investigate the differentiation of bone marrow mesenchymal stem cells (MSCs) into vascular endothelial cells *in vitro*.

**Methods:** MSCs were isolated from bone marrow by attaching growth and identified by flow cytometry. MSCs were seeded in inducing medium supplemented with VEGF, bFGF, EGF and IGF to differentiate into endothelial cells. The differentiated cells were identified by measuring surface marks (CD31 and CD34) on the 2<sup>nd</sup>, 6<sup>th</sup>, 10<sup>th</sup> and 14<sup>th</sup> day. qPCR was performed to detect the expression of vWF and Flk-1 on mRNA level. The functional behavior of the endothelial cells from MSCs was tested by tube formation assay *in vitro* on matrigel gel.

**Results:** The primary MSCs demonstrated spindle-shaped morphology and expressed stem cells marker. After two days induction, CD31 and CD34 began to express in 7.27% cells. The expression of CD31 and CD34 increased gradually during

inducing period and reached a peak on the fourteenth day with 57.6% positive cells. qPCR demonstrated that the expression of vWF and Flk-1 was significantly higher in induced MSCs. The induced MSCs could form vessel-like structures on matrigel gel.

**Conclusion:** MSCs can differentiate into functional endothelial cells after induced by VEGF, bFGF, EGF and IGF and form vessel-like structures *in vitro*, suggesting that induced MSCs will be ideal seed cells for the treatment of lower extremity atherosclerotic occlusive disease.

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