Proliferating and quiescent human umbilical vein endothelial cells (HUVECs): a potential in vitro model to evaluate contrast agents for molecular imaging of angiogenesis.

BACKGROUND: The design of highly specific contrast agents for molecular imaging of angiogenesis requires the availability of adequate in vitro models. In this context, we investigated the applicability of a potential in vitro model based on human umbilical vein endothelial cells (HUVECs) mimicking physiological and angiogenic vasculature.

METHODS: HUVECs in supplemented medium were used to mimic proliferating neovasculature (stimulated HUVECs), whereas quiescent non-proliferating endothelium was modeled by alteration of medium supplements (unstimulated HUVECs). The features of both culture subsets were compared with features of angiogenic and physiological vessels in vivo described in the literature using different techniques. Testing of the cell model was performed by specific labeling of CD105 and VEGFR2 with fluorophores and consecutive imaging using a planar near-infrared fluorescence (NIRF) imager.

RESULTS: Light microscopy revealed tubular alignment of unstimulated HUVECs, which was absent in stimulated HUVECs. Proliferation assay confirmed a high level of proliferation in stimulated HUVECs but almost no cell proliferation in unstimulated HUVECs. Flow cytometry revealed an up-regulation of CD105, but not of VEGFR2 on stimulated HUVECs. CD105 and
VEGFR2 gene expression was detectable both in proliferating and in non-proliferating cells. NIRF-imaging revealed highest fluorescence signal for CD105 in proliferating endothelial cells. No relevant fluorescence signal could be observed for VEGFR2. CONCLUSION: The established cell model exhibits features of physiological and angiogenic vasculature. NIRF-imaging using the proposed model was feasible. We conclude that the presented cell model might be useful in future angiogenesis applications, like evaluating new fluorophores and other contrast media.

**Zeitschriftentitel / Abkürzung:**
Contrast Media Mol Imaging

**Jahr:**
2009

**Band:**
4

**Heft / Issue:**
4

**Seiten:**
192-8

**Sprache:**
eng

**Pubmed:**

**Print-ISSN:**
1555-4309

**TUM Einrichtung:**
tgendiagnostik

**Occurences:**
- Einrichtungen > Fakultäten > Fakultät für Medizin > Kliniken und Institute > Institut für Radiologie > 2009

entries: