

Publication

A versatile in vitro assay for investigating angiogenesis of the heart

JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)**ID** 4507747**Author(s)** Kiefer, Fabrice N.; Munk, Veronica C.; Humar, Rok; Dieterle, Thomas; Landmann, Lukas; Battegay, Edouard J.**Author(s) at UniBasel** [Dieterle, Thomas](#) ;**Year** 2004**Title** A versatile in vitro assay for investigating angiogenesis of the heart**Journal** Experimental cell research**Volume** 300**Number** 2**Pages / Article-Number** 272-282**Mesh terms** Animals; Biological Assay; Coronary Vessels, drug effects, physiology; Growth Substances, pharmacology; Heart, drug effects, physiology; Hypoxia, metabolism; Mice; Myocardium, cytology, metabolism; Neovascularization, Physiologic, drug effects, physiology; Rats; Time Factors

Neovascularization in the heart is usually investigated with models of angiogenesis in vivo. Here we present a simple model that allows investigating heart angiogenesis in mice and rats in vitro. Small pieces of left ventricular myocardium were cultured in three-dimensional fibrin gels for 10 days. A single mouse heart allowed assessing 24 conditions, each tested in octuplicates. Rat recombinant VEGF164, human recombinant bFGF, and human recombinant PDGF-BB were used under normoxia (21% O₂) and hypoxia (3% O₂), and outgrowth of endothelial sprouts from heart pieces was quantified. In 4-week-old OF1 mice, endothelial sprouts formed spontaneously. In contrast, in 12-week-old adult mice, virtually no sprouts formed under normoxia. Under hypoxia, sprout formation increased substantially. Different growth factors induced formation of distinct patterns of sprouts and unorganized single cells. Sprouts were composed of endothelial cells with smooth muscle cells or pericytes interacting with them, as assessed by immunohistochemistry. Taken together, our model is suited for investigation of angiogenesis of the heart in vitro. It may allow performing extensive series of experiments in vitro including rapid screening of pharmacological compounds and assessment of mechanisms of heart angiogenesis in transgenic animals in an easy straightforward manner.

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