Pharmacologically active microcarriers for endothelial progenitor cell support and survival

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Résumé en anglais	The regenerative potential of endothelial progenitor cell (EPC)-based therapies is limited due to poor cell viability and minimal retention following application. Neovascularization can be improved by means of scaffolds supporting EPCs. The aim of the present study was to investigate whether human early EPCs (eEPCs) could be efficiently cultured on pharmacologically active microcarriers (PAMs), made with poly(d,l-lactic-coglycolic acid) and coated with adhesion/extracellular matrix molecules. They may serve as a support for stem cells and may be used as cell carriers providing a controlled delivery of active protein such as the angiogenic factor, vascular endothelial growth factor-A (VEGF-A). eEPC adhesion to fibronectin-coated PAMs (FN-PAMs) was assessed by means of microscopic evaluation and by means of Alamar blue assay. Phospho ERK(1/2) and PARP-1 expression was measured by means of Western blot to assess the survival effects of FN-PAMs releasing VEGF-A (FN-VEGF-PAMs). The Alamar blue assay or a modified Boyden chamber assay was employed to assess proliferative or migratory capacity, respectively. Our data indicate that eEPCs were able to adhere to empty FN-PAMs within a few hours. FN-VEGF-PAMs increased the ability of eEPCs to adhere to them and strongly supported endothelial-like phenotype and cell survival. Moreover, the release of VEGF-A by FN-PAMs stimulated in vitro HUVEC migration and proliferation. These data strongly support the use of PAMs for supporting eEPC growth and survival and for stimulating resident mature human endothelial cells.
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