A simple quantitative method for evaluation of angiogenesis activity

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摘要

Abstract

Angiogenesis plays a major role in many physiological and pathological processes. Pathological development of diseased conditions like growth and metastasis of solid tumors and psoriasis is associated with angiogenesis. Assays developed, thus far, for evaluation of angiogenesis activity are qualitative or semiquantitative. In vivo angiogenesis assays are more physiologically relevant than in vitro models and, however, time-consuming, labor-intensive, and expensive. The ex vivo rat aorta tube formation model has been demonstrated to correlate well to the physiological conditions. The present study established a reproducible and quantitative assay for evaluating angiogenesis with rat aorta ring cultures. Rat thoracic aortas were harvested, cross-sectioned into rings of 1-mm thickness using a set of aligned blades, and cultured in a three-dimensional extracellular matrix. Endothelial cells outgrow consistently from the aorta rings cultured in endothelial cell growth medium. Angiogenic activity was quantified by a colorimetric 3-(4,5-dimethylthiazol-2-yl)-5-(3-carboxymethoxyphenyl)-2H-tetrazolium/phenazine methosulfate method. The colorimetric assay was reproducible, and its results were compared in parallel with that of the imaging analysis method. IC(50) values of several known antiangiogenics, SU5416, suramin, paclitaxel, and 2-methoxyestradiol, were determined and were comparable to those obtained using the imaging analysis method. We have established a simple, reproducible, and quantitative assay for evaluation of angiogenesis activity with the cultured rat aorta ring, which can be used to screen for angiogenics and angiostatics.