The Role of Pericytes for Angiogenesis in Skeletal Muscle Tissue

Birgitte Hoier¹, Ylva Hellsten¹
¹Department of Nutrition, Exercise and Sports (NEXS), University of Copenhagen, Copenhagen, Denmark

The aim of the present study was to assess the presence of angiogenic factors in pericytes and to elucidate whether pericytes promote angiogenesis by secreting VEGF and enhancing endothelial cell proliferation. Pericytes, endothelial and skeletal muscle cells were isolated from rat skeletal muscle tissue by use of Dynabeads coupled to specific antibodies and the cells were maintained in culture for experiments. Pericytes were found to contain several angiogenic factors and the expression of Vascular Endothelial Growth Factor (VEGF) and Thrombospondin-1 (TSP-1) was higher (P<0.05) in pericytes conditioned with skeletal muscle media. The muscle conditioned pericytes had a higher (P<0.05) intracellular VEGF concentration and released a 7-fold greater (P<0.001) amount of VEGF to the media than untreated control cells. Media from pericytes pre-conditioned with muscle media induced a greater (P<0.05) proliferation of endothelial cells compared to non-conditioned endothelial cells. In conclusion, we have identified a complex pattern of cellular communication in cultures of pericytes, endothelial and skeletal muscle cells whereby skeletal muscle cells activate pericytes and induce an upregulation of several angiogenic factors and increase the release of VEGF and other proangiogenic compounds that induce proliferation of endothelial cells. The study strongly suggests that pericytes are important in angiogenesis.