

## Stem Cell Biology for Angiogenesis

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The regenerative potential of stem cells has recently been under intense investigation. In vitro, stem and progenitor cells possess the capability of self-renewal and differentiation into organ-specific cell types. In vivo, transplantation of these cells may reconstitute organ systems, as shown in animal models of diseases. In contrast, differentiated cells do not exhibit such characteristics. Human endothelial progenitor cells (EPCs) have been isolated from the peripheral blood of adult individuals, expanded in-vitro and committed into an endothelial lineage in culture. The transplantation of these human EPCs has been shown to facilitate successful salvage of limb vasculature and perfusion in athymic nude mice with severe hindlimb ischemia, while differentiated endothelial cells (human

microvascular endothelial cells) failed to accomplish limb-saving neovascularization .

Future studies will clarify the mechanisms and circumstances that may be responsible for modulating the contribution of vasculogenesis to postnatal neovascularization. Specifically in this regard, it is intriguing to consider the possibility that certain angiogenic growth factors which are acknowledged to promote both angiogenesis and vasculogenesis in the embryo, but have been assumed to promote neovascularization exclusively by angiogenesis in the adult, may in fact promote migration, proliferation, and mobilization of EPCs from BM. The possibility that modulation of vasculogenesis can be used therapeutically to augment as well as inhibit neovascularization deserves further investigation.