

# **Therapeutic stem and progenitor cell transplantation for organ vascularization and regeneration**

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**Emerging evidence suggests that bone marrow–derived endothelial, hematopoietic stem and progenitor cells contribute to tissue vascularization during both embryonic and postnatal physiological processes. Recent preclinical and pioneering clinical studies have shown that introduction of bone marrow–derived endothelial and hematopoietic progenitors can restore tissue vascularization after ischemic events in limbs, retina and myocardium. Corecruitment of angiocompetent hematopoietic cells delivering specific angiogenic factors facilitates incorporation of endothelial progenitor cells (EPCs) into newly sprouting blood vessels. Identification of cellular mediators and tissue-specific chemokines, which facilitate selective recruitment of bone marrow–derived stem and progenitor cells to specific organs, will open up new avenues of research to accelerate organ vascularization and regeneration. In addition, identification of factors that promote differentiation of the progenitor cells will permit functional incorporation into neo-vessels of specific tissues while diminishing potential toxicity to other organs. In this review, we discuss the clinical potential of vascular progenitor and stem cells to restore long-lasting organ vascularization and function.**