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INNOVATIVE STRATEGIES IN STEM CELL BIOLOGY AND REGENERATIVE MEDICINE

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Stem cell transplantation represents a promising new approach in the area of regenerative medicine and tissue engineering to restore damaged tissue and treat a variety of diseases and organ injuries. An appropriate combination of cells and differentiating stimuli (chemical and/or physical) are crucial for success and for these reasons, many types of protocols have been studied. Different types of chemical stimulus can be used for example, bone morphogenetic proteins (BMPs) in the case of osteogenic differentiation, 5-Azacytidine for cardiac differentiation and vascular endothelial growth factor (VEGF) for angiogenic differentiation based on the target tissue needed to induce cell differentiation. Considering biophysical signals as effective tools for this purpose, it has been demonstrated that they can stimulate myogenesis, chondrogenesis and assist osteogenic differentiation "in vitro" and also bone formation "in vivo".