The Use of Stem Cell Technology in Orthopaedics: Research and Clinical Applications

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Aims and Scope:

The study of stem cells is one of the most stimulating areas of current biomedical research. Recent studies in the field of Orthopaedics mainly focuses on the development, growth, function, and health of the musculoskeletal system, the biology of adult stem cells, and the utilization of this knowledge to develop technologies that will regenerate and/or restore function to diseased and damaged musculoskeletal tissues. The aim is to combine both basic and clinical translational research via stem cell biology and therapies.

In this thematic issue contributing authors are proposing to discuss the use of stem cell technology in orthopaedic research and related clinical applications. In brief, Dr. Tuan and his group will review the use of stem cells in “Skeletal Tissue Engineering”. Their focus will be on current technologies and models. This will be followed by two basic research studies by Dr. Tufan’s group. In their first manuscript they will review the use of cell sheet transplantation of cultured mesenchymal stem cells in bone fracture healing. The focus of this review will be the importance of osteogenic induction of these cells in vitro. In their second manuscript they will review an important signaling pathway, i.e., C-Type Natriuretic Peptide Signaling, and its involvement in chondrogenic differentiation of mesenchymal stem cells. They will review this concern as a putative future strategy for the treatment of skeletal dysplasias. The third contributing group by Dr. Nöth will review the strategy of intraarticular injection of mesenchymal stem cells for the treatment of osteoarthritis. Dr. Coleman and Dr. O’Brien will review another aspect of stem cell technology. They will discuss the diabetic stem cell therapy with an interesting strategy of treating both the fracture and the disease. As the fifth group Dr. Leung and his colleagues will review the future strategies for intervertebral disc regeneration with a perspective from stem cell studies. The last two groups will be focusing on the biomaterials and stem cells in orthopaedics. The group by Dr. Petek Korkusuz will review the interactions between the biomaterials and stem cells from the histological biocompatibility point of view. The group by Dr. Feza Korkusuz, on the other hand, will review the studies on mesenchymal stem cells and nano-bioceramics for bone regeneration.

Keywords: Stem Cells, Tissue Engineering, Bone Fracture Healing, Siganling Pathways, Diabetic Stem Cell Therapy, Intervertebral Disc Regeneration, Biomaterials, Scaffolds, Growth Factors.

Schedule:

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