

MODERN CONCEPTS OF BONE TISSUE REGENERATION STIMULATION BY BIOACTIVE SCAFFOLDS

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Current procedures to repair bone defects include the use of auto- and allografts or implants. These approaches face significant limitations due to insufficient supply, potential disease transmission, cost and the inability to integrate with the surrounding host tissue. To overcome these limitations, bone tissue engineering is an excellent alternative for the regeneration of large bone defects caused by trauma or bone pathologies. Bone tissue engineering and the research surrounding stem cells and growth factors has expanded significantly over the last few decades. Herein, the results of studies that substantiate the benefits of using various biologically active factors in the creation of three-dimensional matrices or scaffolds are reviewed. The review provides an overview of recent developments in bone tissue engineering focusing on growth factors, stem cells, angiogenesis and osteogenesis. The examples of different types of scaffolds are given. Studies regarding the application of bioactive composite scaffolds in vivo for repair bone defects are described. The current strategies of cell therapy, gene transfer, and tissue engineering offer the exciting therapeutic opportunities for skeletal repair and bone tissue regeneration.

Keywords: bone, regeneration, scaffold, tissue engineering, growth factors, stem cells