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Peptides for Bone Tissue Engineering

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Abstract

Molecular signals in the form of growth factors are the main modulators of cell behavior. However, the use of growth factors in tissue engineering has several drawbacks, including their costs, difficult production, immunogenicity and short half-life. Furthermore, many of them are pleiotropic and, since a single growth factor can have different active domains, their effect is not always fully controllable. A very interesting alternative that has recently emerged is the use of biomimetic peptides. Sequences derived from the active domains of soluble or extracellular matrix proteins can be used to functionalize the biomaterials used as scaffolds for new tissue growth to either direct the attachment of cells or to be released as soluble ligands. Since these short peptides can be easily designed and cost-effectively synthesized *in vitro*, their use opened up a world of new opportunities to obtain cheaper and more effective implants for regenerative medicine strategies. In this extensive review we will go through many of the most important peptides with potential interest for bone tissue engineering, not limiting to those that only mediate cell adhesion or induce the osteogenic differentiation of progenitor cells, but also focusing on those that direct angiogenesis because of its close relation with bone formation.

Keywords: Biomimetic peptides; Surface functionalization; Delivery; Osteogenesis; Tissue Engineering