

Human dental pulp mesenchymal stem cells: Efficient in bone defects healing

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Dental pulp is a niche housing neural-crest-derived stem cells. Dental Pulp Stem Cells or (DPSCs) are multipotent stem cells that have the potential to differentiate into osteogenic, chondrogenic, myogenic, adipogenic and neurogenic lineage according to their embryonic origin. DPSCs are easily accessible and limited morbidity after collection. Dental pulp-derived mesenchymal stem cells (MSCs) have emerged as a promising tool for use in regenerative medicine. The limitation associated with bone marrow MSCs, such as their difficulty of obtainment, large trauma, high expense, and patients' low-degree reception, has led to investigation on Dental pulp tissue. Meanwhile, research indicates that DPSCs cultivated in vitro have higher clone forming ability than BMMSCs. Therefore, DPSCs are easy to amplify and have good prospects for application in bone tissue engineering. There are various studies where the importance of these cells and their regenerative capacity has been demonstrated. The quality and quantity of regenerated bone formed by DPSCs was demonstrated in in vitro and in vivo experiments. The main aim was a comparative study on the advancements on bone defects therapy by applying DPSCs. The literatures are reviewed in order to compare new findings in the field of dental stem cell research, their potential use in the dental tissue engineering, summarization of clinical applications and a survey on; three-dimensional (3D) scaffolds, osteogenesis-inducing factors, different methods to isolate and culture dental MSC, also evaluate their differentiation potential, best culture condition for enhanced proliferation, their exact identity, DPSC banking, long-term storage and source of dental pulp (tooth type). Our findings demonstrated the strong potential of stem cells bioengineered constructs for correcting bone defects in animal model and is likely a promising approach for the reconstruction of human large skeletal defects in craniofacial surgery. Collectively, the multipotency, high proliferation rates, and accessibility make the dental stem cell an attractive source of mesenchymal stem cells for tissue regeneration. It is concluded that additional studies are needed to fully evaluate the advantages and disadvantages of these candidates.

Biography

Hamed Hemati Chahardeh has completed his M.Sc. Biotechnology from Kakatiya University, India. He founded PooyaGene Biotech co, 2008 in IRAN at the age of 24 years, focusing on molecular diagnostic, stem cell and biopharmaceuticals research and manufacturing. He has established its branch in INDIA. He has achieved several awards such as national young entrepreneurship award. He is already working as CEO of PooyaGene Biotech Co.

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