ABSTRACT PAULA ACEYTUNO POCH.

Regulation of orthodontic tooth movement by stem cells. A SYSTEMATIC REVIEW

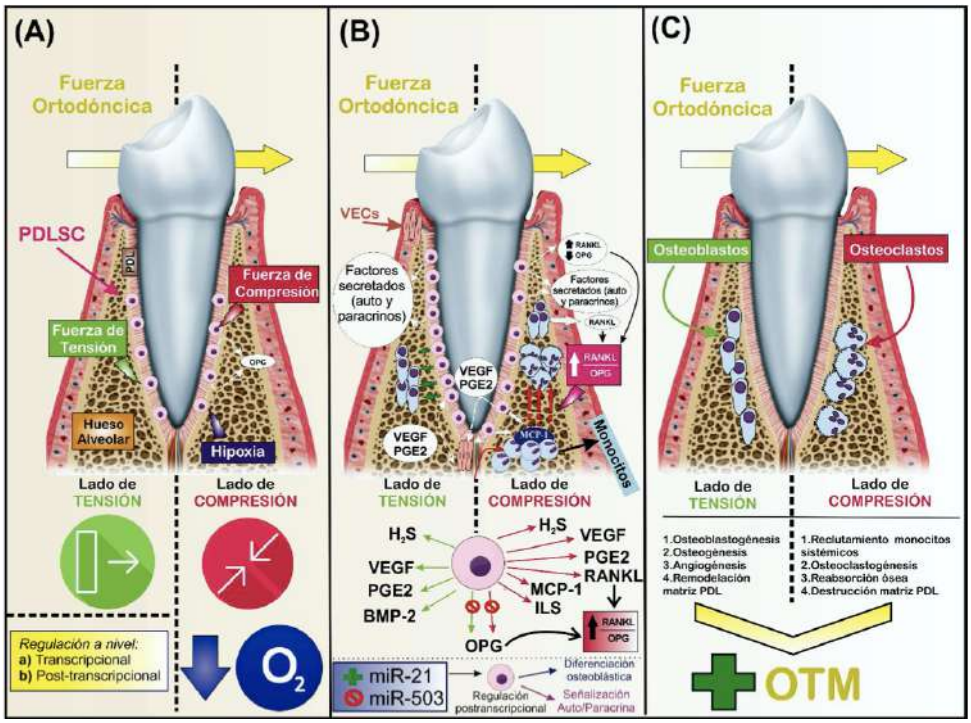
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Abstract (300 word limit)

During orthodontic tooth movement (OTM), the tooth relocates to a new periodontal position formed by alveolar bone and periodontal ligament remodeling. Instrumental to this process and to the maintenance of homeostasis in periodontal tissues are an unique group of multipotent stem cells residing in the periodontal ligament, called periodontal ligament stem cells (PDLSCs). PDLSCs can respond to mechanical (orthodontic force), environmental (hypoxia) and biological (paracrine signals) stimuli present during OTM, and orchestrate it both directly (osteogenic differentiation and osteogenesis, collagen regeneration in the extracellular matrix of the periodontal ligament) and indirectly (paracrine signaling with other cell types to promote angiogenesis, osteoclastogenesis or recruiting of circulating cells to the periodontal ligament). The understanding of the mechanisms through which PDLSCs govern OTM, as well as the stimuli which cause this response and the different signals and messengers involved could give rise to development of future therapies leveraging modulation of endogenous PDLSCs activity to control OTM, adding Orthodontics to the growing number of disciplines which benefit from the application of stem cell therapies, for many the next revolution in Medicine.

Image



Recent Publications (minimum 5)

Trounson A, McDonald C. Stem Cell Therapies in Clinical Trials: Progress and Challenges. Cell Stem Cell. 2018 Mar;17(1):11– 22.

Forostyak O, Dayanithi G, Forostyak S. CNS Regenerative Medicine and Stem Cells. Opera Medica Physiol. 2016;2(1):55–62.

Chen N, Sui BD, Hu CH, Cao J, Zheng CX, Hou R, et al. microRNA-21 Contributes to Orthodontic Tooth Movement. J Dent Res. 2016 Jun;95(12):1425–33.

Liu F, Wen F, He D, Liu D, Yang R, Wang X, et al. Force-Induced H2S by PDLSCs Modifies Osteoclastic Activity during Tooth Movement. J Dent Res. 2017 Feb;96(6):694–702.

Liu Y, Yang R, Liu X, Zhou Y, Qu C, Kikuiri T, et al. Hydrogen Sulfide Maintains Mesenchymal Stem Cell Function and Bone Homeostasis via Regulation of Ca(2+) Channel Sulfhydration. Cell Stem Cell. 2014 Jul;15(1):66–78.