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Jaimini Patel, Ranya El Sayad, Mohammed E. Elsalanty, and
Christopher Cutler

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Role of Dendritic Cells in Post-Extraction Alveolar Bone Healing

Presenter(s): Jaimini Patel

Author(s): Jaimini Patel¹, Ranya El Sayad², Mohammed E. Elsalanty², and Christopher Cutler²

Faculty Sponsor(s): Christopher Cutler, DDS, PhD; Jennifer Bradford, PhD¹; Christopher Terry, PhD¹; and Jennifer Gerber, PhD³

Affiliation(s): ¹College of Science and Mathematics, ²Department of Periodontics (Augusta Univ.), ³College of Osteopathic Medicine of the Pacific (Western Univ. of Health Sciences)

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ABSTRACT

Dendritic cells (DC), the main antigen presenting cells in the body, are an essential link between innate and adaptive immunity. DC inflict an immune response against foreign antigens while maintaining tolerance to commensals by recognizing distinct surface markers. DC is an important osteo-immune player with its role in inflammation-induced bone loss through activation of RANKL-producing T cells. DCs in inflammatory synovial and periodontal tissues interact with activated T cells to form aggregates called lymphoid foci. A direct role has also been involved through the potential ability of some DC subsets to transdifferentiate into osteoclasts. Although the role of DC in inflammation-induced bone loss is well recognized, their role in alveolar bone healing and repair remains to be elucidated. Our study proposes that ablation of DCs in the oral microenvironment perpetrates a negative effect on alveolar bone healing following a maxillary molar extraction in mice due to disruption of osteo-immune homeostasis. Our hypothesis was tested using a classical dendritic cell ablation mouse model *Zbtb46^{tm1} (DTR)Mnz/J* (ZDC-DTR), which are rendered deficient in DCs after diphtheria toxin injection. Histological analysis of photomicrographs of bone sections at the extraction sites showed a significant increase in osteocyte death in the DC-deficient animals compared to wild type animals which had normal DC number and activity. Further, the animals deficient in DCs showed less bone regeneration in the extraction socket compared with WT animals. Our results shed light on the important role of DCs in post-extraction homeostasis of alveolar bone healing, allowing for a better understanding of the complex biological process of bone healing.

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Correspondence: Jaimini Patel, Augusta University, 1120 15th St. Augusta, GA 30912, jpatel7@augusta.edu