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Regenerative properties of the humerus bone in the absence of Stat3

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Abstract

The Interleukin-6/STAT3 (IL-6/STAT3) signaling pathway is essential for proper immune response to invading pathogens and viral infections. This signaling pathway has also been greatly investigated in cancer. Moreover, STAT3 has high implications as a therapeutic target for rheumatoid and osteo-arthritis. Recent literature has found that the IL-6/STAT3 signaling pathway plays an imperative role in the development of cartilage and bone. However, the direct role and the downstream effectors of STAT3 signaling have not been clearly delineated. Through skeletal preparations, X-ray micrographs, and histology, our data show that conditional loss of Stat3 in mouse cartilage, via the Col2-Cre driver, is essential for proper growth plate formation in the forelimbs of the skeleton. Furthermore, loss of STAT3 results in spontaneous bone fractures in the humerus. Interestingly, these severe fractures repair in adulthood, indicating an untapped mechanism for regeneration in bone. These studies will elucidate the imperative role the Stat3-mediated pathway plays in modulating regeneration of the humerus during endogenous development and repair.

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