Sensory neurons from dorsal root ganglia regulate bone regeneration

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Video Byte

Keywords: Angiogenesis, Cellular Communication, Innervation, Matrix metalloproteinases, Extracellular Matrix Remodelling, Neurovascular Interplay, Cell Communication and Signaling, endothelial cells, extracellular matrix, vascularization

Posted Date: November 13th, 2020

DOI: <https://doi.org/10.21203/rs.3.rs-107502/v1>

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Abstract

While it might seem that bone must be solid to support our moving bodies, it's actually a dynamic tissue containing not only blood vessels but also nerves suggesting that they may have closely linked functions, particularly during bone formation and regeneration. A recent study evaluated the role of innervation on blood vessel formation during bone regeneration. Using a microfluidic culture system, researchers examined two types of cells from rats – sensory neurons, which convey neurological signals and endothelial cells, which are responsible for blood vessel generation and repair. They found that two neuropeptides – CGRP and SP – were secreted by sensory neurons when cultured with endothelial cells which drove an increase in markers of blood vessel formation in endothelial cells. The levels of tissue remodeling proteins called matrix metalloproteinases were also increased in endothelial cells. Although further studies using three-dimensional models are needed, these results suggest that sensory neurons can direct tissue remodeling during bone regeneration. Targeting this pathway may help to develop biomaterials to improve bone regeneration following trauma, genetic diseases, or cancer.