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# COMPARISON OF INNERVATION IN WHITE ADIPOSE TISSUE AND BONE MARROW ADIPOSE TISSUE

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Peripheral adipose tissue not only acts as an insulating layer to reduce heat loss, but can also act as a site of energy storage, cytokine release, and, in some cases, thermogenesis. Of the different types of adipose tissues, the role and the regulatory mechanisms of white and brown adipocytes have been extensively explored. However, the role and regulatory mechanisms of bone marrow adipose tissue (BMAT) are still not fully understood. Energy release by white adipose tissues and thermogenesis by brown adipose tissues are largely controlled by the central and peripheral nervous systems. We hypothesize that BMAT within the skeleton is also innervated by the peripheral nervous system, similar to WAT and BAT. To test this hypothesis, we developed immunostains specific for peptidergic sensory neurons that express calcitonin gene related peptide (CGRP) and sympathetic efferent neurons that express tyrosine hydroxylase (TH). After comparing innervation levels of stained WAT and tail vertebrae (BMAT) from 13-week-old C3H/HeJ male mice, we observed an association of tyrosine-hydroxylase (TH) positive axons with a subset of bone marrow adipose tissue adipocytes. However, the overall appearance and density of neurons was substantially reduced in BMAT relative to WAT. Sensory innervation was also observed in both WAT and BMAT along the regions of tyrosine-hydroxylase positive axons. Overall, the data suggests that BMAT is innervated by the sympathetic and sensory nervous systems, but the pattern is distinct from that of WAT. In the future, we will define the specific pathways underlying regulation of marrow adipose tissues and their role in maintenance of skeletal and metabolic homeostasis.