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Bone Marrow Adiposity- Special Edition

We are pleased to introduce a special edition of *Bone* that is focused on Bone Marrow Adiposity. The past decade has been marked by tremendous progress in our understanding of the bone marrow adipocyte origin and biology, and its importance in the bone marrow niche. The number of publications directly related to bone marrow adiposity has increased at a logarithmic rate, as has the investment from NIH and industry. Despite the plethora of papers, and the relative ease in extrapolating a deleterious role for a fat cell adjacent to a bone cell, it is not that simple, even though many papers report that low bone mass in mice, rats and humans is associated with greater bone marrow adiposity. Indeed, a direct cause and effect has never been established between fat and bone in the marrow. Rather there are a number of circumstances where marrow adiposity is dissociated from bone mass but related to changes in bone turnover and whole body metabolism that may be either positive or negative. Moreover, an important role of marrow adipocytes in supporting hematopoietic niche is emphasized by their role in development of multiple myeloma. Hence, one of three areas covered in this special edition relate to the role of the marrow adipocyte in bone remodeling and bone pathologies. There is no question that more innovative functional studies are still needed but in this edition of the Journal, six original manuscripts shed new light on these aspects.

The second area of intense investigation is the origin and phenotype of the marrow adipocyte. It is likely that the bone marrow fat cell differs from other adipocytes because of its site of origin. Certainly there is some suggestion that these cells express unique markers of the osteoblast lineage despite their morphologic appearance. Importantly, it is still unclear whether despite having lipid droplets a significant proportion of marrow adipocytes is more skeletal than adipogenic in phenotype. Hence, their responsiveness to adrenergic signaling is different than extramedular adipocytes. The aspects of marrow adipocytes origin, identification of specific markers, their transcriptional regulation, and responsiveness to environmental cues are discussed in four papers from leading experts in the field.

Finally, the imaging field has grown dramatically in the last half decade as the challenge of identifying the marrow adipocyte has come to the forefront. From our old but gold standard histological assessments, we have moved to *in vivo* MRI and nano CT imaging as well as three dimensional cultures for *in vitro* studies of marrow fat and bone cells. The art and science of imaging marrow adipose tissue is covered in three outstanding manuscripts within this special edition.

Overall, we are thrilled to present these original contributions in a special edition of Bone. It is our hope that this will prompt even more investigations into the origin and function of the marrow adipocyte.

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