

TIMOTHY A. JOHNSON MEDICAL SCHOLAR LECTURE SERIES

Presented by the Fralin Biomedical Research Institute at VTC and the Virginia Tech Carilion School of Medicine



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In Person Lecture: Bone and Blood Interactions in the Bone Marrow Microenvironment

Osteoblasts and their progenitors play an important role in the support of hematopoiesis within the bone marrow microenvironment. From mesenchymal stem cells to fully mature osteoblasts, cells at each stage of differentiation play unique roles in supporting hematopoietic development. Dr. Wu and her lab have reported that, in mice, parathyroid hormone receptor (PTH1R) signaling in osteoprogenitors is required for normal B cell precursor differentiation, and for trafficking of maturing B cells out of the bone marrow. The lab has also found that numbers of maturing myeloid, T cell, and erythroid populations were increased in the bone marrow of mice lacking PTH1R in osteoprogenitors (PTH1R-OsxKO mice). This increase in maturing hematopoietic populations was not associated with an increase in progenitor numbers or proliferation. The spleens of PTH1R-OsxKO mice were small with decreased numbers of all hematopoietic populations, suggesting that trafficking of mature hematopoietic populations between bone marrow and spleen is impaired in the absence of PTH1R in osteoprogenitors. RNA sequencing of osteoprogenitors and their descendants in bone and bone marrow revealed several candidate niche factors that may play a role in supporting hematopoiesis in the bone marrow microenvironment. Dr. Wu and her team also have demonstrated that PTH can influence the hematopoietic niche in postmenopausal women with osteoporosis. The lessons learned from the hematopoietic niche are applicable to cancer metastases to bone, and the lab has also shown that PTH can decrease breast cancer bone metastases in mice. Therefore PTH1R signaling in the osteoblast lineage plays a critical role in the reciprocal interactions between bone and the bone marrow microenvironment, with relevance to hematopoiesis and cancer.

FRIDAY, FEB. 24, at 1 p.m.

Room M203, 2 Riverside Circle, or watch via Zoom at <https://fralinbiomed.info/MedScholar-Join>.

