Cancer Prevention & Research Institute of Texas

Award ID:
RP130145

Project Title:
Osteoclast Regulation of Bone Metastasis of Cancer

Award Mechanism:
Individual Investigator

Principal Investigator:
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Entity:
The University of Texas Southwestern Medical Center

Lay Summary:

Current cancer research often focuses on characterizing the primary tumors. However, most cancer morbidity and mortality relates to metastasis, a complex process involving not only cancer cells but also their microenvironment in the host tissues such as bone. Bone metastasis is a frequent, debilitating and essentially incurable cancer complication. Yet, its regulation remains poorly understood. It is associated with increased bone degradation. Inhibition of the activity of bone-degrading cells by anti-osteoporosis drugs can reduce bone lesions, tumor burden, bone pain and likely mortality. To this end, we have recently identified the microRNA class of small molecules as novel inhibitors of bone-degrading cell formation. Thus, we hypothesize that these microRNAs may be key suppressors of bone metastasis and effective cancer therapeutic strategies. Furthermore, we boldly envision that microRNAs that can simultaneously inhibit tumor cell growth and bone-degrading cell formation may confer dual cancer-fighting powers at both the primary lesion and the bone metastatic site. In this research proposal, we will perform a series of investigations to test this hypothesis by using integrated approaches and state-of-the-art technologies. These investigations will create a new paradigm in cancer research by shifting the focus to a key cell type in the bone metastatic lesion, and to microRNAs as novel therapeutic targets. Our study will elucidate the fundamental mechanisms underlying the development of bone-degrading cells, provide important insights to bone metastasis prevention and treatment, and identify novel signaling pathways as innovative cancer therapies and drug targets. Hence, this investigation will significantly impact cancer research by opening exciting new paths to the understanding of cancer etiology and the improvement of cancer outcome.