

Abstract

NIH P30 Grant Application

This is a competitive renewal of The University of Alabama at Birmingham Core Center for Basic Skeletal Research (UAB CCBSR), Director: Jay M. McDonald, MD. The UAB CCBSR was founded to stimulate innovative, interdisciplinary approaches to the identification and characterization of the key mechanisms underlying bone loss and regeneration and the systemic and local factors that regulate these processes. The research base brings together 33 investigators with expertise in regulation of bone cell differentiation and function; cell-cell and cell-matrix interactions; and growth factor and hormonal regulation of bone cells and investigators with expertise in osteoporosis, periodontal disease, rheumatoid arthritis, bioengineering, and gene therapy. Progress during the first phase of funding (4 years) has been extraordinary: the funding base has increased to \$12,654,831 in annual direct extramural bone-related funding; the CCBSR has supported over 250 bone-related publications; and a dynamic, collaborative research environment has been established. This progress can be attributed directly to the P30 funding: (1) the two research cores have supported 76 investigators, many having used both Cores, resulting in over 100 publications to date; and (2) the P&F program has supported 5 investigators who have obtained independent funding. This has facilitated recruitment of 7 new investigators in basic bone biology to UAB; a commitment of 43,000 net sq. ft. of new and renovated research space; and a multidisciplinary institutional commitment to hire 16 new bone biologists to UAB in the next four years. The infrastructure and Enrichment Programs of the Administrative Core have proven essential to the stimulation of innovative research targeting complex, multifactorial bone diseases, and have led to the rapid formation of new collaborative efforts as the research unfolds. The research cores, which are essential to the success of this dynamic program, include a: 1) Human Bone Cell Production Core providing human osteoclasts and osteoblasts and key reagents for molecular experimentation; 2) Histomorphometry and Molecular Analyses Core providing state-of-the-art histological, histomorphometric and highly sensitive cellular and tissue molecular probe techniques; and 3) Small Animal Bone Phenotyping Core providing comprehensive bone phenotyping by DEXA and micro CT. Three P&F studies have been competitively selected from 10 submissions: *NFAT negatively regulates osteoblast differentiation and bone formation*, M. Zayzafoon, MD, PhD; *Role of hypoxia in bone formation*, S. Gilbert, MD; and *Mechanisms of oral bacteria-mediated bone resorption via toll-like receptors*, H. Wu, PhD. The CCBSR has the potential to rapidly and significantly impact the prevention and treatment of osteoporosis and related bone diseases, as well as the development of more effective hard tissue implants through the basic and translational research necessary for the development of innovative therapeutic strategies.