

Core D: Small Animal Bone Phenotyping Core

The ability to rapidly screen animals for bone mineral content (BMC) and density (BMD) is of great importance. Recent advances in instrumentation, including dual-energy X-ray absorptiometry (DXA) and micro-computed tomography (μ CT) have made it possible to determine BMC and BMD *in vivo* in small animal models. The proposed Small Animal Bone Phenotyping Core is a unique facility that has been developed by the Director, Dr. Timothy Nagy, to enable single projects to access state-of-the-art imaging techniques for the determination of BMC and BMD. The Core will provide all resources, including instrumentation and personnel, to carry out its mission. A centralized Core is required due to the cost of the instruments and the expertise required in their operations. The Director and personnel of the Core have demonstrated expertise in the effective use of this technology for the measurement of BMC and BMD in small animals, and are at the forefront of method development and validation of methods in this area. The Core will operate according to a formal quality assurance plan. In addition, the Core will provide extensive education in terms of the appropriate approaches, the limitations of the technology, and the interpretation of data. Extensive consultation on experimental design (especially animal housing and diet) also will be provided to ensure the generation of informative data. Two specific aims are proposed for this interdisciplinary Core:

Specific Aim 1: To provide accurate and precise measures of bone mineral content and density in small animal models. This will be accomplished by providing a centralized core facility containing state-of-the-art instrumentation (DXA and μ CT) for *in vivo* and *ex vivo* bone imaging.

Specific Aim 2: Validate new techniques and procedures that will enhance research in bone biology and allow investigators to ask novel questions while at the same time being assured of the resultant data.

The Core has been strategically developed in response to investigator demand and has in the past 4 years supported 20 projects instigated by 13 past or current CCBSR investigators, including four Pilot and Feasibility study investigators. It has already stimulated innovative studies in the areas of basic bone cell biology as well as interdisciplinary studies in the area of the development of gene therapy for bone diseases. It is anticipated that its role in the CCBSR will expand considerably over the next 5 years given the enhanced access provided by the P30 funding mechanism, and the increasing use of small animal models by the CCBSR investigators. The Core complements the efforts of the other two CCBSR research Cores and several investigators use all three Cores in their ongoing studies.