THE UNIVERSITY OF ALABAMA AT BIRMINGHAM

CMBD
CENTER FOR METABOLIC BONE DISEASE

DIRECTOR'S NOTES

The CMBD's competitive renewal application to the University-Wide Interdisciplinary Research Center (UWIRC) was funded for three more years effective October 1, 2008. Funding for the current year is $197,453. The CMBD UWIRC funding began on October 1, 1996. The CMBD has active partnerships with the Schools of Dentistry, Engineering, Health Professions, Medicine, Natural Sciences and Mathematics, Optometry and Public Health. I appreciate the support from the Institution and thank the CMBD faculty for its outstanding contributions to the CMBD.

Below is an overview of the Cell and Molecular Analysis of Biomaterials Core Facility written by its Co-Directors, Susan Bellis, PhD and YuanYuan Ma, MD, Department of Physiology and Biophysics.

Jay M. McDonald, M.D., Director, Center for Metabolic Bone Disease
Email: CMBD@uab.edu; ***Office:*** 205-934-6666; ***Website:*** http://cmbd.path.uab.edu

Cell and Molecular Analysis of Biomaterials Core Facility

The Cell and Molecular Analysis of Biomaterials Core Facility was established to meet the growing need for biological testing of innovative new materials being developed at UAB. The Core is supported by a grant from the University of Alabama Health Services Foundation, as well as funds from the Department of Biomedical Engineering, School of Engineering, School of Dentistry, CMBD, and the BioMatrix Engineering and Regenerative Medicine Center.

Mission. The principal objective of the Core is to assist investigators with *in vitro* cytocompatibility testing of biomaterials designed for biomedical applications, particularly those used for orthopaedic, dental and vascular implants. The Core maintains stocks of multiple cell types and performs assays of cell behaviors known to affect biomaterial performance; for example, adhesion and survival of cells on biomaterial surfaces, cell proliferation, cytotoxicity, and gene expression. One of the challenges presented in characterizing cell/biomaterial interactions is that biomaterials have diverse chemistries, sizes and geometries, and therefore most standard protocols require significant adaptation and optimization. Core personnel have extensive experience in evaluating a broad spectrum of biomaterials with varying dimensions, and thus utilization of the Core can save investigators considerable time and expense. Core personnel are also available for consultation regarding what types of experiments are best-suited for assessing biomaterial cytocompatibility, and for assistance with preparation of grant proposals.

Training Opportunities. In addition to performing *in vitro* studies on a fee-for-service basis, the Core offers multiple training opportunities for investigators and their personnel. Students, postdocs, and other personnel are encouraged to work directly with Drs. Bellis and Ma to learn protocols and use Core equipment and facilities. As well, there is a formal course associated with the Core, "Cell Interactions with Biomaterials", that is co-taught by Drs. Bellis and Ma. This class is a laboratory-based course aimed at teaching material scientists and engineers how to adapt cell biology protocols for use with biomaterials.

Services offered. Multiple protocols related to cytocompatibility testing are described in the following table. Additional assays are offered on an as-needed basis. Pricing is dependent upon the number, size and geometry of samples processed.

PROTOCOLS
Protein adsorption to biomaterials (ELISA, Western Blot)
Cell adhesion to biomaterials (picrogreen, crystal violet, tracker green)
Cell morphology (immunofluorescent microscopy, SEM)
Cell proliferation (MTT)
Signal transduction
Cytotoxicity (live/dead staining, apoptosis assays including caspase activity and annexin/PI staining
Cell differentiation (alkaline phosphatase activity, gene expression as measured by ELISA, Western Blot or qPCR)
Cell motility (Boyden chamber, scratch wound)
Cell-directed matrix mineralization (von Kossa, calcein staining, ELISA)

Susan L. Bellis, PhD, Associate Professor, Department of Physiology and Biophysics
Email: bellis@uab.edu; ***Office:*** 205-934-3441
YuanYuan Ma, MD, Research Associate, Department of Physiology and Biophysics
Email: yuanma@uab.edu; ***Office:*** 205-975-0534