

## Core Facility Resources Boilerplate Text

### ***Cell Analysis***

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**Biodosimetry Diagnostic Core:** Using ultrahigh-performance liquid chromatography-tandem mass spectrometry (UHPLC-MS/MS), this core offers high-throughput analytical services for determining diagnostic amino acids and their precursors or metabolic products. Available biomarkers include citrulline and tetrahydrobiopterin. Determination of other small molecules is possible, but fees will be assessed for the cost of method validation.

**Digital and Electron Microscopy Core:** Operates and maintains computer controlled microscope workstations ranging from light to electron microscopy. The core's faculty and staff provide advice, training and user support for equipment operation and sample preparation. Available equipment includes Zeiss LSM 510 Meta, AzioImager, and Axiovert S100TV microscopes and a FEI Tecnai F20 200keV electron microscope.

**Flow Cytometry Core:** Provides cell sorting as well as biomarker, cell cycle, cell proliferation, membrane potential and other analyses. Available instrumentation includes the FACS Aria with three lasers and detection of up to nine colors at one time and cell sorting of up to four populations at once. The FACSCalibur has four fluorescence detectors plus forward- and side-scatter detectors and is used for a variety of cell analyses. The core also offers protocol development advice and data analysis.

### ***Biomarker Analysis***

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**Proteomics Core:** Provides the service of protein characterization by mass spectrometry. This includes identification of unknown proteins, quantitative comparison of proteins in biological samples, and mapping of post-translational protein modifications. Available instrumentation includes a Thermo Scientific LTQ Orbitrap Velos mass spectrometer with electron transfer dissociation capability (EDT), a Thermo Scientific LTQ XL Linear Ion Trap mass spectrometer with EDT, and a PerkinElmer SCIEX MALDI-prOTOF mass spectrometer capable of accurate mass measurements and sub-femtomole sensitivities.

## ***Genetic Analysis***

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**DNA Sequencing Core:** Makes DNA sequencing available to researchers so that they do not have to invest the funds and training of personnel to do it themselves. Available equipment includes the Operate 3100 Genetic Analyzer and supporting equipment (e.g., centrifuges, thermal cyclers, etc.). The core offers rapid turnaround and help with troubleshooting.

**Genomic Core:** Provides access to state-of-the-art instruments and information-intensive data for DNA, RNA and microarray analysis. The core specializes in pharmacogenomics, the influence of genes on an individual's response to medications. Available equipment includes the Agilent 2100 Bioanalyzer and Illumina iScan, BeadXpress, Cluster Station, and Genome Analyzer IIx systems. The core also uses a Tecan Robot for Illumina protocols and a Corbett Gene Extractor. Additional available equipment includes a SpectraMax Microplate Reader, Laser Capture Microdissection and Applied Biosystems 7900 Real-Time PCR.

## ***Molecular Structure Analysis***

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## ***Tissue Analysis***

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**Digital and Electron Microscopy Core:** Operates and maintains computer controlled microscope workstations ranging from light to electron microscopy. In addition, they provide advice, training and user support for equipment operation and sample preparation. Available equipment includes Zeiss LSM 510 Meta, Axiomager, and Axiovert S100TV microscopes and FEI Tecnai F20 200keV electron microscope.

**DNA Damage and Toxicology Core:** Provides expertise, equipment and facilities to perform DNA damage and toxicology studies related to toxic or hypoxic tissue/cell injury in drug development, diseases or aging. In addition to offering standard cytotoxicity assays including in vivo toxicology testing with approved IACUC protocol, the core can measure oxidative damage and quantify levels of apoptosis and necrosis in cells and tissues by using quantitative cytochemistry, immunocytochemistry techniques, and 3-D imaging.

**Experimental Pathology Core:** Offers centralized, comprehensive histological services. The laboratory director, consultants and technicians have extensive experience in routine histology and immunohistochemistry involving both human and animal tissues. The core offers veterinary pathology and a wide range of tissue analyses including Aperio digital slide scanning and image analysis.

**Skeletal Phenotyping Core:** Performs high-resolution skeletal imaging and analysis utilizing bone densitometry (DXA), peripheral quantitated computed tomography (pQCT) or microCT, and detailed histological analysis. Skeletons can be analyzed in vivo or ex vivo. When combined with histological evaluation, detailed insight into skeletal phenotype is obtained.

**Tissue Procurement Facility:** Offers a diverse, high-quality human biospecimen repository with appropriate patient protections, best practice collection methodologies, clinical data capture mechanisms and integrated information technology. The facility is designed to enhance diagnostic, preventive and therapeutic research efforts.

## ***Animal Research***

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**Bioluminescent & Fluorescent Imaging Core:** Offers in vitro and in vivo biophotonic imaging services using bioluminescence and/or fluorescent molecules as reporters of gene or protein expression. The core maintains a Caliper Life Sciences IVIS 200 Imaging System, a highly sensitive CCD camera optimized for biophotonic imaging. The technology has applications in multiple research areas, including osteomyelitis, oncology, inflammation and metabolism. The core also offers protocol development and data analysis.

**Biotelemetry & Ultrasound Imaging Core:** Offers invasive and noninvasive monitoring of cardiovascular function and tumor research using small animal models. The core maintains environmentally controlled, individual rodent housing and 37 transmitters and 16 receiver stations for biotelemetry. The VisualSonic Vevo 2100 System is used for high-frequency, high-resolution digital imaging with linear array technology and color Doppler. This instrument provides frame rates in 2D up to 740 fps and superior resolution (30 micron) and image uniformity through the entire field of view. The core also offers assistance in experimental design, data interpretation and development of animal models.

**DNA Damage and Toxicology Core:** Provides expertise, equipment and facilities to perform DNA damage and toxicology studies related to toxic or hypoxic tissue/cell injury in drug development, diseases or aging. In addition to offering standard cytotoxicity assays including in vivo toxicology testing with approved IACUC protocol, the core can measure oxidative damage and quantify levels of apoptosis and necrosis in cells and tissues by using quantitative cytochemistry, immunocytochemistry techniques, and 3-D imaging.

**Molecular Imaging Core:** Provides comprehensive services for noninvasive imaging with a 7 Tm Magnetic Resonance Imager (MRI) and a MicroPET (Positron Emission Tomography). These instruments can be used to image small animals, biological tissues, phantoms, appendages of human subjects, and many other samples. An on-site cyclotron and a fully staffed radiochemistry laboratory provide a wide range of standard radiolabeled PET imaging probes and can help develop and produce custom probes.

**Skeletal Phenotyping Core:** Performs high-resolution skeletal imaging and analysis utilizing bone densitometry (DXA), peripheral quantitated computed tomography (pQCT) or microCT, and detailed histological analysis. Skeletons can be analyzed in vivo or ex vivo. When combined with histological evaluation, detailed insight into skeletal phenotype is obtained.

**Transgenic Mouse Core:** A state-of-the-art resource offering generation of transgenic mice via pronuclear microinjection of DNA constructs supplied by users. Microinjections are performed in embryos obtained from C57BL/6 or CB6F1 (a cross between BALB/c and C57BL/6) mice. Personnel are also available for consultation regarding DNA construct design and animal husbandry. The core consists of dedicated laboratory space with a microinjection suite, cryopreservation lab, and isolator rack animal wards.

## ***Clinical Research***

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**Brain Imaging Research Core:** This core is a resource to explore the neuroscience of human behavior in healthy and patient populations. Instrumentation includes a Philips Achieva 3T X-series MRI system housed in a custom-designed MRI facility. The short flared-bore magnet offers 50 cm field-of-view (FOV) imaging capability and Quasar dual gradient design with gradient magnitudes up to 80 mT/m and gradient switching speeds (slew rates) up to 200 mT/m/ms. The FreeWave data acquisition system features 32-channel architecture. The scanner room has three custom wave guides, in addition to the primary penetration panel, to permit the MR-shielded and nonferromagnetic application of visual stimulus projection, psychophysiological monitoring, and response acquisition devices. The adjacent control room permits constant visual and auditory contact with subjects in the scanner and contains the imaging control console and two additional computers to manage study stimulus and recording demands. A wide range of MR imaging sequences are available to support T1, T2, T2\*, diffusion tensor imaging, and magnetization transfer imaging.

**Clinical Research Services Core:** Facilitates clinical research by providing infrastructure for clinical investigators conducting human-based research; offering specialized facilities, equipment, personnel and advice. From pilot studies to multi-center trials, the core offers services to investigators who need skilled

nursing support, specimen processing, dietary consultation from a registered dietitian, regulatory assistance, subject recruitment or data management.

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