

**USF HEALTH
COLLEGE OF MEDICINE
CORE FACILITIES**

The following description of USF College of Medicine Core Facilities and instrumentation is provided for use in grant proposal "Description of Resources" forms. More detailed information can be provided upon request. Please direct inquiries to Jo Ann Moore, Research Administrator, jamoore@health.usf.edu or 974-9446.

Mason Laboratory for Small Animal *In Vivo* Imaging – The Small Animal *In Vivo* Imaging Laboratory is located within the vivarium and is equipped with state-of-the-art equipment for high resolution *in vivo* imaging. A VisualSonics Vevo 770 is available in St. Petersburg for real-time noninvasive *in vivo* visualization of live tissue and blood flow from embryonic (E9.5) through to the adult rodent with an image resolution down to 30 microns. The system is equipped with software for 3D visualization and analysis. On the Tampa campus a Xenogen IVIS Spectrum is available for noninvasive whole-animal imaging with a range of bioluminescent and fluorescent reporters across the blue to near infrared wavelength region. It also offers single-view 3D tomography for both fluorescent and bioluminescent reporters that can be analyzed in an anatomical context using the digital mouse atlas. An Olympus IV100 intravital scanning microscope is available with four lasers (488/561/633/748nm), three microprobe objectives (high resolution - NA 0.5, wide-angle, and ultra-high resolution - NA 0.7), and tilting optical axis for minimally invasive deep tissue observation in anesthetized animals. A Moor Instruments LDI2 high resolution laser doppler is available for large area blood flow imaging. The core is available on a fee-for-usage basis to all USF investigators, who are required to undergo training before independently using the equipment.

Murine Neurobehavioral Laboratory – The Murine Neurobehavioral Laboratory (MNL) is equipped with automated, computer-controlled instrumentation for assessment of motor and cognitive behavior as well as drug responses. MNL personnel consult with investigators on experimental design and train core users in animal handling, data acquisition, and statistical analysis. The following equipment is available: Novel Object Recognition, Rota Rod, Open Field, Light/Dark Box, Elevated Plus Maze, Radial Arm Maze, Barnes Maze, Y Maze, T Maze, Zero Maze, Water Maze, Passive Avoidance, Fear Conditioning, Tail Suspension, Tail Flick, Hot/Cold Plate, Pre-Pulse inhibition/acoustic startle. Also available is a DSI implantable telemetry system for monitoring ECG, EEG, EMG, blood pressure, activity, temperature, etc in active animals. The core is available on a fee-for-usage basis to all USF investigators, who are required to undergo training before independently using the equipment.

Fred Wright Jr. Flow Cytometry Laboratory – This facility offers state-of-the-art analytical and sorting flow cytometry in a core location (MDC3111) and at remote locations at IDR319 and at the Byrd Alzheimer Institute. The core has five cytometers: A BD FACSaria IIu sorter capable of 13-color (4 laser) , single-cell, four-way, or bulk sorting; a three laser custom BD LSR II with very broad capabilities for multicolor analysis; and a two laser BD Canto II setup for high-throughput (96- or 384-well automated loaders) 6-color analysis, a BD FACS Canto II with 3 lasers, 8 color capability and an AccuriC6 2 laser 4 color equipment. The FACSaria cytometer is available for biohazardous sorting (max BSL 2) and is housed in a Baker BioProtect III containment hood. Additionally, there is a Miltenyi Biotec AutomacsPro magnetic sorter ideal for bulk separation.

The core is available to all USF investigators on a fee for- service basis. Training in sample preparation, sample and data analysis is available. Investigators can be individually certified to use the FACS Canto II, BD LSR II, AccuriC6 and the magnetic sorter independently. Also available are walkup workstations with a broad array of software platforms (FacsDiva, FloJo, ModFit, Fcap Array, Multibead Analysis Software, Summit).

Bioanalytics Shared Resource – The Bioanalytics Shared Resource houses state-of-the-art instrumentation for imaging and quantification of fluorescent, radioactive, luminescent, and chemiluminescent signals from gels, membranes, slides, or multiple well plates. Gels and membranes stained with visible dyes or ethidium bromide can also be analyzed. Available equipment includes; a three-laser GE Typhoon 9400 imager (red, green and blue excitation wavelengths) with storage phosphor technology and chemiluminescence abilities; and a Bio-Rad Chemidoc XRS gel documentation system. Digitized images can be saved to transportable storage for further analysis in the lab or prints can be made on site. This Resource also has two Bio-Rad real-time quantitative PCR instruments and an MJ Research DNA engine thermal cycler. Also available are a WPI LED-based, dual beam, photometric detection system, a GE Analytical Instruments nitric oxide analyzer and a Kodak M35 film processor.

Lisa Muma Weitz Center for Advanced Microscopy and Cell Imaging – This core facility provides the USF Health community with access to state-of-the-art research microscopy resources. The facility serves as a focal point for biological imaging and a broad range of research applications are supported. Dedicated facility staffs also provide training in instrument use, sample preparation, data analysis, and protocol development as well as expert technical assistance on a fee for service basis.

Electron Microscopy: A JEOL JEM1400 transmission electron microscope with a Gatan Orius widefield CCD camera and a Gatan Ultrascan 2K high-resolution CCD camera is available. This microscope is equipped with a single tilt holder for routine use and stereo imaging. A Gatan single tilt rotating holder, Serial EM, IMOD and Chimera™ are available for tomographic applications. A JEOL JSM6490 scanning electron microscope with an EDAX Genesis energy-dispersive X-ray analysis system is available. In addition to microscopes, the facility has the preparatory equipment necessary for specimen preparation including: a Leica UCT ultramicrotome; Leica Ultracut E ultramicrotome with cryo unit; Edwards vacuum evaporator equipped for rotary shadowing and routine coating; Leica automated sample processor; Balzers carbon and sputter coaters; and a Polaron critical point dryer.

Confocal Microscopy: An Olympus FV1000 MPE multiphoton microscope is available. The system is capable of multicolor fluorescent imaging of living, whole mounted or thickly sliced specimens. This microscope uses IR laser to provides support for applications where phototoxicity/photobleaching are a concern such as time course studies of living cells and tissues. A range of microprobe objectives is also available for minimally invasive in vivo imaging. A Leica TCS SP2 laser scanning confocal microscope (inverted) system supports multicolor fluorescent imaging. It is equipped with 4 lasers and can be used to study any fluorochrome that excites from 405nm to 633 nm.

Both systems provides a variety of imaging applications such as FRET, FRAP, FLIP, 3D image analysis, time lapse imaging, spectral analysis and separation, as well as deconvolution. An incubation chamber for live cell imaging is available.

Light microscopy. A Digital Leica DM4000 upright microscope is equipped with fluorescent filter sets for DAPI, FITC, GFP and Rhodamine/Texas Red, and two CCD cameras. In addition, it has a motorized stage and focus drive for image analysis. It has a Prior motorized stage and focus drives for image analysis interfaced with the Stereologer System supporting computerized quantitative analysis of biological tissues including; cell counts, volume, surface area and length.

Laser Microdissection. An Arcturus XT laser capture/microdissection system allows the isolation of homogeneous populations/regions for analyses of DNA, RNA and protein. This system consists of a motorized Nikon TE 2000U inverted microscope, an infrared laser for laser capture work, and an UV laser for cutting work. The system is equipped for bright field, phase and blue, green and red fluorescence microscopy to allows microdissection of cells from chromogenically or fluorescently stained tissue sections. A second high resolution digital camera is installed for publication quality image capture.

Image Analysis and Processing. A networked computer workstation is available for image processing, archiving and use of instrument –specific software.

Mouse Models Core – The Mouse Models Core facility provides regional scientists with proficient, affordable generation of genetically modified mice. All applications to create a new mouse in which the genome has been altered by the stable introduction of recombinant DNA into the germ-line are made in accordance with the NIH Guidelines for Research Involving Recombinant DNA Molecules (63 CFR 26018) using a “*Non-Exempt Recombinant DNA Registration*” application submitted to the Institutional Biosafety Committee, and an “*Application to Establish/Maintain a Mouse Colony*” submitted to the IACUC. Two doctoral-level senior scientists manage the core. They advise investigators on overall strategy and the design of transgenic and targeting vectors, perform pronuclear DNA microinjection services to generate transgenic founders; culture, transfects, selects, and screens embryonic stem (ES) cells; provide blastocyst microinjection and morula aggregation services to generate germline chimera from gene-targeted ES cells; and advise and assist investigators in the genotypic and phenotypic analysis of mice.

Biostatistics Shared Resource – The Biostatistics Shared Resource staffs two doctoral-level biostatisticians available for consultation on all statistical aspects of research studies including: study design, database design, sample-size estimation, data analysis and interpretation, statistical/software instruction and manuscript writing. Available software tools include: SAS, SPSS, S-Plus, R, and nQuery.

Animals – The USF Division of Comparative Medicine (DCM) serves as the advocate for animals involved in research at the University of South Florida, and provides a fully accredited, centralized service of pathogen-free animal procurement, husbandry, health surveillance, and quality control. DCM is fully accredited by the Association for the Assessment and Accreditation of Laboratory Animal Care, International (AAALAC #000434). Its program and facilities for animal care and use are managed in accordance

with the National Research Council Guide for the Care and Use of Laboratory Animals, the PHS Policy on Humane Care and Use of Laboratory Animals, and the Animal Welfare Regulations 9 CFR A, 1-3. DCM has an assurance of compliance on file with OLAW, NIH (OLAW #A-4100-01), and is a registered research facility with the United States Department of Agriculture (USDA #58-R-0015). Pre-clinical GLP Studies that support permit applications to the Food and Drug Administration are conducted in accordance with Good Laboratory Practice for Non-clinical Laboratory Studies, 21 CFR 58.

DCM animal facilities total 72,140 sq ft within 8 vivariums. Mice housing totals 14,398 sq ft, and non-mice housing totals 8,758 sq ft. Quarantine housing totals 3,966 sq ft.

Procedure suites total 7,580 sq ft, nonrodent mammalian survival surgical space totals 1,824 sq ft and dedicated necropsy suites total 1,181 sq ft.

DCM's veterinarians are state-licensed, members of the American Veterinary Medical Association, and are either specialty board certified by the American College of Laboratory Animal Medicine or the American College of Veterinary Preventive Medicine, and/or hold research doctorates. All members of the program staff are AALAS-certified technicians or technologists.