

## 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, [jamoore@health.usf.edu](mailto:jamoore@health.usf.edu), or 813-974-9446.

**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 for real-time noninvasive *in vivo* visualization of live tissue and blood flow from embryonic (E5.5) through to the adult rodent with an image resolution down to 30 microns. The system is equipped with software for 3D visualization and analysis. 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. The core has three cytometers: A BD FACSaria sorter capable of 13-color, 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. All of the above include use of quantum dot detection. The FACSaria cytometer is available for biohazardous sorting (max BSL 2). Additionally, there is a Miltenyi Biotec magnetic sorter ideal for bulk separation. The core is available to all USF investigators on a fee-for-service basis. Training in sample preparation, and data analysis is available. Investigators can be individually certified to use the FACS Canto II, BD LSR II, and the

magnetic sorter independently. Also available are walkup workstations with a broad array of software platforms.

**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; a two-laser (red- and blue-excitation wavelengths) Storm 860 molecular imager 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 provides users with access to a variety of state-of-the-art research microscopy resources. The technical staff also provides training in routine and advanced digital imaging techniques, assists with protocol development and trouble shooting as well as expert technical assistance on a fee for service basis.

**Electron Microscopy:** A JEOL JEM1400 transmission electron microscope with a Gatan Orius side-mount widefield CCD camera and a Gatan Ultrascan 2K bottommounted 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 low vacuum mode and an EDAX Genesis energy-dispersive xray analysis system is available. In addition to microscopes, the facility has the small equipment items 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 exciting any fluorochrome above 457nm excitation for imaging of living, whole mounted specimen or thickly sliced specimens. A range of microprobe objectives are available for minimally invasive in vivo imaging. A Leica TCS SP2 scanning confocal microscope (inverted) system supports multicolor fluorescent studies. It is equipped with 4 lasers and can be used to study any fluorochrome that excites at or above 405nm. In addition, FRET, FRAP, FLIP, 3D image analysis, time lapse imaging, spectral analysis and separation, as well as deconvolution are supported. An incubation chamber for live cell work is available with advanced notice.

**Light microscopy.** A Digital Leica upright microscope is equipped with fluorescent filter sets for DAPI, FITC, GFP and Rhodamine/Texas Red. In addition, it has a motorized stage and focus drive for image analysis. This Leica microscope is interfaced with stereology software that will allow the user to perform cell counts, derive estimates of cell volume, etc. An Oncor deconvolution microscope system consists of a Nikon

inverted microscope equipped with fluorescent filter sets for 3 color imaging, motorized filter wheels, motorized stage and motorized focus. The Oncor Image software permits digital image capture, optical sectioning and computerized deconvolution of image stacks. The system also supports rendering of image stacks to virtual 3-D images.

**Laser Microdissection.** An Arcturus XT laser capture/microdissection system is available. This system consists of a motorized Nikon TE 2000U inverted microscope, an infrared laser for laser capture work, and an ultraviolet laser for laser cutting work. The microscope is equipped for bright field, phase and blue, green and red fluorescence microscopy. In addition, 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. In addition, an Agfa Duoscan flatbed scanner as well as Fuji Pictography and Codonics photographic quality printers are available.

**Histology.** A full service research histology laboratory is available for histological and cytological preparations, tissue array construction, immunostaining and in situ hybridization. A Dako automated immunostainer, a Chemicon ATA 100 tissue arrayer and 2 cryostats as well as the equipment items necessary for paraffin processing, sectioning and staining are available. The histology staff will also provide training in histological techniques and use of the equipment.

**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 analysis, 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 three 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. Several program staff members are also State of Florida certified veterinary technicians, and/or certified by the Academy for Surgical Research.

Program staff members that coordinate GLP research services are certified by the Society for Quality Assurance and ensure that GLP study conduct is in accordance with 21 CFR 58.