

**BIOMEDICAL RESEARCH SUPPORT FACILITY
CENTER FOR BIOTECHNOLOGY AND BIOENGINEERING**

300 Technology Drive

Pittsburgh, PA 15219

<http://www.pitt.edu/~rsup/mgbresupfac5.html>

The Biomedical Research Support Facility is a group of specialty core facilities developed to enhance the research environment at the University of Pittsburgh and to optimize the productivity and competitiveness of researchers. The cores provide an infrastructure that allows research to remain competitive and take advantage of remarkable shifts in our fundamental understanding and applications of cell and animal model systems. A brief description of the core facilities follows:

BioSensor Facility

412-383-8967

The Biosensor Facility provides real-time biomolecular interaction analysis utilizing a Biacore 3000 system. The Biacore 3000 works on the principle of surface plasmon resonance (SPR), which allows for measurements of changes in refractive index at a surface. Briefly, one interactant (the ligand) is immobilized to the surface of a sensor chip. A solution containing potential binding partner(s) is passed over the immobilized surface, and binding is visualized as a change in refractive index at the surface (response units) over time. SPR allows for immediate visualization of interactions in a label-free manner, lessening the potential impact of labels on the interaction of interest.

DNA Sequencing Core

412-383-9769 (phone)

Performs sequencing reactions on submitted DNA templates and primers, analyzes the products by capillary electrophoresis on automated sequencers, and provides the resultant sequences as an electronic database. In addition, the core personnel consult with investigators in the preparation of DNA for automated sequencing and assist with DNA sequence data analysis.

Mass Spectrometry Core

412-383-9714 (phone)

Operates a VG Quatro II triple quadrupole mass spectrometer that is used for high sensitivity analysis of proteins, peptides, lipids and small molecules by electrospray ionization in either the positive or negative ion mode. This facility seeks to develop techniques to analyze minute quantities of biomolecules via on-line analytical and microcapillary HPLC and nanoelectrospray procedures. Techniques available include molecular mass measurements, assessments of chemical modifications through mass increases, daughter ion scans for peptide sequencing (MS/MS analysis), precursor ion scans, constant mass difference scans, selected ion monitoring, and on-line HPLC. In addition, the mass spectrometry core also houses an Applied Biosystems Voyager-DE STR mass spectrometer. This is a matrix assisted laser desorption ionization (MALDI) time of flight (TOF) mass spectrometer. This instrumentation is equipped with a 337 nm nitrogen laser and a 100 well sample plate. Capabilities of this instrumentation include analysis of masses up to 400 kDa, the ability to measure both positive and negative ions,

the ability to analyze in linear or reflector modes as well as the ability to perform post source decay (PSD) analysis.

Peptide Synthesis Core

412-383-9540 (phone)

Provides comprehensive services for synthesis, purification, and characterization of synthetic peptides that are verified by mass spectrometry. Facility personnel are available for consultation with investigators regarding the design of synthesis peptides, estimates of yield, and considerations of purity requirements. Peptides can be produced at standard scales of ~0.025 mM (10-20mg), 0.1 mM (50-100mg), 0.2 mM (100-200mg), and 0.5 mM (300-500mg), with actual yields dependent on peptide length and content. Peptides may also be prepared with specialized modification, such as acetylation, biotinylation, phosphorylation, cyclization, or fluorescent dyes. The facility has the capacity to produce and vial peptides under Good Laboratory Practice (GLP) conditions for use in human clinical trials with appropriate production documentation for submission to the FDA and other regulatory agencies.

Structural Biology Facility

412-648-9488 (phone)

The Structural Biology Facility houses an Aviv 62A DS Circular Dichroism (CD) Spectrometer and a companion Aviv UV-Vis Spectrophotometer. The instruments have attachments to provide temperature control, total fluorescence, and automated titration. CD spectroscopy measures the difference between the absorption of the left- and right-circularly polarized light. The secondary structural elements of a protein each contribute uniquely to its CD spectrum that can then be deconvolved to provide net structural information. Given its sensitivity to protein conformation, CD spectroscopy may also be used to monitor protein unfolding and protein-ligand interactions. It is a non-destructive technique, so sample may be recovered after examination.

CENTER FOR BIOLOGIC IMAGING

S233 Biomedical Science Towers

3500 Terrace Street

Pittsburgh, PA 15261

412-648-9796 (phone)

412-648-8330 (fax)

<http://www.cbi.pitt.edu>

The Center for Biologic Imaging provides centralized imaging services including light fluorescent microscopy, confocal laser scanning, electron microscopy, advanced computer aided morphometry, and image analysis.

DIVISION OF LABORATORY ANIMAL RESOURCES

412-648-8950 (phone)

412-648-8449 (fax)

<http://www.oorhs.pitt.edu/research/dlar.html>

The Division of Laboratory Animal Resources (DLAR) facilitates research using animals through quality services and support. The division educates, trains, and informs the

University biomedical community, as well as the public, regarding laboratory animal science. DLAR coordinates efforts to provide a humane, quality animal care program in compliance with legal and regulatory requirements. The programs and facilities are USDA registered and covered under an Assurance with the Office of Lab Animal Welfare (OLAW) of the PHS and accredited by the American Association for the Assessment and Accreditation of Lab Animal Care (AAALAC), within the Division. Husbandry, veterinary, and administrative services are available to assist with meeting the institutions research and teaching needs.

FUNCTIONAL IMAGING RESEARCH PROGRAM:

MR Research Center and PET Facility

The Functional Imaging Research Program (FIRP), a joint facility of the University of Pittsburgh and UPMC, allows researchers to make full use of two powerful imaging modalities, positron emission tomography (PET) and magnetic resonance (MR) imaging. The physical proximity of these facilities encourages collaboration by bringing investigators and imaging specialists together in an atmosphere of open communication. One of the program's main goals is to facilitate combined modality imaging, in which complementary information from PET and MR images is combined in a single functional image. This program is directed by faculty members from the School of Medicine.

Magnetic Resonance Research Center (MRRC)

Room B804

UPMC Presbyterian

200 Lothrop Street

Pittsburgh, PA 15213

412-647-9700 (phone)

412-647-9800 (fax)

<http://www.mrctr.upmc.edu/>

The MRRC is dedicated to the development and application of magnetic resonance imaging (MRI) and magnetic resonance spectroscopy (MRS) for medical and biological research and is forging new paths in the use of functional MRI to study cognitive, sensory, and motor function in the brain. The MRRC currently operates state-of-the-art 1.5T and 3.0T MRI scanners. The MRRC is also scheduled to begin operation of a powerful 7.0T whole-body MRI scanner in the spring of 2005. This scanner will be the most powerful whole-body scanner in the state of Pennsylvania and one of a small group of such instruments that are currently being installed at leading research institutions throughout the US, Japan and Europe.

The Positron Emission Tomography (PET) Facility

PUH B-938

200 Lothrop Street

Pittsburgh, PA 15213

412-647-0736 (phone)

412-647-0700 (fax)

<http://www.pet.upmc.edu>

The PET Facility supports a variety of research efforts in collaboration with faculty in the Departments of Psychiatry, Neurology, Radiology, Medicine, and Anesthesiology and the University of Pittsburgh Cancer Institute. It is noteworthy that researchers at this facility developed a prototype combined PET/CT scanner, and demonstrated this technology as the most powerful imaging tool available for localizing, evaluating and therapeutically monitoring head and neck cancer. The combined PET/CT scanner, known commercially as the Biograph, was FDA approved in 2001 as a diagnostic and therapeutic tool for cancer treatment.

**GENERAL CLINICAL RESEARCH CENTER (GCRC) – University of Pittsburgh
UPMC Montefiore, 8 North**

200 Lothrop Street

Pittsburgh, PA 15213

412-648-6691 (phone)

412-648-6697 (fax)

<http://www.gcrc.pitt.edu>

The General Clinical Research Center (GCRC) on the 8th floor of Montefiore Hospital has been active at the University of Pittsburgh since the early 1960's, the time that marked the inception of the national NIH GCRC program. GCRC research encompasses the University's six Schools of the Health Sciences, affiliated hospitals, specialized programs and clinical facilities. Diverse resources applicable to research on the pathogenesis, diagnosis, treatment and prevention of a broad spectrum of diseases and health problems are available through the GCRC.

Infrastructure support to investigators includes facilities, equipment and personnel for conducting clinical research. The GCRC facilities include inpatient beds, an outpatient suite, a metabolic kitchen, a DEXA scanner, and a sample processing laboratory. Personnel include specialized research nurses, a bionutritionist, a research subject advocate, biostatisticians, information technologists and support staff, all of whom have completed the University's on-line training required of individuals engaging in human subject research.

The GCRC is available 24 hours a day, 7 days a week. Protocol review and approval from the GCRC Advisory Committee is required prior to study initiation.

Satellite locations include Magee-Womens Hospital Clinical Research Center, Western Psychiatric Institute and Clinic Clinical Neuroscience Research Center and the Hillman Cancer Center. Laboratories supported by the GCRC include the Pharmacogenetics Core Laboratory, the PET Radiochemistry Laboratory, the Sleep and Circadian Rhythms Laboratory, and the Information Technology and Biostatistics Center.

GENOMICS AND PROTEOMICS CORE LABORATORIES

W940 Biomedical Science Tower

Pittsburgh, PA 15213

412-648-9440 (phone)

412-648-1891 (fax)

<http://www.genetics.pitt.edu/>

The University of Pittsburgh Genomics and Proteomics Core Laboratories (GPCL) were created in 1999 by Dr. Arthur S. Levine, Senior Vice Chancellor for the Health Sciences. The GPCL is committed to fostering the implementation of modern genomics and proteomics in research, education, and clinical care encompassing the University of Pittsburgh Schools of the Basic and Health Sciences. The GPCL is equipped with state-of-the-art instrumentation and provides a variety of standard as well as customized Genomic and Proteomic analyses to university researchers and their collaborators. Genomics services within the following categories are offered: DNA sequencing, STRP and SNP genotyping, RNA/DNA specimen processing, clone services, custom DNA microarray, Affymetrix GeneChip, TaqMan real-time PCR and SAGE.

The Proteomics services offered include the following: Protein Identification by Peptide Mass Fingerprinting, de novo sequencing, PTM analysis, DiGE and standard 2D PAGE and LC MALDI. The Proteomic platforms available include a high performance MALDI TOF-TOF MS/MS, MDLC MSⁿ ion trap and a basic MALDI MS.

For a complete description of services and pricing, please visit <http://www.genetics.pitt.edu/>. The laboratories offer expert knowledge and support with experimental design, protocol development, technical support, data analysis, and interpretation. Affiliated services include cytogenetic analyses and transgenic/knockout mouse production.

JOHN A. SWANSON MICRO AND NANOTECHNOLOGY (JASMN) LAB

Swanson Center for Micro and Nano Systems

B63C Benedum Hall

3700 O'Hara Street

Pittsburgh, PA 15261

412-624-4709 (phone)

http://www.engr.pitt.edu/site/scmns/home/connect/labs_swanson_mems.html

The School of Engineering in the University of Pittsburgh has recently established the John A. Swanson Micro and Nanotechnology (JASMN) Laboratory located in the 6th floor of the Benedum Engineering Hall. A strong research team is on board with expertise in the areas of microfabrication, smart materials (piezoelectric and electrostrictive materials, magnetostrictive materials and shape memory alloys), functional polymers and devices, micro power generation systems, and MEMS device design and applications.

The facilities of the JASMN Lab are open for the University-wide Microelectromechanical Systems (MEMS) and Nanotechnology research and education activities. The current facilities can be utilized for the fabrication, packaging, and testing of various thin and thick film materials, microsensors and microactuators, and various functional materials based micro- and nano-scale devices and structures. Due to stringent processing requirements, the lab is designed to meet class 1000/10,000 clean room specifications throughout with certain areas and rooms in the lab satisfying class 1000 specifications. Activities that can be performed in the JASMN Laboratory will include: DC and RF magnetron sputtering, photolithography, chemical vapor deposition (CVD),

anisotropic and isotropic etching, reactive ion etching (RIE), bulk and surface micromachining, silicon-silicon bonding, electrostatic bonding, wire bonding, dicing, probe inspection, measurement and testing, etc.

MACHINE SHOP

A115 Scaife Hall

412-648-9332

[<http://www.cbp.pitt.edu/shops/machine.html>](http://www.cbp.pitt.edu/shops/machine.html)

The Cell Biology and Physiology / Pharmacology Machine Shop provides consultation, design and fabrication services to School of Medicine investigators who need specialized devices for experimental use. These services are also available to UPMC faculty physicians who need specialized clinical devices. The Shop personnel can also diagnose and repair mechanical scientific machinery and equipment, and working in conjunction with the CBP/Pharmacology Electronics Shop, can also address the repair of electronically controlled scientific machinery and equipment. Services are fee based and accounts are required at the time of request of service.

PITTSBURGH NMR CENTER FOR BIOMEDICAL RESEARCH

Carnegie Mellon University

4400 Fifth Avenue

Pittsburgh, PA 15213

412-268-6336 (phone)

412-268-7083 (fax)

<http://www.cmu.edu/nmr-center/>

The Pittsburgh Nuclear Magnetic Resonance (NMR) Center for Biomedical Research is supported as a Biomedical Research Technology Facility by the National Institute of Biomedical Imaging and Bioengineering, National Institutes of Health. Established in 1986 by Carnegie Mellon University and the University of Pittsburgh, the Center brings together scientists and clinical investigators in a concerted research program focusing on the application of magnetic resonance imaging (MRI) and magnetic resonance spectroscopy (MRS) to the biomedical sciences. Center investigators from Carnegie Mellon University, the University of Pittsburgh and local hospitals use animal and cellular models in their studies and have expertise in such diverse fields as biology, physics, computer science, neuroscience, medicine, and surgery. Other academic, medical, and industrial researchers are welcome to use the Center's facilities.

PITTSBURGH SUPERCOMPUTING CENTER

4400 Fifth Avenue

Pittsburgh, PA 15213

412-268-4960 (phone)

412-268-5832 (fax)

<http://www.psc.edu/>

The Pittsburgh Supercomputing Center (PSC) provides university, government, and industrial researchers with access to several of the most powerful systems for high-performance computing, communications and data-handling available to scientists and engineers nationwide for unclassified research. PSC advances the state-of-the-art in

high-performance computing, communications and informatics and offers a flexible environment for solving the largest and most challenging problems in computational science.

Transgenic and Chimeric Mouse Facility

(412) 383-7986 (phone)

<http://www.genetics.pitt.edu>

The Transgenic and Chimeric Mouse Facility is located in the Biomedical Science Tower at the University of Pittsburgh. The purpose of the Facility is to provide a centralized service to produce transgenic and chimeric mice for investigators throughout the University of Pittsburgh and its affiliated institutions and hospitals. The facility contains injection and tissue culture rooms, and animal rooms for housing and breeding mice involved in the procedures for generating transgenic and chimeric mice. The animal facility is a barrier facility, in which mice are free of specific pathogens known to adversely affect their health and fecundity. This arrangement ensures that pseudopregnant female mice, transgenic mice and knockout mice delivered to the investigator will be healthy and meet the health requirements of their own animal facility. Services include DNA Microinjection, Mouse ES Cell Electroporation, Mouse ES Cell Microinjection, Embryo Derivation, and Cryopreservation.
