Medical College of Wisconsin Research Cores

A - Z Directory

MEDICAL COLLEGE OF WISCONSIN

knowledge changing life

The Medical College of Wisconsin Research Cores and Shared Resources provide research services using advanced instruments and technologies that would otherwise be inaccessible to our faculty. Expert leaders and staff offer laboratory and data analysis services and training for faculty, staff and trainees in support of investigator initiated studies. Professional services include experimental consultation, execution and documentation to assist with scientific projects from concept to publication. Core technologies cover disciplines in support of basic, translational and clinical science.

The mission of the MCW Core Facilities is to support all MCW and MCW-affiliated investigators and physician scientists. They approach each study with curiosity, integrity, innovation and mutual respect to improve research quality and reproducibility that benefits the entire biomedical research endeavor.

In this brochure, you will find an overview of our current research cores. To inquire about services available, contact research@mcw.edu.

The images found throughout the brochure have been provided by various MCW Cores. Many thanks to the following investigators for the use of their fascinating images.

Page 3 *Schistosoma mansoni, innervation of the ventral sucker.* Innervation of the ventral sucker of a juvenile parasitic flatworm (Schistosoma mansoni, male). Stains are: Synapsin (green, 1:75), TRPM (red, 1:100). **Claudia Rohr** (PhD student) and **Jonathan Marchant, PhD**.

Page 5 *Mouse Cerebellum,* Sagittal cryosection from mouse cerebellum labeled with immunohistochemistry. Calbindin-positive Purkinje neuron cells are shown (red) with VGLUT2-positive glutamatergic synaptic inputs (green) and DAPI-positive (blue) granule cell layer. **Cesar Martinez** (MD/PhD student) and **Cecilia Hillard, PhD**.

Page 6 *Smooth muscle cell, isolated from a murine aorta.* IF-staining showing smooth muscle actin (green), a specific marker of a smooth muscle cell, cullin-3 (red), and DAPI (blue) using Nikon A1R Microscope. **Daria Golosova** (Sigmund Lab) and **Patricia Muskus** (Nakagawa Lab).

Page 7 *Mouse Pancreas Tissue.* Mouse pancreatic islet taken from a frozen section, shown here is DAPI (blue), Insulin (Green), Tomato (a genetically encoded fluorescent reporter; magenta), and glucagon (Red) on the 638 channel. **John Corbett, PhD** and **Jennifer Stancill, PhD**.

Adult Translational Research Unit (ATRU)

The Adult Translational Research Unit (ATRU) is designed to provide an optimal clinical research environment for both research participants and translational investigators. The ATRU fosters infrastructure for the conduct of clinical and translational research projects by providing the expertise of support personnel.

Learn more about ATRU.

ATRU Bionutrition and Body Composition

The ATRU BION Core offers dietary assessments for cohort interventions and population studies of all ages for a variety of nutrients, including NDSR variables. Body composition equipment for total and regional lean and adipose measures are available, bioelectrical impedance analysis, dual x-ray absorptiometry, and basic anthropometric equipment. Energy expenditure measures and protocols are available as well as metabolic kitchen services for controlled feeding studies.

Learn more about ATRU BION Core.

BiaCore

The Biacore S200 SPR instrument can measure interactions of various sample types, from low molecular weight drug candidates to high molecular weight proteins (also DNA, RNA, polysaccharides, lipids, cells, and viruses) in various sample environments (e.g., DMSO-containing buffers, plasma, and serum).

Learn more about BiaCore.

Biochemical Assay Core

The Biochemical Assay Core provides a consolidated, highly specialized, well equipped and professionally staffed analytical laboratory capable of performing a wide variety of immunoassays, clinical chemistry and biochemical analyses to meet the analytical needs of members of the Department of Physiology and their collaborators.

Learn more about Biochemical Assay Core.

Biochemistry Mass Spectrometry

The Biochemistry Mass Spectrometry shared equipment houses a Thermo LTQ Mass Spectrometer for walk-up use for peptide and protein analysis. It is available to Department of Biochemistry faculty, students and staff and their collaborators.

Learn more about Biochemistry Mass Spectrometry.

Biochemistry Shared Research Instrumentation

The Biochemistry Department maintains several instruments for isolation and physical characterization of biomolecules and detection of their interactions.

Learn more about Biochemistry Shared Research Instrumentation.

Bioinformatics and Quantitative Child Health (BQCH)

Our mission is to provide scientifically valid, efficient and dependable research support for study design, data management and analysis of laboratory, animal and clinical studies. In partnership with Children's Research Institute, BQCH will help train junior researchers, work with more mature researchers in obtaining and maintaining funding, and develop standardized data management protocols which facilitate the collection of quality data.

Learn more about BQCH.

Biosafety Level 3 Laboratory (ABSL3)

Fully equipped laboratories for biocontainment level 3 preclinical *in vivo* or *in vitro* or human *in vitro* studies.

Learn more about ABSL3.

Biostatistics Consulting Service/Biostatistics Shared Resource (MCW Cancer Center)

Part of the Data Science Institute, the Biostatistics Consulting Service provides comprehensive statistical consulting. Services cover the spectrum of cancer-related and non-cancer research including: experimental design, sample size calculation, randomization, data analysis, design and analysis of clinical trials, observational studies and surveys, assistance with public databases and innovative methods development.

Learn more about the Biostatistics Consulting Service/ Biostatistics Shared Resource.

Biostatistics, Epidemiology, and Research Design (BERD)

BERD Mini-grants provide limited statistical support to investigators on study design and sample size analysis for up to 6 hours.

Learn more about the BERD.

Cardiovascular Academic Initiative (CAI)

The Cardiovascular Academic Initiative is an organized clinical and translational initiative to focus and support the cardiovascular academic missions and intertwine them with the clinical missions of MCW.

Learn more about the CAI.

Cardiovascular iPSC Core

The Cardiovascular iPSC Core provides cutting-edge iPSC services to research teams across MCW's campus to facilitate translational research from preclinical animal and cell models into human cells and tissues. Services include human iPSC reprogramming from peripheral blood monocytes or fibroblasts (skin biopsy); human iPSC cell line differentiation into endothelial cells, cardiomyocytes, or vascular smooth muscle cells; and iPSC CRISPR gene knockout/knock-in or single nucleotide editing. In addition, premade cell products from our bank or select validated external sources are available. Expert staff perform methodological development such as production of organoids and additional cell types, and train laboratory staff and trainees for these techniques.

Learn more about the Cardiovascular iPSC Core.

Cell Therapy Laboratory (CTSR)

The Cell Therapy Shared Resource provides advanced technologies and expertise to develop innovative and effective cell therapies. We offer 1) state-of-the-art production and processing of cell therapy products including on-site CAR-T cell manufacturing, and 2) access to cutting-edge instrumentation for immune profiling (Berkeley Lights Optofluidics, Droplet digital PCR, Isoplexis, Luminex) and immune-oncology consulting services.

Learn more about CTSR.

Center for Infectious Disease Shared Resources

The mission of the Center for Infectious Disease Research (CIDR), is to enhance research efforts that focus on understanding the molecular mechanisms of pathogenesis related to infection with microorganisms, viruses, fungi or parasites. These efforts also include programs to define host factors contributing to disease resistance or susceptibility, host recognition of foreign materials and the innate and adaptive immune responses following exposure to infectious organisms.

Learn more about the CID Shared Resources.

Center for Imaging Research

The Center for Imaging Research provides high-field MRI for functional MRI, structural imaging, dynamic contrast imaging, and diffusion imaging. Animal preparation including survival surgery and post-imaging support can be performed in our facility.

Learn more about the CIR.

Center for Microbiome Research (CMR)

MCW Center for Microbiome Research (CMR) provides specialized resources for microbiome-focused studies and resources for microbial experiments including gnotobiotic and axenic rodent husbandry, and state-of-the-art microbial bioinformatics including 16S rRNA gene sequencing, microbial metagenomics and RNA sequencing, and spatial microbial transcriptomics.

Learn more about the CMR.

CMR Gnotobiotic Core Facility (GCF)

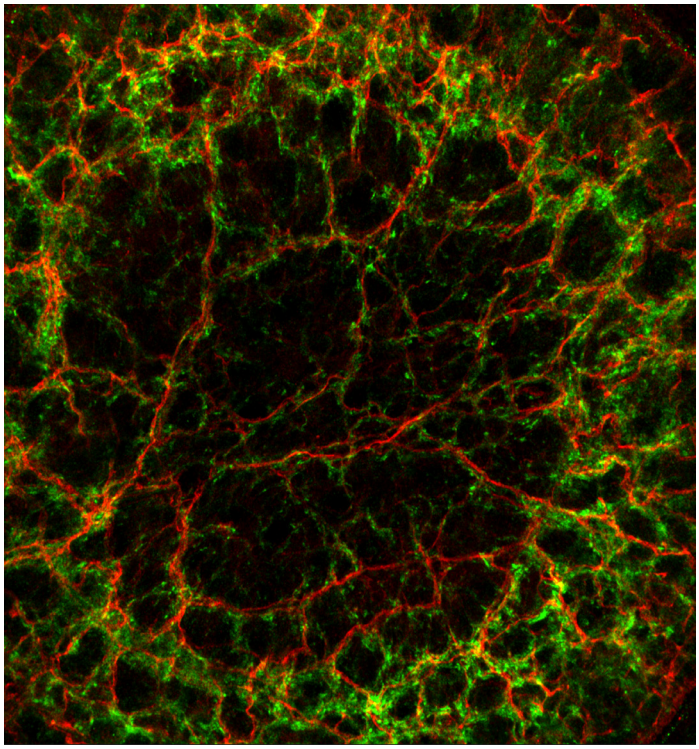
The Gnotobiotic Core Facility (GCF) provides state-of-the-art husbandry for axenic (germ-free) and gnotobiotic rodent studies in a dedicated space within the MCW Biomedical Resource Center. The GCF maintains both axenic and gnotobiotic mouse colonies for use by MCW researchers and assists with gnotobiotic experiments under strict axenic husbandry conditions. Please get in touch with us if you are interested in conducting studies using axenic or gnotobiotic rodent models.

Learn more about the GCF.

Comprehensive Rodent Metabolic Phenotyping Core (CRMPC)

The CRMPC provides guided access and technical support for the comprehensive assessments of energy expenditure and fluid homeostasis in mice and rats. We provide high resolution measurements of metabolic rate, core body temperature, body composition, food/water intake behaviors, caloric density, thermal imaging, bioimpedance and electrolyte flux, fecal material transfer, and blood pressure to the MCW research community.

Learn more about the CRMPC.



CRI & CC Flow Cytometry

The mission of FLOW is to provide investigators with: technical support and training for multicolor analytical flow cytometry and cell sorting; operator-assisted cell sorting in both standard and BSL-2+ modes; consultation for application, assay development and data analysis; and advanced data interpretation.

Learn more about CRI & CC Flow Cytometry.

CRI Histology Core

The Children's Research Institute (CRI) Histology Core is a CAP accredited laboratory that offers a full range of routine and specialized histological, immunological and related services. Training is provided by ASCP certified Histologists with analysis from an American Board of Pathology certified Pathologist. We offer services to investigators from Children's Hospital of Wisconsin, the Medical College of Wisconsin and other institutions.

Learn more about the CRI Histology Core.

CRI Imaging Core

Children's Research Institute's imaging core houses with a variety of state-of-the-art microscopic imaging systems including several confocal microscopes, a laser microdissection system and whole slide scanners. The imaging core is open to all investigators including those at our collaborating institutes. Core users will be trained and consulted on the instrumentation, software, and analysis.

Learn more about the CRI Imaging Core.

CRI Pediatrics Biobank & Analytical Tissue Core

The CRI Pediatric BioBank & Analytical Tissue Core provides quality-controlled banking of human pediatric tissue, blood, bone marrow, and other biological samples for use by investigators both internal and external to MCW and its affiliated institutions.

Learn more about the CIR Pediatrics Biobank & Analytical Tissue Core.

CRI Shared Equipment

Advanced equipment for single cell (Chromium Controller, Chromium X) sequencing preparation and spatial genomics (Visium CytAssist) for self-use.

Learn more about CRI Shared Equipment.

CVRC Confocal Core

The CVRC Confocal Core offers training and use of a range of Nikon microscopes including laser scanning confocal, inverted and upright widefield equipment.

Learn more about the CVRC Core.

Echo Core - Shared High-Frequency Ultrasound Imaging Facility

The Echo Core – Shared High Frequency Ultrasound Imaging Facility has a self-use Fujifilm VisualSonics Vevo 3100 preclinical high frequency/resolution imaging system for preclinical in vivo imaging for oncology, cardiovascular, neurobiology, developmental and other conditions. Transducers: MX250, MX550D, MX700 are available for image-guided injections, color doppler, contrast imaging & 4D. Isoflurane sedation, warming platforms & VevoLAB data analysis software are available, including strain analyses.

Learn more about the Echo Core - Shared High-Frequency Ultrasound Imaging Facility.

Echocardiography Core

Echocardiography is the cornerstone of the phenotyping process. Its highly versatile nature makes it the non-invasive tool of choice. This form of non-invasive assessment is ideal for performing serial evaluations of cardiac function or real-time monitoring during and after pharmacological or therapeutic intervention.

Learn more about the Echocardiography Core.

Epidemiology Data Resource Center

The EDRC is the Medical College of Wisconsin's centralized resource for secondary health and demographic data. The EDRC also provides expertise in the use of spatial data and geographic information systems, or GIS.

Learn more about the Epidemiology Data Resource Center.

Geospatial Epidemiology and Outcomes

The Geospatial, Epidemiology, and Outcomes Shared Resource (GEOSR) provides access for cancer and non-cancer studies to population-based data, cancer epidemiology and database expertise, cancer burden in the catchment area, and geospatial mapping and analysis to catalyze population-based cancer research. The GEOSR also assists non-cancer and cancer-focused investigators with accessing and utilizing electronic health record (EHR) data, including -omics data, and matching patients to clinical trials.

Learn more about the GEOSR.

High-Field Nuclear Magnetic Resonance (NMR) Facility

The NMR Facility is an interdepartmental research service unit located in the Biochemistry Department. High-field NMR spectroscopy is a powerful technique for the study of biomolecular structure and dynamics. The facility provides service for routine 1D and 2D NMR methods, and can also provide consultation and collaborative assistance with the acquisition and analysis of multidimensional, multinuclear protein NMR spectra.

Learn more about the NMR Facility.

IncuCyte Core

Automated image acquisition allows analysis of incubated cells for days, weeks or months while they are maintained in a stationary, stable environment. Investigators can gather data and gain insights into the morphology, movement and function of cell models over an extended time period via a user-friendly interface.

Learn more about the IncuCyte Core.

Macromolecular X-Ray Crystallograpy Facility

The facility includes an X-ray diffraction system consisting of a Rigaku R-AXIS IV++ image plate detector system, MicroMax 007 generator, and automated crystallization system equipped with a CrysCam for nanoliter crystallization and visualization. The Macromolecular X-ray Crystallography Facility is open to MCW faculty members and offers a variety of training levels.

Learn more about the Macromolecular X-Ray Crystallograpy Facility.

MCW Engineering Core

The Engineering Core is a specialized team of biomedical engineers dedicated to supporting MCW's medical research effort by expertly designing, fabricating, repairing, and calibrating research instrumentation tailored to lab-specific needs. By providing these services in-house at a fraction of the cost of commercial vendors, the Core enables cutting-edge research while maximizing budget efficiency.

Learn more about the MCW Engineering Core.

MCW Language Services Core

The MCW Research Language Services Core offers interpreter and written translation services for clinical research projects connected to MCW, Froedtert Hospital, Children's Wisconsin, and CTSI Partner Institutions. Informed consent, ongoing safety assessments, interviews, diet recalls, and clinical data can all be obtained by utilizing these language assistance services.

Learn more about the MCW Language Services Core.

MCW Libraries & Poster Printing

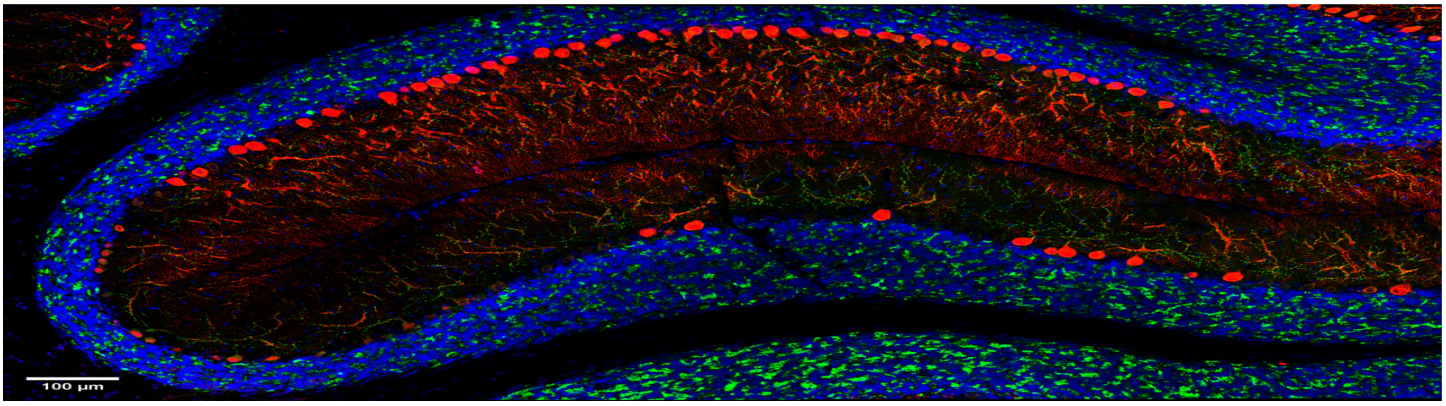
The MCW Libraries poster printing service is an internal resource for MCW faculty, staff, students and residents. Non-academic posters may be printed on a case-by-case basis, but in all instances the submitter must have an employment or enrollment relationship with MCW. We can accommodate requests from staff at clinical affiliates (Froedtert Hospital, Children's Wisconsin, Versiti Blood Research Institute, VA) as cash or check orders.

Learn more about MCW Libraries & Poster Printing.

MCW Tissue Bank - Biorepository & Tissue Analytics

The CAP-accredited MCW Tissue Bank provides services involving human biospecimens to MCW faculty investigators. In addition to distributing tissues and other biospecimens, services associated with human biospecimens include tissue and blood processing, RNA/DNA extraction, tissue analytics, and storage. Biorepositories are maintained for General Tissue and Tumor Bank, the Maternal Bank, the COVID-19 Bank, and the MCW Cancer Center Immuno-oncology Bone Marrow Bank.

Learn more about MCW Tissue Bank - Biorepository & Tissue Analytics.



Mellowes Center Bioinformatics Shared Resource

The Mellowes Center Bioinformatics Core provides bioinformatics services and collaborative research support to MCW investigators engaged in life science. The Core provides support for every stage of bioinformatics analyses, including study design, data acquisition, data analysis, and publication.

Learn more about the Mellowes Center Bioinformatics Shared Resource.

Mellowes Center for Genomic Sciences and Precision Medicine

The Mellowes Center provides short read (Illumina) and long read (Oxford Nanopore) sequencing (NGS), single cell sequencing and spatial genomic analysis, and NanoString nCounter applications to investigate the genome, transcriptome, epigenome and proteome. The Mellowes Center Bioinformatics Resource will assist in processing data and provides services or collaborative research support to MCW investigators. Analysis services include study design, data acquisition, data analysis, and publication. Standard and novel assays, and analyses, are applied to integrate new data types, in support of investigator single or multi-omics studies.

Learn more about the Mellowes Center for Genomic Sciences and Precision Medicine.

NRC Microscopy Core

The microscopy core at the Neuroscience Research Center offers a variety of confocal imaging systems for specialized imaging of neuronal tissue, including the AxL Cleared Tissue Light Sheet Microscope along with appropriate software including Bitplane Imaris 10.0 F1 package and SVI Huygens Professional deconvolution software. The availability of a cleared tissue instrument enables unparalleled visualization of developmental processes, injury recovery, and disease-related pathology.

Learn more about the NRC Microscopy Core.

NRC Rodent Behavior Core

The Neuroscience Research Center's Rodent Behavior Core was established to enable laboratories within the Medical College of Wisconsin to perform behavioral analysis on rodents. The center is equipped with up-to-date experimental devices, analysis software, multifunctional rooms, and the ability to reserve time, space and equipment for your own research needs.

Learn more about the NRC Rodent Behavior Core.

Ophthalmology Animal Research Services

The Ophthalmology Animal Research Services Core provides access to the PROVEO 8 F42 – Premium Ophthalmic surgical microscope with intraoperative Optical Coherence Tomography (OCT), used to perform precise ocular injections. In addition, multiple devices are available for imaging and measuring various aspects of eye anatomy and function in multiple species.

Learn more about the Opthalmology Animal Research Services.

Oxford Instruments Center for Advanced Microscopy - Electron Microscopy Core

The OxCAM-EM encompasses both Light and Electron Microscopy services that is open to all MCW investigators, investigators at affiliated institutions and other non-MCW investigators. The Electron Microscopy laboratory offers tissue processing, immunoelectron microscopy, negative staining, enzyme cytochemistry, ultrastructural electron tomography and TEM training. The Light Microscopy laboratory services include training for independent use and assisted use for spinning disc confocal microscopes and super resolution microscopy and 3D analysis software.

Learn more about the OxCAM-EM.

Pediatric Translational Research Unit

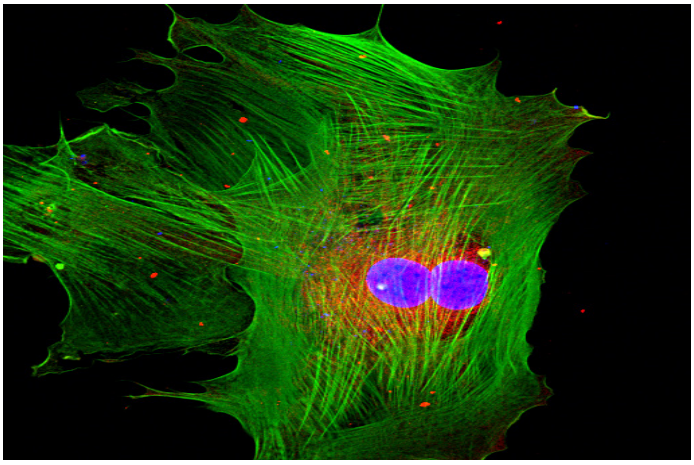
The Pediatric TRU (P-TRU) provides nursing care and coordination for research subjects and their families. Care, from infancy through adulthood, is individualized to meet a variety of research needs.

Learn more about the P-TRU.

Precision Irradiation Core

The Irradiation Core utilizes three x-ray instruments from Precision capable of irradiating both small animals and cells. These units are currently implemented to develop therapeutics to mitigate radiation damage to radiosensitive organs such as bone marrow, heart, lungs, and kidneys.

Learn more about the Precision Irradiation Core.



Qualitative Research Consulting Service

The Qualitative Research Consulting Service provides comprehensive consulting in qualitative research methodologies to MCW faculty, staff, and trainees. Our center is made up of qualitative methods experts focusing on community-engaged research, with grant preparation on funded intra- and extramural projects.

Learn more about the Qualitative Research Consulting Service.

Radiology Quantitative Imaging (QIL)

The Department of Radiology, in collaboration with the Medical College of Wisconsin's Clinical Cancer Center (MCWCC) Clinical Trials Office, supports the assessment of tumor response to therapy guided by board certified radiologists. The QIL support clinical trials using Precision Imaging Metrics software to track and maintain clinical trial response criteria.

Learn more about QIL.

Rat Models and Genotyping Service Center

The Rat Models and Genotyping Service Center maintains and supplies several rat strains as well as rat genotyping services. Available strains including Brown Norway and diabetes models Dahl Salt Sensitive plus Fawn Hooded Hypertensive and the Hybrid Rat Diversity Panel. The Genotyping Service Center offers genotyping assays to detect transgenic, knock-out, and knock-in mutations and can assist with assay and primer design.

Learn more about the Rat Models and Genotyping Service Center.

Rodent Model Resource (RMR)

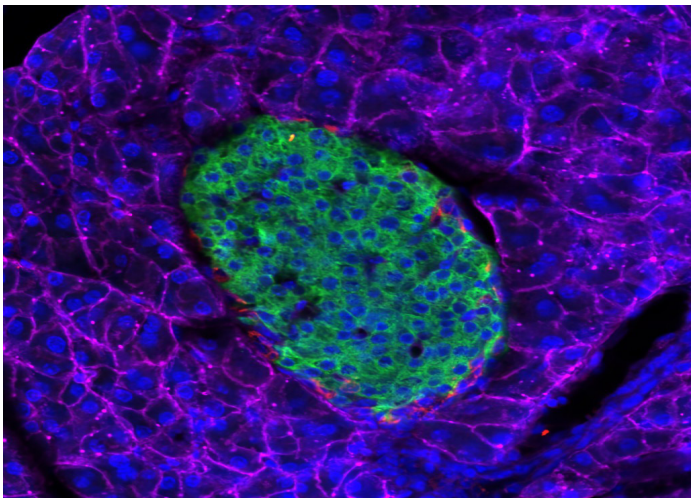
The Rodent Model Resource is equipped to perform all procedures involving production and maintenance of transgenic or knock-out rodents. Services include custom production of novel transgenic, gene knockout, and gene knockin rat and mouse models and management of rat breeding models. The facility can provide both sperm and embryo cryopreservation/recovery, IVF, ICSI, pronuclear microinjection of CRISPR and DNA/BAC constructs.

Learn more about the RMR.

Structural Biology Shared Resource (SBSR)

The Structural Biology Shared Resources (SBSR) facility is made up of two components. The protein production facility was developed to supply high quality homogeneous proteins for structural biology and other applications using a variety of expression systems including baculovirus/insect cell, HEK293, CHO, and E.coli. The CryoEM facility houses a Thermo Glacios 200kV Cryo-TEM configured to carry out single particle analysis in support of protein structure derivation.

Learn more about the SBSR.



Translational Metabolism Shared Resource (TraMSR)

The Translational Metabolomics Shared Resource (TraMSR) (Redox & Bioenergetics, Preclinical Biomedical Imaging, Mass Spectrometry, Radiology Quantitative Imaging) provides expertise and state-of-the-art instrumentation for MCW investigators and cancer center members to explore cancer and non-cancer metabolism by enabling users to run mass spectrometry analyses, bioenergetic and redox function analyses, pre-clinical imaging and therapy response.

Learn more about the TraMSR.

TraMSR Biomedical Imaging

The Biomedical Imaging Shared Resource (BISR) advances research at MCW by providing expertise and state-of-the-art technology and methods for preclinical bioluminescence and fluorescence, low dose X ray microCT and Cherenkov Luminescence imaging. Preclinical near-infrared (NIR) and short-wave infrared imaging (SWIR) greatly increasing the translational potential of non-cancer and cancer center research.

TraMSR Mass Spectrometry

The TraMSR Mass Spectrometry Shared Resource provides multiple analytical services for proteins, peptides, lipids, small molecules, metabolites, complex glycans and other biological molecules to investigators at Medical College of Wisconsin and our partner institutions.

TraMSR Redox and Bioenergetics

Metabolic services supported by the Redox and Bioenergetics Shared Resource (RBSR) include reactive oxygen species(ROS) measurement, metabolic pathway profiling, oxygen consumption, glycotic function, membrane potential and metabolic reprograming using Agilent Seahorse, HPLC and UHPLCelectron paramagnetic resonance (EPR) and luminescence spectrometers.

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