Biomedical Research Core Facilities

February 2018

Welcome to the University of Pennsylvania Perelman School of Medicine Research Core Facilities. As the Associate Dean for Research Integration, I want to welcome you to our core facilities community and the wealth of services it provides within and beyond Penn.

The Perelman School of Medicine is committed to advancing the research and academic endeavors at Penn and in neighboring scientific communities. Our 23 research cores offer a wide variety of services, ranging from molecular profiling to cell sorting to high resolution electron microscopy. Through these diverse resources, we provide access to state-of-the-art equipment and instrumentation, technical expertise, and training and education, all designed to support innovative, cutting-edge research.

I invite you to explore the exciting resources available. We look forward to collaborating with you in your scientific endeavors.

If you have any questions about our cores or would like additional information, please visit our website: http://www.med.upenn.edu/cores/

My best,
Lou Soslowsky

For updates and detailed contact information for each of our cores, please visit our central website: http://www.med.upenn.edu/cores

- Bioinformatics Core
- CDB Microscopy Core
- Cell Center Services Facility
- Cell Center Stockroom
- Clinical Cell and Vaccine Production Facility
- Clinical Research Computing Unit
- CRISPR Cas9 Mouse Targeting Core
- Electron Microscopy Resource Laboratory
- Flow Cytometry and Cell Sorting Facility
- High-Throughput Screening Core
- Human Immunology Core
- Investigational Drug Service
- Neurobehavior Testing Core
- Next Generation Sequencing Core
- Penn Genomic Analysis Core
  - DNA Sequencing Facility
  - Molecular Profiling Facility
- Penn Gnotobiotic Mouse Facility
- Quantitative Proteomics Resource Core
- Research Instrumentation Shop
- Small Animal Imaging Facility
- Stem Cell and Xenograft Core
- Transgenic and Chimeric Mouse Facility
- Vector Core

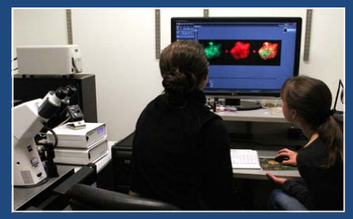
Bioinformatics Core

The Bioinformatics Core provides professional bioinformatics services, including data analysis and consulting, to the Penn biomedical research community. The core builds efficient pipelines to handle various next-generation sequencing (NGS) data analysis. The Bioinformatics Core provides support for grant applications by drafting approaches and offering computation resources and analysis expertise for the proposed research.

http://www.med.upenn.edu/cores/bioinformaticscore.html

CDB Microscopy Core

The Cell & Developmental Biology (CDB) Microscopy Core is a full-service facility providing personalized assistance on all aspects of imaging, from tips on sample preparation to training on one of the core's microscopes, to assistance with image data analysis. The facility currently houses seven confocal microscopes, a Zeiss Z.1 Lightsheet system, five widefield light microscopes, and several computers dedicated to image processing and analysis. In addition, the core offers scanning electron microscope (SEM) sample preparation and imaging.



http://www.med.upenn.edu/cdbmicroscopycore

Cell Center Services Facility

The Cell Center Services Facility provides basic cell culture training and services in various cell culture and related procedures, e.g. Mycoplasma and Endotoxin testing. The services include cell culture at various scales, expansion of primary cells, seed cell cultures from an on-site cell bank, and cell storage; large scale growth of hybridoma and other cell lines followed by antibody purification or recombinant protein production; and EBV induced transformation of lymphocytes. Additionally, it offers hybridoma generation by cell fusion and screening, and the transfection of mammalian cells. The facility prepares specialized cell culture media, Drosophila media, and various tissue culture and molecular biological reagents.

http://www.med.upenn.edu/genetics/cellctr/services/services.shtml

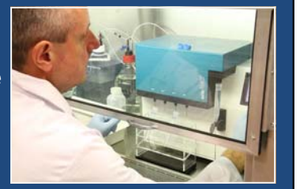
Cell Center Stockroom

The Cell Center Stockroom was established to offer coordination with various suppliers of molecular biological research materials. This involves not only bulk purchasing of these products, but the negotiation of discounts and convenient delivery arrangements. There are over 1,400 products on-site for immediate delivery. Special ordering of non-regularly stocked products is available from 24 bioreagent vendors with discounted pricing and overnight delivery.

http://www.med.upenn.edu/cores/cell_center_stockroom.html

Stem Cell and Xenograft Core

The Stem Cell and Xenograft Core (SCXC) is a resource laboratory with an extensive repository of viable hematopoietic cells from healthy donors (BM, CB, FL) and from patients with hematologic malignancies (AML, MPDs, MDS, CML, ALL). In addition, the Core maintains a large colony of NSG mice and provides users with a wide variety of human xenograft models and services in a dedicated BSL-2 barrier space. The SCXC supports a broad range of translational projects, on a fee-for-service basis, from human cancer biology and regenerative medicine, to human immunology and immunotherapy of cancer and HIV.



http://www.med.upenn.edu/cores/stem_cell_and_xenograft.html

Transgenic and Chimeric Mouse Facility

The Transgenic and Chimeric Mouse Facility provides a centralized service to efficiently produce infection-free transgenic founder, chimeric, and genome-edited strains of mice carrying transgenes or gene "knockouts" of specific interest to Penn researchers. The Facility offers services including DNA pronuclear injection into fertilized oocytes (along with genotyping of transgenic founders), ES cell injection into blastocysts, cytoplasmic/pronuclear injections into fertilized oocytes of CRISPR-Cas9 mix (gRNA, Cas9RNA, ssDNA/dsDNA templates), embryo and sperm cryopreservation, in vitro fertilization, and re-derivation of live and cryopreserved lines. The Core also oversees a cyropreservation facility for long-term storage of mouse embryos and sperm samples.

http://www.med.upenn.edu/cores/transgenic_and_chimeric_mouse_facility.html

Vector Core

The Vector Core facility is an important technological resource for investigators, both within the University of Pennsylvania and those external to Penn, interested in the use of vectors for gene transfer. The main objective of this Core is to provide investigators access to state-of-the-art vector technology for preclinical studies and other basic research applications. Such studies provide tools critical to the understanding of gene function and development of therapeutic vectors.

http://www.med.upenn.edu/cores/vector_core.html

http://www.med.upenn.edu/cores/

Penn Gnotobiotic Mouse Facility

The Penn Gnotobiotic Mouse Facility (PGMF) provides centralized germ-free and gnotobiotic mouse services. The PGMF maintains three strains of germ-free mice that are available upon request, and provides re-derivation services for generating customized germ-free and gnotobiotic mouse strains. In addition, the PGMF offers the Penn research community access to isolators for utilizing germ-free and gnotobiotic mice during IACUC-approved experimental procedures. To further meet the needs of investigators, the PGMF provides technical support required for various experimental procedures.

http://www.med.upenn.edu/cores/PennGnotobioticMouseFacility.html

Clinical Cell and Vaccine Production Facility

The Clinical Cell and Vaccine Production Facility (CVPF) is a GMP facility providing focused scientific, technical, and regulatory support for investigator-initiated investigational new drug applications (INDs) in cell and gene therapy. CVPF services include washing and cryopreservation of pheresis product, activation and expansion of donor or patient T lymphocytes, transduction of activated T cells with retroviral or lentiviral vector, and generation of immature or mature dendritic cells.

http://www.med.upenn.edu/cores/clinical_cell_and_vaccine_production.html

Quantitative Proteomics Resource Core

The Quantitative Proteomics Resource Core (QPRC) provides investigators with access to the most advanced high resolution mass-spectrometry-based proteomics technologies. These technological approaches are implemented with a broad variety of mass-spectrometry-based experiments to characterize and quantify proteins from complex biological samples.

http://www.med.upenn.edu/cores/quantitative_proteomics_resource_core.html

Clinical Research Computing Unit

The Clinical Research Computing Unit (CRCU) is a designated core research facility within Penn Medicine, specializing in clinical research informatics (CRI) collaboration and research IT services for a growing number of clinical and translational research investigators at Penn. The CRCU provides expertise in all facets of research management (biomedical, behavioral, clinical, and translational) by understanding regulatory and cultural environments. Services provided by CRCU include project management, data management and research technology specializing in clinical research informatics, and collaboration and research IT services.

http://www.med.upenn.edu/cores/clinical_research_computing_unit.html

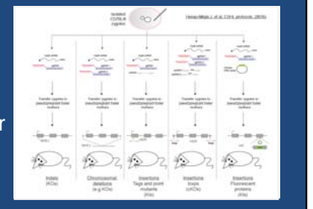
Research Instrumentation Shop

The Research Instrumentation Shop (RIS) is a shared resource machine shop serving various University of Pennsylvania schools and departments. The RIS mission is to assist University researchers to design and construct both laboratory and clinical instruments. RIS provides mechanical and optical ideas and machining services to the University community.

http://www.med.upenn.edu/cores/research_intrumentation_shop.html

CRISPR Cas9 Mouse Targeting Core

The CRISPR/Cas9 technology has revolutionized the way genome editing is performed, significantly reducing the time and cost required to generate genetically engineered mice, and allowing scientists to test more precise hypotheses in vivo. The core, in partnership with the Transgenic and Chimeric Mouse Facility, offers a variety of services including targeting design, sgRNA preparation, Cas9 mRNA generation, DNA repair template preparation, microinjection, and genotyping/screening for targeted mice. This partnership provides the research community access to the latest technologies available for editing the genome of one-cell mouse embryos for the purpose of producing novel models such as knock-out (KO), conditional KO, and knock-in (KI) mice.
http://www.med.upenn.edu/cores/crispr_targeting_core.html



Small Animal Imaging Facility

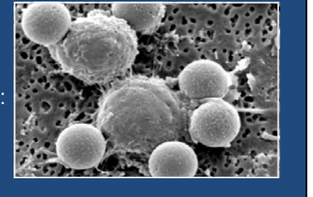
The Small Animal Imaging Facility offers a comprehensive suite of imaging modalities for cells, tissues, and small animals including: MRI, MRS, optical imaging, and ultrasound. Housing is available for mice and rats for longitudinal studies. Additional facilities include chemistry, radiochemistry, image analysis, and tumor models.

http://www.med.upenn.edu/cores/small_animal_imaging_facility.html

Electron Microscopy Resource Laboratory

The Electron Microscopy Resource Laboratory (EMRL) offers high quality electron microscopy (EM) imaging services. With a team of experienced professional staff and state-of-the-art sample preparation and imaging equipment, the EMRL offers users a full spectrum of both transmission EM and scanning EM services. These services include: specimen preparation (including high pressure freezing, chemical fixation, microwave tissue processing, and sectioning of cells and tissues or preparation of non-cellular materials), operation of equipment, data acquisition, data interpretation, and training on all aspects of EM analysis.

http://www.med.upenn.edu/cores/electron_microscopy_resource_lab.html



Flow Cytometry and Cell Sorting Resource Laboratory

The Flow Cytometry and Cell Sorting Resource Laboratory, recognized as one of the largest and most comprehensive flow cytometry laboratories, has been designated a laboratory of exceptional merit by the National Cancer Institute. The resource provides a broad array of instrumentation, support, education, and consultation services including cell sorting (up to 17 colors); basic and high dimensional analytical platforms, including the Symphony A5 high dimensional analyzer (46 colors) to be available in Spring 2017; and the ImageStream imaging cytometer. Currently the facility offers 7 cell sorters and 13 analytical instruments, located throughout the university and available 24/7 with training.

http://www.med.upenn.edu/cores/flow_cytometry_cell_sorting.html

Neurobehavior Testing Core

The Neurobehavior Testing Core provides facilities and services including consultation on study design such as: appropriate tests, mouse line/strain, numbers of animals, control groups and breeding strategies. The core also provides comprehensive behavior phenotyping of your mice. The behavior apparatus available in the core includes: running wheels, beam splitters, EEG/EMG recording chambers, open field activity monitors and Rotarod, various mazes, light/dark chamber, passive/active avoidance chambers, hole poke arenas, and object recognition tests.

http://www.med.upenn.edu/cores/Behavioral_Testing_Core.html

High-Throughput Screening Core

The High-Throughput Screening (HTS) core provides services to identify genes or organic small molecule modulators of signaling pathways, cellular phenotypes, and protein function in models of complex biological process relevant to human physiology and disease. The core's mission is to provide high-throughput chemical and functional genomic screening of innovative, robust biochemical, cell-, and high-content based assays. Core staff educate and assist scientists with assay development, high-throughput screening, post-screening validation and progression, data analysis, and scientific reporting. The core maintains libraries of siRNA, shRNA, cDNA, FDA approved drugs, and a diverse collection of organic small molecules for HTS.

http://www.med.upenn.edu/cores/High_ThroughputScreeningCore.html

Next Generation Sequencing Core

The Next Generation Sequencing Core offers library construction and quality assessments, sequencing, and optional preliminary data analysis for a wide variety of experimental protocols, including ChIP-seq, RNA-Seq, HITS-CLIP, miR-Seq, exome capture, and BIS-seq. The core offers library preparation services for common library types and can advise on most library preparation techniques. The Fluidigm C1 allows simple high-throughput single-cell library preparation. The core sequences with Illumina MiSeq, NextSeq 500, HiSeq 2500, and HiSeq 4000 sequence to cover the range of sequencing projects, from small pilot studies or targeted sequencing, to large studies and whole-genome sequencing.

http://www.med.upenn.edu/cores/NextGenerationSequencingCore.html

Human Immunology Core

The Human Immunology Core (HIC) provides wet bench and scientific expertise for investigators conducting early-phase clinical trials and other translational immunology research. The HIC also offers human blood-derived cell products from apheresis donors. For clinical trial support, the HIC performs blood/tissue processing, cryopreservation, sample storage and shipping, as well as qualified cellular and molecular assays that incorporate modern immunology techniques. Assays include multicolor immunophenotyping, digital ELISA, Luminex, conventional ELISA, ELISPOT, and T cell and B cell receptor repertoire profiling with single cell molecule techniques in development. The HIC also offers expert data analysis and scientific consultation.

http://www.med.upenn.edu/cores/human_immunology.html

DNA Sequencing Facility

As part of the Penn Genomic Analysis Core, the DNA Sequencing Facility offers sequencing services on two platforms, gold standard Sanger sequencing on ABI capillary sequencers, and next-generation sequencing (NGS) on Ion Torrent PGM and high-throughput S5 along with experimental design and data analysis. The NGS service includes library preparation for multiple applications including targeted sequencing, RNA-Seq and Exome-Seq. The capillary sequencers also enable microsatellite genotyping and fragment analysis for microsatellites, VNTR, SNaPshot and Human Cell Line Authentication. The molecular biological services include PCR, cloning, subcloning, mutagenesis, making constructs, and plasmid DNA preps at different scales.

http://www.med.upenn.edu/genetics/dnaseq/

Investigational Drug Service

The Investigational Drug Service (IDS) manages preparation, dispensing and accountability for study medications throughout Penn Medicine. The IDS handles all study medications used at HUP and PPMC and can assist with any outpatient trial involving a Penn investigator. Services include product formulation and manufacturing of blinded dosage forms, randomization and masking, monitoring patient compliance, distribution, and central study coordination. The IDS operates out of two locations - Maloney (Main) and Mutch (North) - and is able to deliver or pick up medications throughout the main campus.

http://www.med.upenn.edu/cores/investigational_drug_service.html

Molecular Profiling Facility

As part of the Penn Genomic Analysis Core, the Molecular Profiling Facility provides full service whole genome and targeted molecular profiling of DNA and RNA on multiple platforms. The Core supports quantitative RNA profiling on Affymetrix GeneChips and high-throughput Gene Titan instruments; Luminex FlexMap 3D; Fluidigm BioMark HD; ABI QS 12K real-time PCR machine. DNA profiling is offered on Affymetrix SNP GeneChip and high-throughput Gene Titan instruments; Fluidigm BioMark HD; ABI QS 12K. Agilent aCGH platform provides genome-wide chromosomal analysis. The users benefit from consultation and training available throughout their projects, including during experimental design and budget development, sample accrual, data management and analyses, and manuscript preparation.

https://pathbio.med.upenn.edu/pbr/portal/mpf/