



# *Indiana CTSI Designated Core Services*

September 22, 2023

## Welcome

The Indiana CTSI Access Technology Program (ATP) is pleased to present to you this listing of our [CTSI Designated Core Services](#) on our Indiana University, Purdue University, University of Notre Dame and Regenstrief Institute campuses.

The ATP connects investigators to novel technologies and facilitates access to any of our 60+ Core's services which aid investigators with the instrumentation and services needed to advance their research.

Additionally, the Indiana CTSI Designated Cores are eligible for the annual [Core Pilot Grants](#) which provide investigators with up to \$10,000 in Core services and for the annual [Postdoc Challenge Grants](#) which award postdoctoral fellows with up to \$5,000 in Core services.

To learn more about our services please visit our webpages or use the contact information we have provided with each Core below.

We look forward to working with you!

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## **Behavioral Phenotyping Core (BPC)**

*Indiana University – Indianapolis*

The Behavioral Phenotyping Core (BPC) at Indiana University School of Medicine is a state-of-the-art facility where IUSM and external investigators can request studies within a broad spectrum of rodent behavioral paradigms. Housed on the fourth and fifth floors of Stark Neurosciences Research Institute in the Neurosciences Research Building, the BPC maintains more than 1,300 square feet of dedicated testing space. The BPC validates all assays; allows for testing of pharmacological or other manipulations to study disease models; incorporates necropsy endpoints to behavioral assays as needed; and provides guidance on interpretation and analysis of data. Investigators can use the facility to look at a variety of sensory, motor, and cognitive indicators, which can signal differences in the underlying physiology of the animal model. The facility also has the ability to execute behavioral studies requested via a fee-for-service or via collaborative efforts, provide behavioral training and advise in behavioral experimental design and questions. In addition to providing behavioral assays, the BPC helps train graduate students and postdoctoral researchers on the implementation of sound experimental design for behavioral studies and to use specific equipment.

<https://indianactsi.org/servicecores/core/112/>

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## **Bioinformatics Core**

*Indiana University - Indianapolis*

The Bioinformatics Core provides advanced computation and informatics approaches to analyze large and complex biological datasets, including: Next Generation Sequence Data Analysis; Microarray Data Analysis; Proteomics Data Analysis; Multi-omics Data Integration; Statistical Genetics; Pharmacokinetics/Pharmacodynamics Data Analysis; Drug Absorption, Disposition, Metabolism, Elimination and Transportation Prediction, and Drug Exposure Prediction; Public Domain Database Access and Custom Data Annotation.

<https://indianactsi.org/servicecores/core/8/>

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## **Biological Evaluation (BE-SR)**

*Purdue University*

The mission of the Biological Evaluation Shared Resource (BE-SR) is to provide expert guidance to investigators in grant preparation, model selection and experimental design, and to perform toxicity testing and proof-of-concept efficacy studies for the advancement of their projects using in vivo testing.

<https://indianactsi.org/servicecores/core/74/>

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## **Biophysics Instrumentation Core (BIC) Facility**

*University of Notre Dame*

The BIC Facility offers 13 complementary instruments dedicated to characterizing biomolecular conformations and interactions, as well as equipment for the isolation and purification of macromolecules. These instruments include a Jasco J-815 circular dichroism spectropolarimeter and Bio-Logic stopped-flow kinetic system, a Biacore T200 surface plasmon resonance system, a MicroCal PEAQ-ITC microscale isothermal titration calorimeter, an AKTA pure 25 M1 protein purification system, two TTP Labtech crystallization robots, an Amersham Typhoon IP phosphoimager, an Azure c400 gel documentation system, and five centrifuges and associated rotors, including a Beckman ProteomeLab XL-A analytical ultracentrifuge. The BIC employs one full-time PhD-level Staff Scientist who provides equipment training and technical assistance. The BIC Facility is open to outside academic and industry researchers and welcomes both in-person use and mail-in samples for analysis.

<https://indianactsi.org/servicecores/core/113/>

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## **Biospecimen Collection and Banking Core**

*Indiana University - Indianapolis*

The IUSCCC Biospecimen Collection and Banking Core (BC2) offers a suite of services related to biospecimen and data collection in support of cancer research. Formed in 2021, four distinct service lines, each with its own specialty, were joined as part of an effort to best serve cancer center members. The collection comprises:

- the Tissue Procurement and Distribution Core
- the Komen Tissue Bank (the only known global biorepository that collects, stores, and annotates healthy breast tissue and blood to be used as normal controls);
- the Oncology Research Information Exchange Network (ORIEN; a national consortium of cancer centers forming a collaborative partnership dedicated to accelerating cancer research);
- the Clinical Trials Office (CTO) Biospecimen Lab Tech group (providing specimen collection/distribution support for all trials handled by the CTO and the IUSCCC).

The core provides an extensive collection of well-annotated samples from patients with malignancy and normal controls to support studies exploring the biologic basis of cancer, move basic findings to the clinic, and probe the biology underlying clinical and population phenomena. BC2 aims to provide well-annotated, diverse, high quality biologic material and data to support basic and translational cancer research; to coordinate procurement, processing, storage, and management of tissue samples collected in conjunction with therapeutic and correlative solid tumor clinical trials; to develop and maintain tissue

microarrays (TMA) to support biomarker research; and to collaborate with investigators to provide support (collection, processing, storage) for “protected collections” of samples to be used by specific IUSCCC researchers.

<https://indianactsi.org/servicecores/core/44/>

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### **Biospecimen Management Core (CTSL/SSF)**

*Indiana University - Indianapolis*

The CTSI Biospecimen Management Core consists of the Specimen Storage Facility and the Clinical and Translational Support Laboratory, which together offer cost-efficient processing & storage services with a focus on consistent quality and sample integrity. The Specimen Storage Facility (SSF) currently maintains four mechanical freezer storage sites and two LN2 freezer storage sites. Both investigator and SSF-owned freezers are monitored and maintained by SSF staff 24/7 to virtually eliminate specimen loss due to freezer failures. Quality is maintained via our contracted independent QA oversight and guidance. Our facility and procedures are ISBER compliant (International Society for Biological and Environmental Repositories). The Clinical and Translational Support Laboratory (CTSL) provides SOP-driven, protocol-specific processing and shipping services for studies collecting human derived research specimens. The highest levels of quality and consistency are assured due to our voluntary compliance to GCPs and GLPs along with independent QA oversight.

<https://indianactsi.org/servicecores/core/30/>

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### **Biostatistics and Health Data Science Core**

*Indiana University - Indianapolis*

The Biostatistics and Health Data Science Core collaborates with investigators in the planning, statistical design, algorithm development, data management, and analysis of health-related clinical, basic science, and epidemiological research projects. The Core supports the research use of clinical, demographic, molecular, and imaging data as well as data collected from clinical trials and observational studies. We also provide analytical support for dissemination of real-world data from medical claims, electronic health records, social media, and other public resources. Grant development assistance is provided without charge. Study design includes sample size/power calculations, preliminary statistical analysis, and development of data management and statistical analysis plans. The Core is equipped to provide full support for all the data-related activities throughout the stages of a research study, from the design phase through final publications of study outcomes. This includes creation of study specific database management systems for HIPAA aligned data collection, storage and transfer (platforms used: REDCap, OnCore, other), quality control measures, report generation, and randomization and subject scheduling. The Core also employs advanced statistical methods to perform statistical analyses of all types that will

speed up the translational research and publications of results. The Core holds a no-cost weekly walk-in clinic. A biostatistician is available to provide brief consultations on study design, sample size and power calculations, data analysis advice, interpretation of results, and statistical software. If more in-depth (or potentially fee-based) support is needed, a biostatistician will guide you to the appropriate person. Please see the Biostatistics and Health Data Science Department website (<https://medicine.iu.edu/departments/biostatistics/services>) for time and location.

<https://indianactsi.org/servicecores/core/6/>

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### **Biostatistics Consulting Center**

*Indiana University - Bloomington*

Biostatistical support is available through faculty collaboration or professional fee-for-service for study design and data analysis on health-related research projects.

<https://indianactsi.org/servicecores/core/68/>

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### **Cellular Response Technologies Core**

*Indiana University - Indianapolis*

The Cellular Response Technologies Core (CRT) is a state-of-the-art facility that has been established through the IU Simon Cancer Center to conduct validated and highly reproducible in vitro and in vivo angiogenesis, endothelial, hematopoietic and multi-parametric flow cytometry in the areas of normal and patient-related hematologic and cardiovascular disorders. The CRT provides all aspects of sample analysis, including consultation, education, and new assay development for scientists within and outside the IU School of Medicine and Indiana University. Furthermore, the CRT is one of three IUSOM cores funded by the NIH Core Centers of Excellence in Molecular Hematology. The CRT houses the Essen Bioscience IncuCyte ZOOM. This instrument allows for the automated, extended, real-time assessment of cellular behavior under various experimental conditions. The ZOOM is capable of multiple real time quantitative analyses of multiple biological processes such as proliferation, apoptosis, angiogenesis, cell migration/invasion, immune function, and 3D spheroid formation. In addition, the CRT houses the Seahorse XFP analyzer from Agilent Technologies. The Seahorse XFP performs routine tests of metabolic pathways in real time that measure oxygen consumption rate (OCR), an indicator of mitochondrial respiration, as well as extracellular acidification rate (ECAR), which is largely the result of glycolysis.

<https://indianactsi.org/servicecores/core/31/>



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## **Center for Genomics and Bioinformatics (CGB)**

*Indiana University - Bloomington*

The CGB offers a wide range of genomic services, including high-throughput DNA/RNA extraction, library preparation, next-generation sequencing, and bioinformatic analysis. We also provide support in the early stages of projects, including consulting on experimental design, providing cost estimates, and writing letters of support for research proposals. We support an extremely diverse clientele, including researchers interested in human health, ecology, evolution, virology, microbiology, plant sciences, etc. Our goal is to facilitate high-quality cutting-edge research, while minimizing costs. The CGB's mission is to: Act as a service facility that provides IU faculty access to genome technologies and bioinformatic support. Provide consulting and training that supports the development of genome-enabled research programs and grant proposals. Develop new genome technologies and bioinformatics tools that are not easily purchased as a fee for service elsewhere.

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<https://indianactsi.org/servicecores/core/20/>

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## **Center for Medical Genomics (CMG)**

*Indiana University - Indianapolis*

The Center for Medical Genomics is a state-of-the-art technology center that provides investigators with affordable access to high-quality high-throughput genomics services in a timely fashion. Key services include:

### **High-throughput sequencing**

The CMG provides full scale high-throughput sequencing services, including genomic DNA sequencing, transcriptome RNA sequencing, miRNA sequencing, methylome or targeted methylation sequencing, protein DNA/RNA interaction (ChIP-seq, ATAC-seq and CLIP-seq), as well as 10x single cell or single nuclei sequencing. CMG staff have experience in conducting sequencing experiments from standard samples, blood samples, low quantity samples (minimum 1ng total RNA), and low quality or degraded samples (from FFPE or micro-dissection). Our staff can work with investigators on adopting/developing other

assays that require high-throughput sequencing technology. Next Generation Sequencing instrumentation at the center includes:

- Illumina NovaSeq
- Illumina HiSeq 4000
- Illumina NextSeq 500
- Illumina MiSeq Dx
- LifeTech Ion Proton sequencing system

<https://indianactsi.org/servicecores/core/10/>

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### **Center for Proteome Analysis**

*Indiana University - Indianapolis*

The IUSM Center for Proteome Analysis provides numerous types of mass-spectrometry (MS) based proteomics services and associated bioinformatics including global proteome quantitation, affinity purification-MS, targeted MS for precise quantitation, post-translational modification analysis, and experimental design services. We also support thermal proteome profiling (TPP) and cellular thermal shift assay (CETSA) type experiments at the design, bench, and bioinformatics levels.

<https://indianactsi.org/servicecores/core/12/>

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### **Center for Survey Research (CSR)**

*Indiana University - Bloomington*

Since the early 1980's, the Center for Survey Research has conducted thousands of quantitative and qualitative research projects, using surveys, interviews, focus groups, and a wide range of other methods. Our work advances knowledge and humankind by helping researchers plan for, gather, and analyze data in the medical and health sciences. Our partners include collaborators from universities, governmental agencies, nonprofits, and businesses. We manage studies from start to finish—or support a discrete task like reviewing a questionnaire or conducting interviews.

<https://indianactsi.org/servicecores/core/76/>

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### **Chemical Genomics Core Facility**

*Indiana University - Indianapolis*

The Chemical Genomics Core Facility (CGCF) at the Indiana University School of Medicine seeks to provide sophisticated small molecule informatics, design, and analysis by LCQTOF and NMR; to facilitate faculty-driven high-throughput screening, high-content analysis, and CRISPR technologies; and to perform SAR by NMR and phage display for academic and industrial investigators.

<https://indianactsi.org/servicecores/core/11/>

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### **Chemical Genomics Facility (CGF)**

*Purdue University*

The Chemical Genomics Facility (CGF) provides affordable access to large chemical and CRISPR libraries and state-of-the-art instrumentation in high-throughput screening (HTS) and high content screening (HCS) campaigns. The facility also provides assistance in assay development and hit validation using various biophysical approaches.

<https://indianactsi.org/servicecores/core/88/>

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### **CISAB Mechanisms of Behavior Laboratory**

*Indiana University - Bloomington*

The Mechanisms of Behavior Core lab provides equipment and reagents for performing experiments on a molecular level. The director is also available for consultation on experimental design and introduction to molecular techniques.

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### **Clinical Pharmacology Analytical Core (CPAC)**

*Indiana University - Indianapolis*

Detailed understanding of drug disposition and factors affecting this process is important to guide preclinical drug discovery and development and in optimizing available drug therapies. CPAC specifically focuses on providing scientific and technical services to help investigators in their preclinical and clinical

drug metabolism and pharmacokinetic studies. To support these activities, CPAC utilizes state-of-the-art LC-MS/MS methods to quantify small molecules (drugs, metabolites, and new chemical entities) from a wide variety of biological samples (plasma, urine, tissues, media, etc.). CPAC provides investigators with detailed information on in vivo pharmacokinetics (PK), drug interactions, in vitro drug metabolic stability, formulation optimization, protein binding, drug purity verification, and drug stability. CPAC is the only analytical core on campus that offers a unique combination of extensive expertise on in vitro and in vivo drug metabolism, including stereoselective metabolism, drug-drug interactions, and pharmacokinetics (PK).

<https://indianactsi.org/servicecores/core/7/>

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### **Cryo-EM Facility**

*Purdue University*

The Purdue University Cryo-EM Facility provides state-of-the-art instruments (FEI Titan Krios with Gatan K3 direct electron detector, FEI Volta phase plate) and expertise for high resolution structure determination of viruses, larger macromolecular complexes, nano-particles, as well as tomographic visualization of virus-cell interactions by cryo-electron microscopy (cryo-EM). The facility staff can provide complete service from sample grid preparation to automated data collection.

<https://indianactsi.org/servicecores/core/63/>

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### **Electron Microscopy Center (IUB-EMC)**

*Indiana University - Bloomington*

The IU Bloomington Electron Microscopy Center (IUB-EMC) provides equipment, services and expertise for both biological and materials science electron microscopy.

<https://indianactsi.org/servicecores/core/67/>

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### **Flow Cytometry and Cell Sorting Facility**

*Purdue University*

The Flow Cytometry and Cell Sorting Core Facility provides a variety of flow cytometry and single-cell genomics services, including cell sorting, flow cytometry analysis, individualized training, data analysis, experimental design, preparation of data and figures for publications and grants, and expert consultation and assistance. Available instrumentation includes two flow cytometry analyzers (BD Fortessa, Attune

Nxt), three cell sorters in BSL-2 hoods (two BD Arias, one BC Astrios), and two systems for single cell genome and transcriptome analysis (10x Genomics, Fluidigm). The Purdue University Flow Cytometry Facility is a Purdue University-wide, Discovery Park shared facility, an NIH-funded Purdue University Cancer Center Research Center Facility, and a core facility of the Indiana state-wide, NIH-funded CTSI.

<https://indianactsi.org/servicecores/core/37/>

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### **Flow Cytometry Core Facility (FCCF)**

*Indiana University - Bloomington*

The IU-B FCCF provides flow cytometry analysis, sorting and cell counting services, access to flow cytometry data analysis software, and assistance with experimental design. The core houses five flow cytometry instruments, including two high speed cell sorters, two cell analyzers (one on a cart) and a large particle sorter, as well as a cell counter/sizer.

<https://indianactsi.org/servicecores/core/64/>

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### **Flow Cytometry Resource Facility (FCRF)**

*Indiana University - Indianapolis*

The Flow Cytometry Resource Facility (FCRF) provides flow cytometric analysis and cell sorting services as well as flow cytometric image analysis. FCRF offers consultation, technical advice, experimental design assistance, and data interpretation services to promote use of state-of-the-art technologies and cutting-edge science. Four full-time employees who are well-qualified operators with extensive training and experience provide these services. The FCRF houses 3 flow cytometric analyzers, a Cytex Aurora Spectral Flow Cytometer, 3 sorters (up to 18 parameters), and an Amnis ImageStreamx Mk II Imaging Flow Cytometer.

<https://indianactsi.org/servicecores/core/17/>

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### **Freimann Life Sciences Center (FLSC)**

*University of Notre Dame*

The Freimann Life Science Center is home to virtually all laboratory animals supporting University of Notre Dame teaching and research. The FLSC primarily serves faculty from the Departments of Biological Sciences, Chemistry and Biochemistry, Chemical Engineering and the Indiana University School of Medicine – South Bend.

<https://indianactsi.org/servicecores/core/26/>

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### **Genome Editing Center**

*Indiana University - Indianapolis*

The Indiana University Genome Editing Center at Indiana University School of Medicine is an institutionally subsidized shared resource whose mission is to provide Indiana University and external investigators access to state-of-the-art genome editing technologies by assisting with the generation of genetically modified organisms in a time- and cost-effective manner. The center exploits various technologies, including CRISPR-based genome editing systems, conventional gene targeting in embryonic stem cells and transgenesis, to engineer genetically modified transformed cell lines, stem cells and animals that will help identify and validate novel therapeutic targets, accelerate translational research and advance precision medicine.

<https://indianactsi.org/servicecores/core/104/>

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### **Genomics and Bioinformatics Core Facility (GBCF)**

*University of Notre Dame*

The Genomics & Bioinformatics Core Facility (GBCF) at the University of University of Notre Dame offers comprehensive services and support for state-of-the-art genomics experiments and bioinformatics analysis. This includes next generation Illumina sequencing, standard and specialty DNA and RNA library construction methods, 10X Single Cell workflows, Visium Spatial Transcriptomics, nucleic acid QC, consultation, and analysis support.

<https://indianactsi.org/servicecores/core/29/>

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## **Genomics Facility**

*Purdue University*

The Genomics Facility provides gene sequencing services to researchers, including quality control and library preparation, as well as next generation MiSeq services, and project pooling for large sequencing runs.

<https://indianactsi.org/servicecores/core/72/>

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## **Histology and Histomorphometry Core (HHC)**

*Indiana University - Indianapolis*

The Histology Core provides histological services histomorphometric analysis for basic science (non-clinical) research. Both mineralized (plastic embedded) and soft tissue (paraffin embedded and frozen) specimens can be prepared by the facility. In addition, image collection and dynamic and static bone histomorphometric measurements are offered by the core. The histology and histomorphometry laboratory offers a cost-effective approach to complete tissue processing and staining, as well as image collection and analyses, and the support from experienced personnel to multiple investigators from different institutions across the state and elsewhere in the United States. One hundred percent of the core resources are available to investigators on a fee for service basis. The core employs two full time and a part time histotechnicians, who are available for investigators consultation, training and tissue processing.

<https://indianactsi.org/servicecores/core/93/>

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## **Histology Research Laboratory (HRL)**

*Purdue University*

The Histology Research Laboratory is a full service histology laboratory that provides general histology, immunohistochemistry, frozen sectioning, decalcified and undecalcified bone histology, and slide digitization services. It also manages a small animal necropsy room. The laboratory may collaborate with investigators in the development of new techniques and in the characterization of animal models (e.g. phenotyping of genetically altered mice). Expertise in the processing of bone and implants is available.

<https://indianactsi.org/servicecores/core/33/>

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## **Imaging and Flow Cytometry Core Facility**

*Indiana University - South Bend*

The Imaging and Flow Cytometry Core Facility is located at the Indiana University School of Medicine South Bend campus. Our equipment includes:

- Zeiss LSM 710 confocal microscope with 488nm, 561nm, 631nm laser lines and two PMT detectors,
- Olympus FV1000 multi-photon confocal microscope with environmental chamber for long time course imaging, lasers 488nm, 543nm, 631nm, and tunable IR 700nm-1100nm, 3 confocal detectors, 1 transmitted light detector and 4 multiphoton detectors, and
- Beckman Coulter FC500 flow cytometer with 488nm and 631nm lasers and 5 color detectors.

For usage rates, policies and availability, please contact the core director. Assisted and unassisted rates are available for each instrument. All CTSI members are considered internal and receive reduced internal rates.

<https://indianactsi.org/servicecores/core/56/>

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## **Imaging Facility**

*Purdue University*

The Purdue University Imaging Facility enables imaging of all types of biologic and non-biologic samples. Our systems can image samples ranging in size from rodents to extremely small sized objects on glass slides with resolution down to tens of nanometers on our super resolution systems. We train users how to use the imaging instruments and support users in sample preparation, anesthesia, image acquisition and analysis. Our instruments range from high-end confocal and multi-photon microscopes to pre-clinical molecular,  $\mu$ CT and nuclear imaging systems for both live animal models and non-biologic samples.

<https://indianactsi.org/servicecores/core/53/>

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## **Imaging Research Facility (IRF)**

*Indiana University - Bloomington*

The Imaging Research Facility (IRF) at Indiana University is a state-of-the-art neuroimaging facility that supports research on brain structure and function and their relation to behavior and cognition. The IRF houses a research-dedicated 3 Tesla Siemens Magnetom Prisma Magnetic Resonance Imaging (MRI) scanner, and can support the acquisition of functional MRI (fMRI), structural MRI, diffusion and perfusion



imaging, and MR spectroscopy data. The IRF also houses two synchronized 64-channel electroencephalography (EEG) systems, allowing for hyperscanning of pairs of individuals, as well as various supporting technologies (e.g., Tobii and Eyelink eye trackers, physiological monitoring). Examples of current research activities include studies of substance use and abuse, concussion, stroke, psychiatric conditions such as autism, depression, and schizophrenia, aging, language acquisition, and developmental studies in infants, toddlers, and children. The IRF has the dual mission of research and education, and aims to foster an interactive and collaborative neuroimaging community consisting of researchers from departments across the Bloomington campus and beyond.

<https://indianactsi.org/servicecores/core/61/>

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### **In Vivo Therapeutics Core (IVT)**

*Indiana University - Indianapolis*

The IUSCCC In Vivo Therapeutics Core (IVT) provides investigators with cost-effective and comprehensive services to facilitate the development and testing of novel pharmacological & cellular therapies. The Core will act as a liaison between the Principal Investigator and any other outcome analyses from live-phase studies. The IVT Core also maintains multiple on-site mouse breeding colonies, as well as oversees operation of the cesium irradiator facility.

<https://indianactsi.org/servicecores/core/108/>

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### **In-Vivo Imaging Core**

*Indiana University - Indianapolis*

The In-Vivo Imaging is located at Research II Building (R2), Goodman Hall (GH), Neuroscience Building (NB), and Biomedical Research and Training Center (BRTC). Clinical Imaging Facility. The In-Vivo Imaging Core provides experienced, trained and credentialed technologists for the acquisition and basic image processing required for all studies. Investigators and their staff work closely with the imaging core technologists in the performance of specific studies. The licensed technologists administer PET tracers or contrast agents and operate the PET and MRI imaging systems. The imaging core staff can also assist with necessary PET and MRI image reconstruction for studies. An emphasis for all imaging studies is placed on the collection of data that permits quantitative or semi-quantitative analysis of results. Roberts Translational Imaging Facility. The Roberts Translational Imaging Facility (RTIF) provides structural, functional and molecular imaging solutions to investigators. RTIF has state-of-the-art simultaneous PET-MR system with 9.4T magnet strength for preclinical imaging. We provide all aspects of preclinical imaging services including animal handling, anesthesia, radioactive PET tracer handling and injection, MR contrast injection (with or without infusion pump and catheter placement), data acquisition, processing and analysis. PET Tracer Production. PET tracers labeled with both cyclotron and generator produced

radionuclides [11C, 13N, 15O, 18F, 62Cu, 64Cu, and 68Ga] for a broad application in the neurosciences, cancer, and cardiovascular disease are available. The PET Tracer Core also brings new compounds online as needed to meet established institutional research priorities.

<https://indianactsi.org/servicecores/core/97/>

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### **Indiana Center for Biological Microscopy (ICBM)**

*Indiana University - Indianapolis*

The Indiana Center for Biological Microscopy is a unique microscopy core facility, providing investigators with effective access to a variety of advanced microscopy techniques. The Center is equipped with three laser-scanning confocal microscopes supporting high-resolution 3D imaging of cells and tissues, a spinning disk/epifluorescence microscope for extended studies of living cells and tissues, a selective plane illumination microscope ideal for 3D microscopy of embryos and tissue organoids and imaging workstations for quantitative 2D and 3D image analysis. In addition to conventional techniques, these systems support advanced approaches such as fluorescence lifetime microscopy (FLIM), fluorescence correlation microscopy (FCS), spectral imaging and fluorescence resonance energy transfer (FRET) studies. Effective application of these techniques is ensured by thorough training and ongoing support provided by a full-time staff of expert imaging scientists. Depending upon the needs of the investigator, Center staff is available to provide guidance on the design, conduct and interpretation of imaging studies or, as necessary, to conduct complete studies. The Center is a core resource for three NIH Centers – the Indiana O’Brien Center for Advanced Renal Research, the IUSM Cooperative Hematology Specialized Core Center and the Indiana Center for Diabetes and Metabolic Diseases. In this capacity, the Center is actively developing methods of intravital microscopy of the kidney, liver, bone marrow and pancreas. As a consequence, the ICBM is able to offer investigators with unique capabilities for intravital microscopy, supported by experienced investigators, three multiphoton microscopes and complete facilities for surgical preparation and physiological monitoring of experimental rats and mice.

<https://indianactsi.org/servicecores/core/18/>

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### **Infectious Diseases Laboratory (IDL)**

*Indiana University - Indianapolis*

The Infectious Diseases Laboratory (IDL) is a Core Laboratory Facility for the Indiana Clinical and Translational Sciences Institute (CTSI). The IDL is skilled in performing clinical research studies including the evaluation of new technologies for the diagnosis of sexually transmitted pathogens, developing novel assays to meet the needs of individual research collaborators, and tailoring services to successfully meet study objectives. Many of the assays evaluated by our laboratory have become standard diagnostic techniques. Available molecular testing includes Chlamydia trachomatis, Neisseria gonorrhoeae,

Trichomonas vaginalis, Human Papillomavirus (HPV), Herpes Simplex Virus 1 and 2, and Mycoplasma genitalium. Routine specimen types include urine, vaginal, endocervical, oral, rectal, and liquid cytology medium. Culture isolation is available upon request for Chlamydia trachomatis, Neisseria gonorrhoeae, and Trichomonas vaginalis. In addition to the main laboratory, an adjacent laboratory provides sophisticated diagnostic services specifically focused on HPV including molecular typing.

<https://indianactsi.org/servicecores/core/66/>

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### **Integrated Imaging Facility (NDIIF)**

*University of Notre Dame*

The University of Notre Dame Integrated Imaging Facility (NDIIF) is a state-of-the-art research core that makes available to the University of Notre Dame science and engineering community, as well as external customers, an integrated suite of sophisticated microscopes and imaging stations. The NDIIF also provides resident professional staff (three Ph.D.-level imaging specialists and two technicians) to guide the non-expert users. The technical staff of the NDIIF are physically located with the instrumentation at three sites on the campus of the University of Notre Dame: basement of Stinson-Remick Hall (emphasis on electron microscopy), basement in Galvin Life Sciences (emphasis on optical microscopy and in vivo imaging), and Freimann Life Sciences Center (histology).

<https://indianactsi.org/servicecores/core/28/>

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### **Integrated Imaging Facility – Histology Core (NDHC)**

*University of Notre Dame*

The University of Notre Dame Histology Core (NDHC) provides a means to examine biological processes in mice, rats, frogs, zebra fish, fruit flies, sheep bone, and even human tissue by use of immunohistochemical techniques and pathology. The facility is located in Freimann Life Sciences and it is equipped with a Shandon Citadel Tissue Processor, Leica microtome, Tissue-Tek III embedding station, and a Leica Cryostat with a special Tungsten blade attachment capable of slicing through bone. Services include tissue fixation, processing, embedding, sectioning, and staining of paraffin or frozen tissue sections. Staining of tissue sections ranges from routine H&E's (Hematoxylin-Eosin) to special stains demonstrating specific tissue structures. The Core offers immunohistochemical staining with antibodies supplied by investigators.

<https://indianactsi.org/servicecores/core/69/>

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## **Islet and Physiology Core**

*Indiana University - Indianapolis*

The Islet and Physiology Core of the Center for Diabetes and Metabolic Diseases provides investigators with the capability to obtain high quality rodent pancreatic islets for study. The Core also provides services for islet transplantation and will assist investigators who wish to perform immunohistochemistry, immunofluorescence, and/or analysis of beta cell mass on whole pancreata from mouse and rat models. We are also pleased to offer several services for rodent metabolic characterization, including performance of insulin and glucose tolerance testing, analysis of body composition and metabolic cage analysis using the TSE System cages. The Islet and Physiology Core functions as part of the Indiana Diabetes Research Center and the Indiana University School of Medicine Center for Diabetes and Metabolic Diseases, to foster new knowledge, support training, and promote basic and translational research in diabetes and related metabolic disorders and their complications.

<https://indianactsi.org/servicecores/core/62/>

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## **IUSM Center for Electron Microscopy (iCEM)**

*Indiana University - Indianapolis*

The Indiana University School of Medicine Center for Electron Microscopy (iCEM) is a full service research laboratory providing Cryo-EM, Transmission, and Scanning Electron Microscopy. iCEM can provide the technical services to help design and then implement experiments needing each type of microscopy. Free consultation with the center Director is provided with any new experiment. The service provided can apply both traditional methods and more recent technical developments to suit the investigator's needs.

<https://indianactsi.org/servicecores/core/16/>

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## **Laboratory Animal Resources (LAR)**

*Indiana University - Bloomington*

Laboratory Animal Resources (LAR) oversees and maintains 6 core animal facilities across IU-Bloomington with facilities containing racks and cages to house fish, frogs, mice, rats, hamsters, voles, rabbits and birds. Investigators requesting space to house their animals are directed to facility management. Initially, labs are requested to purchase their own animal housing equipment maintained by LAR. LAR can provide some minor equipment. Charges are based on per diem rates listed on the LAR website.

<https://indianactsi.org/servicecores/core/89/>

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## **Laboratory for Biological Mass Spectrometry (LBMS)**

*Indiana University - Bloomington*

The LBMS is broadly interested in the development and application of proteomic techniques that facilitate understanding of biological systems at the molecular level. There is a particular emphasis on several lines of research: Biochemical approaches to enrich and characterize post-translationally modified (PTM) peptides and proteins. A key aspect of large-scale PTM characterization is the ability to enrich specific classes of modified peptides. Examples include: TiO<sub>2</sub> chromatography for the enrichment of phosphopeptides; immobilized lectin chromatography for the enrichment of glycopeptides; anti-acetyllysine antibodies for the enrichment of acetylated peptides; anti-GlyGly remanant antibodies for the enrichment of peptides bearing a ubiquitin attachment sites; biotin-capture and release approaches for enriching persulfidated peptides. The development and application of large scale techniques that enable quantitative comparisons between cells or tissue in distinct physiological states. We have extensive experience with label-free quantification using the intensity of the top three peptides on a Synapt G2S equipped with ion mobility. We also commonly use stable isotope labeling strategies such as iTRAQ or TMT. Proteomic applications of Ion Mobility Spectrometry, particularly with respect to the previous two research aims.

<https://indianactsi.org/servicecores/core/50/>

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## **Light Microscopy Imaging Center (LMIC)**

*Indiana University - Bloomington*

Purpose:

- To provide state of the art light microscopy for the IU and CTSI research communities
- To promote the development of researchers that are knowledgeable and productive with the use of light microscopes.

Facility and Equipment:

- Microscopes available include Nikon NIE widefield, Applied Precision Personal Deltavision deconvolution, Leica SP5, Leica SP8 and Nikon A1 laser scanning confocal microscopes, GE Life Sciences OMX Super-Resolution microscope, Olympus OSR spinning disk confocal microscope, TIRF imaging on the Nikon A1 confocal, FLIM on the Leica SP8, Veritas Microdissection system, Leica Fluorescence Stereo Microscope
- Image processing and analysis workstations and software
- Wet bench for sample preparation
- 24-hour access available

<https://indianactsi.org/servicecores/core/57/>

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## **Macromolecular Crystallography Facility Integrated with the Crystallization Automation Facility (MCF/CAF)**

*Indiana University - Bloomington*

The Macromolecular Crystallography Facility Integrated with the Crystallization Automation Facility (MCF/CAF) provides all equipment necessary to facilitate research in all aspects of Structural Biology at IU Bloomington. New instrumentation allows high throughput macromolecular crystallography using advanced robotics. The Phoenix DT and Gryphon LCP drop setter robots commercialized by Art Robbins Instruments can set up crystallization trails with high accuracy and minimizing the total amount of purified sample used during the screening. The Minstrel HT-UV (Rigaku) is a fully automated high-throughput ultraviolet and visible crystal imaging and protein crystal monitoring system, which is coupled to two Gallery™ HT incubator storage systems. Using the CrystalTrak software in situ or online the users can control, optimize, visualize and document automatically all the crystallization screening process. In addition, the Alchemist DT (Rigaku), also connected to CrystalTrak software, allows automatic liquid handling for protein crystallization optimization. Stereoscopes coupled to high definition cameras and supplies for crystal manipulation are also provided by the facility. Moreover, computational resources facilitate structure determination and refinement with the latest programs available. In addition, IUB is a member institution in the Molecular Biology Consortium, which allows for easy and very frequent remote synchrotron access on beamline 4.2.2 at the Advanced Light Source (ALS), at Berkeley, California. Therefore, testing for crystal/diffraction quality and/or data collection is done effortless and time-effectively. MCF/CAF was founded to facilitate and encourage research endeavors in structural biology and to provide centralized resources for training and education in latest crystallographic and structural biology techniques.

<https://indianactsi.org/servicecores/core/70/>

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## **Magnetic Resonance Research Center**

*University of Notre Dame*

The Magnetic Resonance Research Center (MRRC) supports research in chemistry, biochemistry, molecular biology, engineering, and related fields. The MRRC operates six solution-state NMR spectrometers (400 to 800 MHz), a solid-state 300 MHz NMR instrument, and an X-band EPR spectrometer. Most instruments are equipped with sample changers for increased sample throughput and automation. The 800 MHz NMR instrument has a cryogenic probe and a sample changer allowing to perform sensitive measurements on a large number of low-concentration samples in an automatic mode. Users, typically, operate instruments on their own while booking instrument time through an online scheduling system, iLab. The MRRC staff provides all training free of charge. When more assistance is

needed, the MRRC may perform consulting services for a nominal fee or collaborate with research groups (with a co-authorship for MRRC staff).

<https://indianactsi.org/servicecores/core/24/>

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### **Mass Spectrometry and Proteomics Facility**

*University of Notre Dame*

Analysis of large and small molecules using several ionization methods, low or high resolution, hyphenated techniques, proteomics, and metabolomics.

<https://indianactsi.org/servicecores/core/23/>

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### **Metabolite Profiling Facility (MPF)**

*Purdue University*

Metabolite profiling is an integral component of systems biology, an exciting field that combines genomics, transcriptomics and proteomics to define cellular functionality. The Metabolite Profiling Facility provides state-of-the-art technologies that enable both qualitative (defining all components of a metabolome) and quantitative (determining differential concentrations of metabolites) metabolomics in complex biological systems. This facility employs highly sensitive mass spectrometry coupled with liquid chromatography and gas chromatography for precise sample analysis. Our scientists empower researchers with new technologies, methods development, sample analysis, expert training, and consultation.

<https://indianactsi.org/servicecores/core/42/>

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### **Multiplex Analysis Core (MAC)**

*Indiana University - Indianapolis*

The Multiplex Analysis Core (MAC) offers microplate-based immunoassay systems that can perform multiplex analysis of multiple different analytes in a single sample. The MAC uses a Bio-Plex 200 Multiplex System with High Throughput Fluidics based on Luminex technology. Commercially available Luminex-compatible kits are available to detect analytes such as cytokines, chemokines, hormones, cell signaling molecules, phosphoproteins or nucleic acids for a variety of animal species including human, mouse, cow, dog, pig, rat and primate. Custom kits are also a possibility. Samples such as sera, plasma, cell culture media, cell lysates, urine, and synovial fluid have been successfully analyzed in this facility and many

analytes are detectable in the nanogram or picogram range. The MAC provides all reagents & buffers required to run the samples (excluding kits), analysis of raw data and optimization of standard curves using vendor software, and delivery of data to the user in an Excel spreadsheet.

<https://indianactsi.org/servicecores/core/48/>

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### **NMR Facility**

*Indiana University - Bloomington*

The Indiana University Nuclear Magnetic Resonance (NMR) facility provides access to state-of-the-art instrumentation and expertise in solution NMR spectroscopy. The facility has six high resolution NMR spectrometers from 400 MHz to 800 MHz to perform all modern solution-state experiments for structural elucidation, molecular dynamics and reaction kinetic study of small molecules and large biological molecules in solution.

<https://indianactsi.org/servicecores/core/90/>

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### **Pre-Clinical Research Laboratory (PCL)**

*Purdue University*

The Pre-Clinical Research Laboratory (PCL) facilitates pre-clinical animal research by providing research expertise, technical support, facilities and equipment. The PCL is a multidisciplinary laboratory where faculty conduct advanced clinical and applied research using induced animal models ranging from rodents to pigs and sheep. Board certified veterinary surgeons associated with the laboratory are available for consultation and collaboration and technical assistance is provided by highly trained veterinary technicians.

<https://indianactsi.org/servicecores/core/41/>

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### **Preclinical Modeling and Therapeutics Core (PMTC)**

*Indiana University - Indianapolis*

The Preclinical Modeling and Therapeutics Core (PMTC) facilitates the development of pharmacological and cellular therapies for cancer. It provides advanced resources essential for the preclinical validation of novel drug targets and biomarkers of cancer. The PMTC provides expertise in: Cellular response technologies; Breeding of specialized mouse strains; Tumor modeling; In vivo therapeutics efficacy & safety testing; Hematopoietic & immune cell analysis. The Cellular Response Technologies (CRT) team



focuses on in vitro assays to evaluate angiogenesis, proliferation, cell death, and metabolism in normal and diseased cells derived from animal sources and patient samples. Multi-parametric flow cytometry is available to define cellular phenotypes and frequencies of hematopoietic, immune and cancer cell populations. The CRT is equipped with IncuCyte ZOOM and S3 imaging which provides longitudinal, real-time assessment of cellular behavior including angiogenesis, apoptosis, cell migration/invasion, immune function, and 3D spheroid formation. The CRT also oversees the Seahorse XFp analyzer for analysis of metabolic pathways. The In Vivo Therapeutics (IVT) team maintains on-site breeding colonies of specialized immunocompetent (BoyJ, C57/Bl6, BoyJ/Bl6 F1) and immunodeficient (NSG, NSGS and NRG) mouse strains. As requested and coordinated by research programs, the IVT team supports the validation of syngeneic mouse tumor models and development of patient-derived human xenografts. The IVT team manages all aspects of the IVIS SpectrumCT optical imaging system to evaluate tumor response in mouse models via bioluminescence and fluorescence modalities. The IVT team also manages the radiation facility and performs irradiation services needed for in vitro and in vivo experiments, including hematopoietic stem-cell transplantations.

<https://indianactsi.org/servicecores/core/111/>

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### **Proteomics Facility**

*Purdue University*

The Purdue University Proteomics Facility (PPF) provides innovative state-of-the-art LCMS/MS analysis of proteins in clinical, environmental and other biological samples. As a shared facility of the Bindley Bioscience Center (BBC) in Discovery Park of Purdue University University, the facility enables both targeted and global analysis of proteins, their post-translational modifications and analysis of protein complexes and protein-protein interactions. Coupled with different chromatographic separation techniques, modern mass spectrometric instrumentation, and advanced scientific and bioinformatics expertise, the facility provides unique opportunities for researchers at Purdue University and beyond to perform quantitative analysis of proteins in complex biological samples using both global, as well as, targeted proteomic approaches.

<https://indianactsi.org/servicecores/core/43/>

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### **Purdue University MRI Facility**

*Purdue University*

The Purdue University Magnetic Resonance Imaging (MRI) Facility is the union of three MR scanners (and facilities) located directly on the campus of Purdue University University. The Small Animal MRI Facility, located in the Bindley Bioscience Center, houses a Bruker Biospec 7T MRI system. The Life Sciences MRI Facility houses a 3T Siemens MAGNETOM Prisma MRI system, and the Engineering MRI Facility houses a

GE Discovery MR750 3T MRI system. The latter two share a building and several resources. All three systems are available for research involving magnetic resonance imaging (MRI), MR spectroscopy (MRS), and other MR applications.

<https://indianactsi.org/servicecores/core/4/>

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## **Regenstrief Data Services**

*Indiana University - Indianapolis*

The mission of Regenstrief Data Services (RDS) is to leverage Regenstrief Institute's data and informatics assets to support the pursuit of innovative healthcare solutions. RDS provides data and expertise to those seeking answers to important scientific questions in all stages of development, from study design to algorithm validation to implementation. Capabilities: RDS is a group that leverages decades of experience in research and clinical informatics. Regenstrief analysts and engineers can create customized datasets from records on millions of patients, match information from disparate data sources, build prototype applications to answer research questions, provide guidance on data usage and expertise in study planning, manage REDCap databases, deliver data for training and validation of machine learning algorithms, and much more. Resources: RDS provides research access to the Indiana Network for Patient Care (INPC), managed by Indiana Health Information Exchange, which contains 13 billion data elements from more than 100 hospital systems and tens of thousands of providers across the state of Indiana. Regenstrief also collaborates with Indiana CTSI to provide data from regional and national data network collaborations and the Indiana University Melvin and Bren Simon Cancer Center to provide cancer-related data. RDS continues to develop new tools, data sources and capabilities to make data more accessible to address research questions and improve health and wellbeing.

<https://indianactsi.org/servicecores/core/75/>

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## **Transgenic and Genome Editing Facility (TGEF)**

*Purdue University*

The TGEF Shared Resource is a state-of-the-art facility that offers a large number of services, including the creation of transgenic, gene knock-in and knock-out mouse and rat models for gain-of-function and loss-of-function experiments. Model systems based on transgenic and knock-in/knock-out strategies provide approaches that are developmentally, anatomically and physiologically relevant to human disease, and that can supplement traditional xenograft models for testing new anti-cancer therapies. Genome-edited animal models provide valuable reagents for studies ranging from the regulatory mechanisms governing gene expression patterns to cell-cell interactions, cell cycle control and regulation of signal transduction pathways.

<https://indianactsi.org/servicecores/core/51/>

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## **Translation Core**

*Indiana University - Indianapolis*

The Translation Core provides services that facilitate the conduct of research involving human subjects, including supplying low-cost, high-quality analyte measurements for a variety of hormones, cytokines, lipids and other analytes. Translation Core human studies services include phenotyping (i.e. GTT, clamp studies, tracer studies), and access to a biobank of human tissues and serum. The core has the capacity to undertake specialized and customizable laboratory services, including bringing online assays not previously available at IU School of Medicine.

<https://indianactsi.org/servicecores/core/73/>

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## **Translational Pharmacology Facility**

*Purdue University*

The Purdue University Translational Pharmacology (PTP) Core conducts in vivo studies that avoid the stress-induced complications of biofluid collection and provide a translational model more closely aligned with drug metabolism in humans. The facility serves individual investigators, government entities and private companies. The PTP synergizes with the Metabolite Profiling Facility in the Bindley Bioscience Center, which facilitates the pharmacological analysis of samples collected during the studies.

<https://indianactsi.org/servicecores/core/52/>

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