Cleveland Clinic
Lerner Research Institute

Service Name	Core	Contact	Description
10X or single cell omics	Flow Cytometry	Kewal Asosingh, Ph.D., Staff, Core Director Location: NB2-28a Phone: 216-444-0891 Email: asosink@ccf.org	Single-cell gene transcriptome analyses using 10x Chromium Controller.
3D-EM Ultrastructure	Electron Microscopy	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	The ability to image and view cells in 3 dimensions at the ultrastructural level
3-D Microscope Imaging	Imaging	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	"Optical sections" or "Z Stacks" of samples can be obtained on confocal microscopes. The stacks can be reconstructed with software that allows 3-D visualization and analysis.
Analysis Of Whole Blood CBCs	Hematology Analysis	Alan Pratt MT (ASCP), Core Manager Location: NE6-205 Phone: 216-444-4299 Fax: 216-636-2070 Email: pratta@ccf.org	Absolute and percent Reticulocyte Count (Retic), CBC plus white cell differential counts (CBC/Diff), CBC/Diff plus retic (CBC/diff/retic), CBC/retic, Complete Blood Count (CBC)
Antibody Titration	Immunohistochemistry	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	Experimental determination of appropriate antibody concentration for optimal imaging
Antigen Conjugations	Hybridoma	Earl Poptic, Core Manager, Location:NB1-25 Phone: 216-445-6635 Fax: 216-445-0515 Email: poptice@ccf.org	Peptide conjugation to KLH by a glutaraldehyde protocol
Bacteriological Media	Media Preparation	Carmel M. Burns, Core Manager Location: NB1-25 Phone: 216-444-5814 Email: burnsc@ccf.org	Media used for the growth of bacteria
Biohazard Waste Processing	Glassware	Carmel M. Burns, Core Manager Location: NB1-25 Phone: 216-444-5814 Email: burnsc@ccf.org	Live or contagious waste can be decontaminated by the autoclave process before disposal; this service is available through the glassware core.
Buffers	Media Preparation	Carmel M. Burns, Core Manager Location: NB1-25 Phone: 216-444-5814 Email: burnsc@ccf.org	A buffer is an aqueous solution that has a highly stable pH. (i.e. Phosphate and Tris Buffered Saline)
CD Spectroscopy	Molecular Biotechnology	Smarajit Bandyopadhyay Ph.D., Project Staff, Core Director Location: NB2-37 Phone: 216-445-7095 Fax: 216-444-9404 Email: bandyos1@ccf.org	A Circular Dichroisms (CD) Spectropolarimeter (Model J-815 from Jasco) is a type of light absorption spectroscopy that can provide information on the structures of optically active biological macromolecules. CD spectra of proteins between 250 and 185 nm can be analyzed for different secondary structural types such as, alpha helix, parallel and antiparallel beta sheet, turn and other random structures.

Service Name	Core	Contact	Description
Cell Culture Media	Media Preparation	Carmel M. Burns, Core Manager Location: NB1-25 Phone: 216-444-5814 Email: burnsc@ccf.org	A growth medium to support the growth of cells (i.e. RPMI and DMEM)
Cell Culture Training	Cell Culture	Carmel M. Burns, Core Manager Location: NB1-25 Phone: 216-444-5814 Email: burnsc@ccf.org	The Core provides training on good lab practice to new researchers. The training can be tailored to individual needs and includes aseptic technique and culturing and maintaining cell lines.
Clinical Research Unit	CRU	LaTasha Bolden, Dept. Manager Location: M51 Phone: 216-445-8496 Email: boldenl@ccf.org	Facilities and personnel to conduct clinical research studies. Pre-proposal consultations, protocol-specific nursing, pre-analytic lab, study coordination services.
Cloning	Hybridoma	Earl Poptic, Core Manager, Location:NB1-25 Phone: 216-445-6635 Fax: 216-445-0515 Email: poptice@ccf.org	Limiting dilution cloning of five chosen hybridoma cell lines. Collection of media samples for screening by the investigator. Minimal scale up and preparation of frozen stocks (5 vials) of clones are completed by HCF. Includes labor and supplies. This phase goes 4-8 weeks. Freezing Cells from culture expansion associated with mAb production can be frozen down for storage in Liq N2. The freezing media is 90% FBS:10% DMSO and the cells are at a concentration of 2-4 x 106 cells/ml.
Confocal Microscope	Imaging	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	Laser-based confocal microscopes allow us to focus on a thin "optical section" within a sample, thus removing the out-of-focus light that comes from other layers of the sample. This offers not just a clearer image, but clarifies the location of the signal within a cell or tissue. Both samples on slides and live samples can be examined.
Critical Point Drying	Electron Microscopy	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	Process for drying a sample for scanning electron microscopy in a way that does not cause surface deformation
Cryogenic Storage	Cell Culture	Carmel M. Burns, Core Manager Location: NB1-25 Phone: 216-444-5814 Email: burnsc@ccf.org	The Core can accommodate the storage of cryovials. The core offers this service to LRI researchers for backup storage of precious cell lines.
Cryosectioning	Histology	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	Frozen Tissue is cut into sections and placed on slides using a cryostat.
Direct Mycoplasma Testing	Cell Culture	Carmel M. Burns, Core Manager Location: NB1-25 Phone: 216-444-5814 Email: burnsc@ccf.org	This method uses an enriched agar to support the growth of colonies. Cells and supernatant are swabbed onto agar and incubated in a modular incubator chamber. Samples are viewed microscopically every other day for 2 weeks. Mycoplasma contamination is detected by the appearance of a “fried egg “-like growth.
EBV Transformations/ Separation Of Whole Blood	Cell Culture	Carmel M. Burns, Core Manager Location: NB1-25 Phone: 216-444-5814 Email: burnsc@ccf.org	The Cell Core can provide immortalization of lymphocytes with the Epstein Barr Virus (EBV). The core will separate the whole blood, collect the lymphocytes, infect with EBV, and establish a cell line.

Service Name	Core	Contact	Description
EDAX	Electron Microscopy	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	Determination of the elemental composition of a sample prepared for EM observation
Electron Microscope (Scanning And Transmission)	Electron Microscopy	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	Uses a beam of electrons (rather than photons) to investigate the ultrastructure of a sample. Resolution down to .034 um
Elemental Analysis (with SEM)	Electron Microscopy	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	Determination of the elemental composition of a sample prepared for EM observation
ELISA	Hybridoma	Earl Poptic, Core Manager, Location:NB1-25 Phone: 216-445-6635 Fax: 216-445-0515 Email: poptice@ccf.org	We can perform antigen-capture or sandwich type ELISA's to measure antibody levels in tissue culture supernatant.
EM Sample Preparation	Electron Microscopy	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	The preparation of a sample for cutting and staining that will allow for it to be observed in a transmission electron microscope
Endotoxin Testing	Media Preparation	Carmel M. Burns, Core Manager Location: NB1-25 Phone: 216-444-5814 Email: burnsc@ccf.org	The Endoscan V software system uses Kinetic Turbidimetrics to provide quantitative Endotoxin results for in process and end product samples. The assay sensitivity available for use is 0.06EU/mL using a standard curve of 5-0.05 EU/mL. The Second method uses an Endosafe-PTS- A rapid, point of use test system that utilizes Limulus Amebocyte Lysate (LAL) reagents in a test cartridge with a handheld spectrophotometer. The PTS can effectively be used to obtain fast; quantitative LAL test results in about 15 minutes.
Eradication Of Mycoplasma From Cell Cultures	Cell Culture	Carmel M. Burns, Core Manager Location: NB1-25 Phone: 216-444-5814 Email: burnsc@ccf.org	The core will test for and eradicate mycoplasma from your cells. If mycoplasma contamination is present in your cultures the core will begin to eradicate using specialized antibiotics. This will take several weeks to complete. At the end of the treatment the core will provide clean cells growing in culture as well as several frozen vials.
FBS- Heat Inactivated Or Regular	Media Preparation	Carmel M. Burns, Core Manager Location: NB1-25 Phone: 216-444-5814 Email: burnsc@ccf.org	Fetal Bovine Serum, the most widely used serum-supplement due to its very low levels of antibodies and the fact that it contains more growth factors, allowing for versatility in many different cell culture applications.
Flow Cytometry Consultation	Flow Cytometry	Kewal Asosingh, Ph.D., Staff, Core Director Location: NB2-28a Phone: 216-444-0891 Email: asosink@ccf.org	Assistance with panel design, controls, troubleshooting, data analysis and interpretation, grant writing, budget, generation of publication quality figure according to the current standards of the International Society for Advancement of Cytometry (ISAC).
Fluorescence Microscope	Imaging	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	Microscopes with specialized illumination and detection that allow the imaging of fluorescently tagged specimens — both on slides and in wells, dishes and flasks.

Service Name	Core	Contact	Description
Freezing Cells	Hybridoma	Earl Poptic, Core Manager, Location:NB1-25 Phone: 216-445-6635 Fax: 216-445-0515 Email: poptice@ccf.org	The Core will freeze back hybridomas in freezing media from actively growing cells.
Frozen Sectioning	Histology	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	Frozen tissue is cut into sections and placed on slides using a cryostat.
Fusion Of Cells	Hybridoma	Earl Poptic, Core Manager, Location:NB1-25 Phone: 216-445-6635 Fax: 216-445-0515 Email: poptice@ccf.org	Fusion of spleen cells from chosen mouse to myeloma cell line. Plating of fused cells and collection of media samples for screening by the investigator. Includes labor and supplies. This phase goes 4-6 weeks.
Gene Expression Profiling Services	Genomics	Yu-Wei Cheng, Ph.D., Staff, Core Director Location: R4-058 Phone: 216-445-0757 Email: chengy@ccf.org	Clients provide the Core with arrays (human or mouse) and total RNA (minimum of 1 microgram, 10 ul @ 100 ng/ul). The Core will perform an RNA quality control step, process the RNA samples if they pass, hybridize to the arrays and produce relevant output files (at the Cleveland Clinic the Core can install the Illumina GenomeStudio software on a PC in your lab). Supported products: Whole genome gene expression arrays e.g. Whole- Genome Expression Beadchips for Gene Expression Analysis HumanHT-12 v4 Expression BeadChipMouseWG-6 v2 Expression BeadChip MouseRef-8 v2 Expression BeadChip
Genotyping Services	Genomics	Yu-Wei Cheng, Ph.D. , Staff, Core Director Location: R4-058 Phone: 216-445-0757 Email: chengy@ccf.org	Clients provide the Core with arrays (Infinium or GoldenGate) and DNA (generally 10 ul @ 50 ng/ul). The Core will process the DNA samples, hybridize to the arrays and produce relevant output files (at the Cleveland Clinic the Core can install the Illumina genomeStudio software on a PC in your lab). Supported products: (most) Infinium and all Goldengate products. E.g. Core Array Family Omni array Family Custom Genotyping
Glassware Services	Glassware Core	Carmel M. Burns, Core Manager Location: NB1-25 Phone: 216-444-5814 Email: burnsc@ccf.org	Collection of glassware from labs daily Storage of sterile glassware Daily delivery and stocking of glassware in lab areas
Glow Discharge	Electron Microscopy	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	Removal of the positive charge from an electron microscope grid to prevent dispersion of sample
High Throughput Sequencing Illumina	Genomics	Yu-Wei Cheng, Ph.D., Staff, Core Director Location: R4-058 Phone: 216-445-0757 Email: chengy@ccf.org	
Histology	Histology	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	The processing, wax embedding, cutting and staining of tissue for observation in a microscope

Service Name	Core	Contact	Description
Image Analysis/ Quantitation	Imaging	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	Various software programs allow microscope images to be examined for data such as area, intensity, volume, velocity, trajectory, etc. as required for 2-D, 3-D, and time-lapse experiments.
Immuno EM / Immunogold Labeling	Electron Microscopy	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	Labeling with gold-tagged antibodies for ultrastructural localization of proteins in cells and tissues
Immunohistochemistry	Immunohistochemistry	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	Staining tissues with antibodies to visualize the expression levels and distribution of specific proteins within cells and tissues.
Immunophenotyping and or enumeration of extracellular vesicles	Flow Cytometry	Kewal Asosingh, Ph.D., Staff, Core Director Location: NB2-28a Phone: 216-444-0891 Email: asosink@ccf.org	Volumetric quantification of extracellular vesicles (micro-particles and exosomes) in biological fluids or cell culture supernatant using Apogee Micro Flow Cytometry or Zetaview nanoparticle tracking analyzer.
Immunophenotyping of cells	Flow Cytometry	Kewal Asosingh, Ph.D., Staff, Core Director Location: NB2-28a Phone: 216-444-0891 Email: asosink@ccf.org	Analysis of cell surface and or intracellular expression of markers (cytokines, CD proteins, phosphoproteins etc.) using flow cytometry.
Indirect Mycoplasma Testing	Cell Culture	Carmel M. Burns, Core Manager Location: NB1-25 Phone: 216-444-5814 Email: burnsc@ccf.org	The core also uses a quick method to detect mycoplasma. This kit detects the four most common types of mycoplasma to contaminate cells. This is useful in determining the type of mycoplasma present.
Infrared Scanner (Odyssey)	Imaging	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	Infrared Scanning of gels, membranes, or slides on Li-Cor Odyssey
Insect Cell Culture	Cell Culture	Carmel M. Burns, Core Manager Location: NB1-25 Phone: 216-444-5814 Email: burnsc@ccf.org	The Core is equipped with a 27°C incubator that is an optimum temperature to support the growth of insect cells.
Insect Media	Media Preparation	Carmel M. Burns, Core Manager Location: NB1-25 Phone: 216-444-5814 Email: burnsc@ccf.org	Media for insect cell culture
In situ Hybridization (ISH/FISH)	Immunohistochemistry	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	Chromogenic or Fluorescent In Situ Hybridization for localizing DNA or RNA in tissue.
Integra Culture System	Hybridoma	Earl Poptic, Core Manager, Location:NB1-25 Phone: 216-445-6635 Fax: 216-445-0515 Email: poptice@ccf.org	For production of mAb from cell lines. This system is intended for production of 30-60mg of mAb per month in the smaller system and 100-200mg of mAb in the larger system. Average concentration is 1.5mg/ml. The production schedule average is 8 weeks.

Service Name	Core	Contact	Description
Isothermal Titration Calorimetry	Molecular Biotechnology	Smarajit Bandyopadhyay Ph.D., Project Staff, Core Director Location: NB2-37 Phone: 216-445-7095 Fax: 216-444-9404 Email: bandyos1@ccf.org	Isothermal Titration Calorimetry (ITC) is the gold standard for measuring biomolecular interactions. ITC simultaneously determines all binding parameters (n, K, δH and δS) in a single experiment – information that cannot be obtained from any other method. When substances bind, heat is either generated or absorbed. ITC is a thermodynamic technique that directly measures the heat released or absorbed during a biomolecular binding event. Measurement of this heat allows accurate determination of binding constants (KB), reaction stoichiometry (n), enthalpy (δH) and entropy (δS), thereby providing a complete thermodynamic profile of the molecular interaction in a single experiment. Because ITC goes beyond binding affinities and can elucidate the mechanism of the molecular interaction, it has become the method of choice for characterizing biomolecular interactions.
Laboratory Testing	Laboratory Diagnostics	Alan Pratt MT (ASCP), Core Manager Location: NE6-205 Phone: 216-444-4299 Fax: 216-636-2070 Email: pratta@ccf.org	Automated clinical chemistry assays, Drugs of Abuse/ Toxicology/ Specific Proteins/ Metabolic Special Chemistry/ Fertility/ Pregnancy/ Therapeutic Drug Monitoring/ ELISA based testing
Large-scale Antibody Production	Hybridoma	Earl Poptic, Core Manager, Location:NB1-25 Phone: 216-445-6635 Fax: 216-445-0515 Email: poptice@ccf.org	The Hybridoma Core uses a static cell culture system – the Integra Flask – to produce high concentration (>.5mg/ml) monoclonal antibodies. This can be done in serum-free or using ultra-low IgG/IgM serum. Yields can be as high as 100mg/month/flask.
Large-scale Antibody Purification	Hybridoma	Earl Poptic, Core Manager, Location:NB1-25 Phone: 216-445-6635 Fax: 216-445-0515 Email: poptice@ccf.org	We can purify up to 80mg of IgG from one sample using a protein G column
Laser Capture Microdissection	Imaging	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	Use of a specialized microscope equipped with lasers to cut and collect individual cells or small sections of tissues or cultured cells.
LB Agar Plates	Media Preparation	Carmel M. Burns, Core Manager Location: NB1-25 Phone: 216-444-5814 Email: burnsc@ccf.org	Luria Broth agar plates are typically used as a growth substrate for the culture of bacteria. Selective growth compounds may also be added to the media, such as antibiotics. (i.e. Ampicillin and Kanamycin) Custom plates are also available.
LB Broth	Media Preparation	Carmel M. Burns, Core Manager Location: NB1-25 Phone: 216-444-5814 Email: burnsc@ccf.org	Luria Broth, a nutritionally rich medium used for the growth of bacteria
Light Microscope	Imaging	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	Samples can be viewed on a microscope using visible light for brightfield on fluorescence observation.

Service Name	Core	Contact	Description
Liquid Nitrogen Storage Of Cells	Hybridoma	Earl Poptic, Core Manager, Location:NB1-25 Phone: 216-445-6635 Fax: 216-445-0515 Email: poptice@ccf.org	Storage for cloned cell lines. The stored cell lines must be mycoplasma free.
Live Cell Imaging	Imaging	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	Inverted microscopes allow the imaging of live cells in culture acquiring either still photos or time-lapse movies.
Method Development	Proteomics And Metabolomics	Belinda Willard Ph.D., Staff, Core Director Location: NE1-251 Phone: 216-444-7170 Fax: 216-444-9404 Email: willarb@ccf.org	It is essential to provide accurate, reliable, and consistent data in analytical services. Based on the need of investigators, we provide services for developing analytical methods using a) HPLC-UV, b) HPLCFluorescence, and c) LC/MS/MS for analysis of endogenous compounds and xenobiotics in biological matrices like plasma, urine and tissues.
Methylation Services	Genomics	Yu-Wei Cheng, Ph.D., Staff, Core Director Location: R4-058 Phone: 216-445-0757 Email: chengy@ccf.org	Clients provide the Core with arrays (Infinium HumanMethylation450) and DNA (10 ul @ 50-100 ng/ul). The Core will process the DNA samples, hybridize to the arrays and produce relevant output files (at the Cleveland Clinic the Core can install the Illumina GenomeStudio software on a PC in your lab). Bisulphite conversion can also be done in the Core Supported products: Infinium HumanMethylation450.
Molecular Weight Analysis	Proteomics And Metabolomics	Belinda Willard Ph.D., Staff, Core Director Location: NE1-251 Phone: 216-444-7170 Fax: 216-444-9404 Email: willarb@ccf.org	Determination of the molecular weight of a small molecule, peptide or protein.
Mouse Injections	Hybridoma	Earl Poptic, Core Manager, Location:NB1-25 Phone: 216-445-6635 Fax: 216-445-0515 Email: poptice@ccf.org	We will perform intraperitoneal injections of antigen into mice to elicit an immune response for the production of monoclonal antibodies.
Multi-Photon Microscope	Imaging	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	A multi-photon microscope allows deeper penetration of light into a sample (up to 500um rather than the 100um of standard confocals) and can be used for tissue slices or anesthetized animals.
Multiplex IHC	Immunohistochemistry	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	Labeling tissues with 3-8 fluorescent antibodies simultaneously to localize multiple proteins in tissues.
Mycoplasma Testing	Cell Culture	Carmel M. Burns, Core Manager Location: NB1-25 Phone: 216-444-5814 Email: burnsc@ccf.org	The core routinely performs a direct and an indirect method of testing for Mycoplasma. The following 2 tests are done in parallel.

Service Name	Core	Contact	Description
Nucleic Acid Quality/ quantity Assessment Agilent Bioanalyzer Chip, Nanodrop And Qubit Services	Genomics	Yu-Wei Cheng, Ph.D., Staff, Core Director Location: R4-058 Phone: 216-445-0757 Email: chengy@ccf.org	Characterization of the integrity of RNA and DNA samples using Agilent Bioanalyzer chips. Samples may be destined for whole genome gene expression, genotyping, next gen sequencing library preparation and sequencing. Sample quantification via Nanodrop and Qubit are also offered.
Nucleic Acid Shearing Covaris Services	Genomics	Yu-Wei Cheng, Ph.D., Staff, Core Director Location: R4-058 Phone: 216-445-0757 Email: chengy@ccf.org	Nucleic acid fragmentation is a crucial first step in NGS sequencing workflow. Covaris S220 shears DNA without GC bias or thermal damage. The Adaptive Focused Acoustics™ (AFA) technology is firmly established as the fragmentation method of choice for NGS library generation.
Paraffin Embedding	Histology	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	Placement of processed samples into wax blocks for sectioning onto slides.
Peptide Synthesis	Molecular Biotechnology	Smarajit Bandyopadhyay Ph.D., Project Staff, Core Director Location: NB2-37 Phone: 216-445-7095 Fax: 216-444-9404 Email: bandyos1@ccf.org	Peptides are complex molecules and each peptide sequence is unique with regard to its chemical and physical properties. Peptides are synthesized by the solid-phase method using Fmoc chemistry using a liberty peptide synthesizer(CEM Inc.) based on microwave technology and an Omega 396 multiple peptide synthesizer (Advanced ChemTech).
Plastic Embedding	Histology	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	Special form of histological tissue preparation that uses plastic resin rather than paraffin wax
Polyclonal Antibody Production	Hybridoma	Earl Poptic, Core Manager, Location:NB1-25 Phone: 216-445-6635 Fax: 216-445-0515 Email: poptice@ccf.org	This service will be offered on a limited basis depending on available housing. One rabbit per antigen. Includes animal purchase and board, 6 injections, 1 test bleed, 3 production collections, final bleed and labor for 120 days. Time course can be extended for additional fee based on animal board and labor charges. The goal is to provide a total of 100mls of serum, but this is not guaranteed. Allow 1-2 weeks for animals to arrive.
Post-translational Modification analysis: Global	Proteomics And Metabolomics	Belinda Willard Ph.D., Staff, Core Director Location: NE1-251 Phone: 216-444-7170 Fax: 216-444-9404 Email: willarb@ccf.org	Identification and quantitation of global post-translational modification sites from a complex samples such as cell lysates or tissue homogenates. These experiments are performed using modification specific enrichment. The post-translational modifications that can be identified include phosphorylation, acetylation, and, ubiquitination.
Post-translational Modification Analysis: Protein Specific	Proteomics And Metabolomics	Belinda Willard Ph.D., Staff, Core Director Location: NE1-251 Phone: 216-444-7170 Fax: 216-444-9404 Email: willarb@ccf.org	Identification of protein post-translational modification sites from a protein sample. These experiments are performed with either in-gel, on-bead, or in-solution digestion usually using multiple proteases. Some examples of post-translational modifications that can be identified include phosphorylation, acetylation, methylation, ubiquitination, along with others.

Service Name	Core	Contact	Description
Preclinical Research Facilities	Translational Research	Alan Pratt MT (ASCP), Core Manager Location: NE6-205 Phone: 216-444-4299 Fax: 216-636-2070 Email: pratta@ccf.org	AFIC/ GCIC Operating Theater. Two theaters are available
Preparing Your Samples For Mycoplasma Testing	Cell Culture	Carmel M. Burns, Core Manager Location: NB1-25 Phone: 216-444-5814 Email: burnsc@ccf.org	The cells should be grown without antibiotics for 3-4 days. Collect cells for testing by scraping the adherent cells and collecting about 5mls of cells and media. For suspension cells, grow without antibiotics and supply 5mls for testing.
Protein Identification and Quantitation	Proteomics And Metabolomics	Belinda Willard Ph.D., Staff, Core Director Location: NE1-251 Phone: 216-444-7170 Fax: 216-444-9404 Email: willarb@ccf.org	Identification and quantitation of proteins. These experiments can be performed on proteins in gel bands, affinity purified on magnetic beads, or in-solution. Protein quantitation can be performed using label free methods, isobaric tagging, or SILAC. For complex samples such as cell lysates or tissue homogenates, the samples can be pre-fractionated prior to LC-MS/MS to increase proteome coverage.
Purifications	Hybridoma	Earl Poptic, Core Manager, Location:NB1-25 Phone: 216-445-6635 Fax: 216-445-0515 Email: poptice@ccf.org	We can purify monoclonal or polyclonal antibodies using Protein G or an epitope specific affinity column
Quantification and or detection of expressible fluorescent proteins	Flow Cytometry	Kewal Asosingh, Ph.D., Staff, Core Director Location: NB2-28a Phone: 216-444-0891 Email: asosink@ccf.org	Analysis of fluorescent report genes using flow cytometry.
Quantification and or detection of fluorescent probes of cell function	Flow Cytometry	Kewal Asosingh, Ph.D., Staff, Core Director Location: NB2-28a Phone: 216-444-0891 Email: asosink@ccf.org	Analysis of fluorescent cell function specific probes using flow cytometry.
Quarterly Testing Of DI Water	Glassware Core	Carmel M. Burns, Core Manager Location: NB1-25 Phone: 216-444-5814 Email: burnsc@ccf.org	DI water from throughout the Lerner complex is tested for Endotoxins on a quarterly basis. Results are available in NB1-15.
Readout Systems - Using The Synergy4 Multi-detection Multiplate Reader	Molecular Screening	Earl Poptic, Core Manager, Location:NB1-25 Phone: 216-445-6635 Fax: 216-445-0515 Email: poptice@ccf.org	General requirements, Optimization Screening, Data processing, shRNA bank
Rodent Survival Surgery Procedure Room	Translational Research	Alan Pratt MT (ASCP), Core Manager Location: NE6-205 Phone: 216-444-4299 Fax: 216-636-2070 Email: pratta@ccf.org	Two bays with surgical microscopes and machines to administer volatile anesthetics (isoflurane).Vivid 7 echocardiography machine.

Service Name	Core	Contact	Description
Roller Bottle Cultures	Cell Culture	Carmel M. Burns, Core Manager Location: NB1-25 Phone: 216-444-5814 Email: burnsc@ccf.org	The Core has the capability of producing large scale adherent cells cultured in either 850 cm" or 1750 cm" roller bottles grown on a roller apparatus in a 37°C warm room. This is a very suitable method when large amounts of cells are required. This method also works well with suspension cells.
RNA Scope	Immunohistochemistry	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	Chromogenic or fluorescent in situ hybridization for localizing RNA in tissue
Screening Chemicals	Molecular Screening	Earl Poptic, Core Manager, Location:NB1-25 Phone: 216-445-6635 Fax: 216-445-0515 Email: poptice@ccf.org	Stage I: establishment of the readout assay Stage II: primary screening Stage IV: optimizing hits, SAR
Sectioning	Histology	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	The cutting of embedded tissue onto slides (also "cryosectioning")
Serum Testing	Cell Culture	Carmel M. Burns, Core Manager Location: NB1-25 Phone: 216-444-5814 Email: burnsc@ccf.org	The core screens FBS from different sources for optimum cell growth. The batch that proves most compatible to a broad range of cell types is provided for LRI researchers.
Single Cell Sequencing	Genomics	Yu-Wei Cheng, Ph.D., Staff, Core Director Location: R4-058 Phone: 216-445-0757 Email: chengy@ccf.org	In collaboration with the Flow Cytometry Core, the Genomics Core can prepare libraries and sequence single-cell mRNA libraries generated with the 10X Chromium
Single cell suspension preparation	Flow Cytometry	Kewal Asosingh, Ph.D., Staff, Core Director Location: NB2-28a Phone: 216-444-0891 Email: asosink@ccf.org	Assistance, guidance with the preparation of high quality single cell suspension for various assays.
Slide Scanning	Imaging	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	A large region of interest - or even the whole surface of a slide - can be imaged on a special scanner.
Specialty And Custom Media	Media Preparation	Carmel M. Burns, Core Manager Location: NB1-25 Phone: 216-444-5814 Email: burnsc@ccf.org	A custom recipe prepared according to researchers instructions or guidelines
Spinner Cultures Cells	Cell Culture	Carmel M. Burns, Core Manager Location: NB1-25 Phone: 216-444-5814 Email: burnsc@ccf.org	Useful for the production of large volumes of suspension cells. Vessels come in various sizes that are used in conjunction with a magnetic stirrer spinner base. The core can provide volumes from 100mls-10L.
Sputter Coating	Electron Microscopy	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	Samples for scanning electron microscopy are first prepared by depositing an ultra-thin layer of gold on the surface

Service Name	Core	Contact	Description
Stereomicroscope	Imaging	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	Dissecting microscope with color digital camera allows the imaging of large unmounted samples with brightfield and/or fluorescence illumination.
Sterile and or BSL2 cell sorting	Flow Cytometry	Kewal Asosingh, Ph.D., Staff, Core Director Location: NB2-28a Phone: 216-444-0891 Email: asosink@ccf.org	Purification of specific cell subsets using electrostatic cell sorting.
Sterility Testing	Cell Culture	Carmel M. Burns, Core Manager Location: NB1-25 Phone: 216-444-5814 Email: burnsc@ccf.org	The Core offers sterility services using in-house prepared broths along with regular mycoplasma and endotoxin testing. Quarterly testing results are available.
Sterility Testing	Media Preparation	Carmel M. Burns, Core Manager Location: NB1-25 Phone: 216-444-5814 Email: burnsc@ccf.org	Verifying the sterility of our products or yours through QC broths, endotoxin and Mycoplasma testing
Sterilization And Autoclaving	Glassware Core	Carmel M. Burns, Core Manager Location: NB1-25 Phone: 216-444-5814 Email: burnsc@ccf.org	Washing and Sterilization of all types of glassware, Sterile Pipettes and Pasteurs, Autoclaving of liquids and dry Materials, Washing and Sterilization of special glassware, Sterile Tips and custom tips available, Sterile DI water
Storm 820 Phosphorimager	Molecular Biotechnology	Smarajit Bandyopadhyay Ph.D., Project Staff, Core Director Location: NB2-37 Phone: 216-445-7095 Fax: 216-444-9404 Email: bandyos1@ccf.org	The Storm system is an optical scanner that produces digital images of radioactive or fluorescently labeled samples. The Storm 820 Phosphorimager is used only to scan a phosphor screen that has been exposed with a radioactive sample. Users will need to provide their own phosphor screen. One can analyze the results of a scan with ImageQuant TL which has been installed on the data acquisition computer. Storm 820 is located in NB-5, near the elevators. A sign-up log book is available next to the instrument.
Surface Plasmon Resonance (SPR)	Molecular Biotechnology	Smarajit Bandyopadhyay Ph.D., Project Staff, Core Director Location: NB2-37 Phone: 216-445-7095 Fax: 216-444-9404 Email: bandyos1@ccf.org	Surface Plasmon Resonance (SPR) has been used to monitor macromolecular interactions in real time. The Biacore 3000 system is an instrument that uses SPR technology for measuring the interactions of macromolecules with each other, and with small ligands. One of the ligands is immobilized on carboxymethylated dextran over a gold surface, while the second partner (analyte) is captured as it flows over the immobilized ligand surface. Most ligands can be directly immobilized onto the surface of the chip via amino groups, carbohydrate moieties, or sulfhydryl groups. Others are immobilized indirectly through the use of biotinylation of the ligand (such as biotinylated peptides or oligonucleotides), or through immobilized monoclonal antibodies (such as anti-GST). Typical amounts of a protein ligand needed for an immobilization reaction is about 1 µg. The immobilized ligands are remarkably resilient and maintain their biological activity.

Service Name	Core	Contact	Description
Targeted Metabolomics	Proteomics And Metabolomics	Belinda Willard Ph.D., Staff, Core Director Location: NE1-251 Phone: 216-444-7170 Fax: 216-444-9404 Email: willarb@ccf.org	Targeted LC-MS/MS or GC-MS/MS analysis of small molecule metabolites in biological matrices. Several metabolite panels are available including amino acids, TCA metabolites, short chain fatty acids, fatty acids, oxidized fatty acids, along with others. Please contact the core to see if methods are in place for any metabolites of interest. The Metabolomics core will also perform method development for metabolites not currently available in a targeted panel.
Thick Sectioning (for EM)	Electron Microscopy	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	Thick sections in the 1-2 µm range can be stained and viewed in a light microscope to determine the right area of the specimen for ultra-thin sectioning.
Thin Sectioning (for EM)	Electron Microscopy	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	The plastic embedded sample must be cut with a diamond knife into extremely thin slices for viewing in the electron microscope. Ultra-thin sections range from 50-100 nm in thickness.
Time-lapse Imaging	Imaging	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	Inverted microscopes allow the imaging of live cells in culture over a determined period of time and at set intervals, producing time-lapse movies.
TIRF Microscope	Imaging	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	Total Internal Reflection Fluorescence with a microscope using a laser and specially designed optics to view a thin region of a sample (less than 200 nm) attached to glass.
Tissue Processing	Histology	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	The preparation of tissue for cutting and staining that involves dehydration and infiltration with paraffin or plastic
Tissue Staining	Histology	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	Use of various dyes to render tissue visible and to mark particular features
Two-Photon Microscope	Imaging	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	A multi-photon microscope allows deeper penetration of light into a sample (up to 500um rather than the 100um of standard confocals) and can be used for tissue slices or anesthetized animals.

Service Name	Core	Contact	Description
Untargeted Metabolomics	Proteomics And Metabolomics	Belinda Willard Ph.D., Staff, Core Director Location: NE1-251 Phone: 216-444-7170 Fax: 216-444-9404 Email: willarb@ccf.org	The unbiased analysis of small molecules (100-800 Daltons) derived from a variety of biological matrices such as plasma, urine, and cell extracts. These experiments involve the extraction of the small molecule metabolites, LC-MS/MS analysis, chromatographic alignment of the LC-MS data, and quantitative comparison of these metabolites across groups. The first involves the identification and quantitation of all metabolites based on the observed m/z ratio and retention time. This analysis results in the identification of 1000's metabolites. The identification of compounds of interest can be validated by follow up LC-MS/MS experiments. Analysis, chromatographic alignment of the LC-MS data, and quantitative comparison of these metabolites across groups. The data is analyzed with two different methods. The first involves the identification and quantitation of all metabolites based on the observed m/z ratio and retention time. This analysis results in the identification of 500 to 1000 metabolites many of which are unnamed compounds. The second method of data analysis involves the comparison of the observed metabolites to an in-house metabolite library. This method of data analysis results in the determination of the relative abundance of 100's of named metabolites in these samples.
Western Blot	Hybridoma	Earl Poptic, Core Manager, Location:NB1-25 Phone: 216-445-6635 Fax: 216-445-0515 Email: poptice@ccf.org	We will run the SDS PAGE gel, transfer and detect using investigator provided primary antibody plus ECL reagent.
Whole Slide Scanner (microscope)	Imaging	Judith A. Drazba Ph.D., Staff, Core Director Location: NB1-46 Phone :216-445-3760 Email: drazbaj@ccf.org	A large region of interest - or even the whole surface of a slide - can be imaged on a special scanner.