



The Children's Hospital  
1056 East Nineteenth Avenue, Denver, Colorado 80218



## Introduction to Core Facilities at the University of Colorado

---

It is surprising how many “tools” are available on our campus that can help us with implementing our specific research ideas. The problem is finding them! This chapter is an attempt to provide faculty with a comprehensive list of the various cores that exist at either TCH or UCD. No doubt some have been missed and that others have been established or disbanded during the time that we have accumulated this data. To that end, we have tried to provide you with two approaches: (1) In the alphabetical listing for each core, we have provided you with the web address where we found that core. This is so that you can go to that address and, hopefully, find the most up to date information about that core. (2) We have provided you with a current summary of each core, which will provide you with a snapshot of the facilities offered.

Finally, this part of the handbook will only be helpful if, as you use it, you provide us with feedback about the quality of the information provided and about cores that we have missed. In this way we can update this information at our own web site and keep it as current as is possible. For the most up-to-date version of this chapter, please visit the Core Facilities page at our web site: <http://www.uchsc.edu/peds/research/cores/>.



The Children's Hospital  
1056 East Nineteenth Avenue, Denver, Colorado 80218



## Core Facilities at the University of Colorado

---

**Biophysics Core Facility** [The Program in Biomolecular Structure]  
**Biostatistics and Bioinformatics Core** [UCCC: University of Colorado Cancer Center]  
**Cell and Molecular Resources Core** [DERC: Diabetes and Endocrine Research Center]  
**Clinical Investigation and Informatics Core** [DERC: Diabetes and Endocrine Research Center]  
**Clinical Investigations Core** [UCCC: University of Colorado Cancer Center]  
**Clinical Trials Organization** [The Children's Hospital Research Institute]  
**Colorado Biostatistics Consortium** [UCD Dept. of Preventive Medicine and Biometrics]  
**Computational Biology Core** [The Program in Biomolecular Structure]  
**Computational Pharmacology**  
**Cytogenetics Core Laboratory** [UCCC: University of Colorado Cancer Center]  
**Developmental Core** [CFAR: Colorado Center for AIDS Research]  
**Diabetes and Endocrine Research Center** [DERC: Diabetes and Endocrine Research Center]  
**DNA Sequencing and Analysis Core** [UCCC: University of Colorado Cancer Center]  
**DNA Sequencing Core** [Genetic–Molecular Diagnostic]  
**Flow Cytometry Core** [UCCC: University of Colorado Cancer Center]  
**Gene Expression Core (Microarray & PCR)** [UCCC: University of Colorado Cancer Center]  
**Histology and Flow Cytometry Core** [DERC: Diabetes and Endocrine Research Center]  
**Informatics Core** [UCCC: University of Colorado Cancer Center]  
**Islet and Animal Resources Core** [DERC: Diabetes and Endocrine Research Center]  
**Laboratory Animals Core** [UCCC: University of Colorado Cancer Center]  
**Mass Spectrometry/Proteomics Facility** [UCD Mass Spectrometry Shared Resource]  
**Metabolic Core Laboratory** [CNRU: Colorado Clinical Nutrition Unit]  
**Metabolomics Magnetic Resonance Spectrometry** [UCCC: University of Colorado Cancer Center]  
**Microarray Core Facility** [Pulmonary Sciences/Critical Care Medicine]  
**Nuclear Magnetic Resource Core Facility** [The Program in Biomolecular Structure]  
**Pathology Core** [UCCC: University of Colorado Cancer Center]  
**Peptide and Protein Chemistry Core Facility** [The Program in Biomolecular Structure]  
**Pharmacology (Pharmacokinetic) Core** [UCCC: University of Colorado Cancer Center]  
**Small Animal Hemodynamic Core** [Cardiovascular Research Institute]  
**Small Animal Imaging Core** [UCCC: University of Colorado Cancer Center]  
**Structural Biology Core** [UCCC: University of Colorado Cancer Center]

- Nuclear Magnetic Resonance Core
- X-Ray Crystallography

**Survey Research Core** [UCCC: University of Colorado Cancer Center]  
**Tissue Culture and Monoclonal Antibody Core Lab** [UCCC: University of Colorado Cancer Center]  
**Tissue Procurement Core** [UCCC: University of Colorado Cancer Center]  
**X-Ray Core Facility** [The Program in Biomolecular Structure]

## **Biophysics Core Facility** [The Program in Biomolecular Structure]

Website: <http://biomol.uchsc.edu/cores/biophysics/main.html>

The Biophysics Core Facility is a user facility owned and operated by The Program in Biomolecular Structure at the UCHSC. We opened our doors in early 2001 and have since served several researchers on diverse projects.

We currently have resources to study biomolecular structure and thermodynamics with Biacore surface plasmon resonance phenomenon, CD/ORD, ITC, DSC, and analytical ultracentrifugation (AUC). Mass spectroscopy, LC/MS/MS, HPLC, amino acid analysis are also available.

### ***Facility Users***

The Facility provides professional collaborations, training, and instrument time to researchers associated with both nonprofit organizations and private institutions. We offer one-on-one and group training to those interested in operating the instruments. In some cases, you may contract with us to analyze your samples.

### ***Scheduling***

All scheduling is done with the [online calendar](#). After you are trained to operate an instrument, you may register for an account by visiting the calendar and clicking on [Update]. Priority is generally on a first-scheduled first-served basis.

## **Biostatistics and Bioinformatics Core** [UCCC: University of Colorado Cancer Center]

Website: <http://www.uch.edu/for-healthcare-professional/cancer-center/cores/biostat/index.aspx>

The University of Colorado Cancer Center Biostatistics and Bioinformatics Core provides quantitative and information science support for the planning, design, analysis and presentation of basic science, clinical, and epidemiological investigations by Cancer Center members.

- Consultation on study design (clinical and basic science, including gene expression arrays and proteomics experiments)
- Consultation on sample size and power
- Development of data collection, storage, and quality control procedures (basic science and clinical studies, protocol review and monitoring)
- Data analysis, including genomic and proteomic data
- Collaboration on manuscript and oral presentation preparation, and grant proposal development

Rather than charging users for services, we ask Cancer Center investigators to writing in funding for biostatistics and bioinformatics support on grants and contracts, then to acknowledge the Core in any publications.

Your study's initial design and data collection strongly affect its analysis and interpretation. Please involve us during the design phase so we can help make sure your project is successful. Our work is usually done as part of protocol development for clinical trials or during project design for other cancer-related research.

To get started, please contact Anna Barón, director.

- You will meet with one of our Core biostatisticians or bioinformaticians to present your hypothesis and goals.
- We will help you put together a basic scope of work and general timeline and identify key collaborators to include.
- We will work with you throughout your project.

**Cell and Molecular Resources Core** [DERC: Diabetes and Endocrine Research Center]

Website: <http://www.uchsc.edu/misc/diabetes/derc/molecular.htm>

The principal objective of the DERC Molecular Biology Core Laboratory is to facilitate and promote the application of contemporary molecular biological techniques to existing endocrinology and diabetes research programs at UCHSC and its affiliated institutions. The Core provides:

**"Molecular Bed and Breakfast"** training facility in which DERC members and their staff can gain hands-on basic skills working on projects specifically related to their interests. A consultation service also provides advanced training and promotes and fosters interdisciplinary and collaborative ventures among DERC members.

**Centralized DNA resource** for automated DNA sequencing, genotyping, fragment analysis, quantitative PCR, development of viral expression systems and provision of certified specific reagents, including islet cDNA libraries, islet cell markers, Taqman primers, PCR primers and pancreas-specific promoters. The Core liaises with the Bioresources Core for animal genotyping and speed congenic services, providing the primers to distinguish several common mouse strain backgrounds and with the Cytometry Core for the generation of RNA probes for high throughput in situ hybridization analyses.

**Access to Microarray Core Facilities** The Core has contracted out a number of services to other biomedical cores on campus and negotiated favorable terms for reagents and services with commercial entities. This includes access to two microarray Cores performing gene expression analyses, one using Affymetrix oligonucleotide arrays and the second using custom long oligonucleotide and cDNA microarrays including PANC Chip 5.0 available through the NIH Beta Cell Biology Consortium.

**Planned new services** include developing of virus mediated gene transfer technologies in-house for gene expression and suppression, working with the Bioresources and Cytometry Cores on the development of techniques for cell tracking and lineage tracing using fluorescent and luminescent photoproteins, recombinant protein engineering and recombineering for gene targeting.

**Location:** Barbara Davis Center at Fitzsimons, 4th floor

**Clinical Investigation and Informatics Core** [DERC: Diabetes and Endocrine Research Center]

**Website:** <http://www.uchsc.edu/misc/diabetes/derc/clinical.htm>

The Clinical Investigation and Informatics Core provides multiple users with: 1) database and informatics resources, 2) state-of-the art subject recruitment and sample/data acquisition, processing and storage protocols, as well as 3) a set of high quality laboratory assays. The Core allows independent, predominantly NIH-funded, investigators to access unique information resources concerning patients and potential non-diabetic study participants at the Barbara Davis Center and affiliated institutions. The BDC is in the unique position of being the major Rocky Mountains Region center for the treatment of type 1 diabetes (500 new cases and 12,000 patient visits annually) and samples from more than 20,000 diabetic patients and their relatives as well as over 30,000 general population controls which have been screened for biochemical antibodies and HLA-type and are stored at the Center. The Core's main activities are to expand its services in the area of type 1 and 2 diabetes and develop new populations of research subjects.

**Location:** Barbara Davis Center at Fitzsimons, 2nd floor

**Clinical Investigations Core** [UCCC: University of Colorado Cancer Center]

**Website:** <http://www.uccc.info/for-healthcare-professional/cancer-center/cores/cic/index.aspx>

The UCCC Clinical Investigations Core (CIC) mission is to optimize the quality and quantity of cancer clinical trials research for UCCC. The specific objectives are to:

- Ensure the provision of exceptional patient care at UCCC sites by offering new approaches to cancer management through cancer clinical trials
- Support of all aspects of cancer clinical investigations headed by UCCC investigators
- Provide a conduit for activation of UCCC investigator-initiated cancer clinical trials
- Ensure opportunities for clinical trials education
- Offer a final common pathway for UCCC translational research applications

Almost 70 CIC clinical, regulatory and administrative staff manage performance of more than 400 clinical studies with a total accrual of nearly 7,500 subjects.

Services offered:

- Regulatory submission and monitoring
- Protocol Development
- Budget development and contract negotiation
- Enrollment of eligible patients

- Data collection and monitoring
- Specimen procurement and processing
- Adverse event reporting
- Coordination of patient treatment
- Training and education of clinical and regulatory staff
- Training of Phase I oncology fellows
- General Good Clinical Practice Training
- Maintenance of the UCCC Clinical Trials Database
- Quality Assurance
- Protocol Review and Monitoring
- PQASC-audit schedule & Data Safety Management Plan

**Clinical Trials Organization [The Children's Hospital Research Institute]**

*Website:* <http://www.uchsc.edu/peds/research/cto/>

The Clinical Trials Organization (CTO) was created at The Children's Hospital in October 1997 to ensure performance of high-quality clinical research in children. This is accomplished by facilitating participation in clinical research, including investigator-initiated studies, industry-sponsored studies and foundation- and government-sponsored investigations. The Children's Hospital Research Institute is the umbrella organization of the CTO.

**Colorado Biostatistics Consortium [UCDHSC Dept. of Preventive Medicine and Biometrics]**

*Website:* <http://cbc.uchsc.edu/>

The Colorado Biostatistics Consortium (CBC) is a unit in the Section of Biostatistics, Department of Preventive Medicine and Biometrics at the University of Colorado at Denver and Health Sciences Center (UCDHSC). The CBC is a shared resource for biomedical investigators at UCDHSC. It provides biostatistics expertise for centers, programs, departments, and individual investigators to facilitate the design of studies, data acquisition systems, data analysis, and the preparation of manuscripts and grants.

**Computational Biology Core [The Program in Biomolecular Structure]**

*Website:* <http://biomol.uchsc.edu/researchFacilities/ComputationalCore/index.html>

The focus of the Computational Biology Core is to support UCDHSC scientists in the molecular understanding of the biological processes being investigated experimentally. Additionally, this knowledge will be used in the development of novel ligands as putative drugs for intervention in these processes. This core is in the early stages of being developed as the last of the cores to support Biomolecular Structure activities at UCDHSC.

There are 5 main areas that will be covered:

- [Structural Models of Receptor Targets in the Low Homology or New Fold Region](#)
- [Receptor Target Structure Modeling based on Known Structures](#)
- [Computational Simulation of Receptor-Ligand Energetics](#)
- [Computational Receptor](#)
- [Putative Ligand Virtual Screening and Lead Generation](#)

### **Computational Pharmacology**

*Website:* [http://compbio.uchsc.edu/Hunter\\_lab/](http://compbio.uchsc.edu/Hunter_lab/)

**Mission:** Creating novel algorithms and knowledge-based tools for the analysis and interpretation of high-throughput molecular biology data.

Our ultimate goal is transforming the process of drug design through the use of advanced computational techniques, particularly machine learning and knowledge-based approaches applied to high throughput molecular biology data. We create novel algorithms for the analysis and interpretation of gene expression arrays, proteomics, metabonomics, and combinatorial chemistry. We also create tools for building, maintaining and applying knowledge-bases of molecular biology, and for knowledge-driven inference from multiple biological data types. Finally, we are developing and applying natural language processing techniques for information extraction from and management of the biomedical literature.

**Current Projects:** An overview of our activities can be found in Dr. Hunter's [Engelmore Prize Lecture](#) (pdf file). They include:

- Development of tools for the creation of a large-scale molecular biology knowledgebases. Our focus is on the extraction of information from biomedical texts, and on dynamic, semantic data integration. A pilot molecular biology knowledge-base, *Biognosticopia*, focused on representing the molecular, physiological and molecular effects of excess ethanol consumption, and on signal transduction pathways.
- A web-based, [comprehensive gene expression array analysis and interpretation tool](#) for the [INIA consortium](#). This tool is currently being extended for proteomic data, and for applications in cancer research
- [Biophysical simulations of macromolecular systems, and their visualization.](#)

### **Cytogenetics Core Laboratory** [UCCC: University of Colorado Cancer Center]

*Website:* <http://www.uccc.info/for-healthcare-professional/cancer-center/cores/cytogenetics/index.aspx>

The UCCC Cytogenetics Core Laboratory provides classic and molecular cytogenetics services, including fluorescence in situ hybridization (FISH). We have experience with commercially available and researcher-provided probes, such as:

- chromosome enumeration probes
- painting probes
- translocation probes
- single copy or locus-specific probes
- nick-translated DNA fragments

We also provide consulting services and training for non-assisted lab use.

### **Single and dual color fluorescence in situ hybridization (FISH) assays**

- Differentiation of mammalian chromosomes or DNA sequences translocated to rodent chromosomes and monitoring established cell lines using human genomic or Cot-1 DNA probes.
- Identification of specific aneuploidies in metaphase spreads and interphase nuclei, in preparations from diffuse or solid tissues using satellite and locus-specific DNA probes.
- Identification of particular human chromosomes or chromosome fragments in complex rearrangements and/or marker chromosomes using whole chromosome-specific painting probes (WCP) or a region-specific probe (Partial Chromosome Probes). WCPs are used also for identification of human chromosomes in hybrid cells.
- DNA clone mapping (phage, cosmid, P1, PAC, BAC, and YAC) on metaphase chromosomes of human, rat, mouse and hamster cells.
- Investigation of genomic deletion, duplication or amplification in metaphase and in interphase nuclei in fresh or preserved biological preparations using DNA clones.
- Detection of chromosome translocations in metaphase or interphase cells using probes encompassing or closely associated with the breakpoints.

### **Multicolor-FISH assay**

- Simultaneous hybridization of several probes to extended chromatin to determine the orientation and overlap of the tested sequences.
- Analysis of multiple probes in a given cell for more accurate definition of its genomic status.

### **Spectral Karyotyping**

Spectral karyotype of a cell representative of the small cell lung carcinoma cell line UMC19.

### **Comparative Genomic Hybridization (CGH) assay**

- Analysis of DNA sequence copy numbers of cultured or uncultured human, mouse and rat specimens.

- Multicolor Karyotyping using spectral karyotyping in human, mouse and rat specimens (SKY) and multiplex-FISH (M-FISH) in human specimens.

#### **Unbanded chromosome analysis**

- Breakage evaluation.
- Cell proliferation index (mitotic index).
- Ploidy evaluation

#### **Giemsa-trypsin (GTG) banded chromosome analysis**

- Karyotype characterization of human, mouse, rat, and hamster specimens or cell lines in metaphase or prometaphase cells.
- Determination of cell line homogeneity and evolution using metaphase analysis.
- Identification of parental species in hybrid cell lines.

Testing and instrumentation are available by appointment only. Turnaround time is highly dependent on the specimen or project. Please contact [Dr. Varella-Garcia](#) to schedule your project and discuss turnaround times.

#### **Developmental Core [CFAR: Colorado Center for AIDS Research]**

*Website:* <http://www.uchsc.edu/ccfar/cores/development.htm>

The primary purpose of the Developmental Core is to allocate resources to augment AIDS research efforts at component institutions. Emphasis is placed on support for interdisciplinary projects and infrastructure investments that will have a broad impact on AIDS research capabilities by recruiting new investigators, providing transitional funding to Junior Faculty, and facilitating the conduct of pilot studies.

The Developmental Core has three Specific Aims:

1. To make major infrastructure or programmatic investments that will broadly facilitate interactions, capabilities, and/or efficiencies of the AIDS research community at the component institutions.
2. To recruit outstanding new investigators with AIDS expertise to the faculties of the institution from outside institutions or from training programs within the institution.
3. To provide initial funding for pilot and feasibility studies.

These funds might be used by junior investigators, by established investigators to explore novel areas of AIDS research, or by experienced investigators not previously involved in AIDS research. Follow this link to find out [more about funding opportunities of the Developmental Core](#).

**Diabetes and Endocrine Research Center** [DERC: Diabetes and Endocrine Research Center]

Website: <http://www.uchsc.edu/misc/diabetes/derc/index.htm>

The Diabetes and Endocrine Research Center (DERC) at the University of Colorado at Denver and Health Sciences Center (UCDHSC) was established in June 2000 with its administrative and biomedical cores housed at the Barbara Davis Center for Childhood Diabetes (BDC). Membership totals 33 faculty from UCDHSC including the BDC, School of Medicine Departments of Endocrinology, Immunology, Preventative Medicine and Biometrics, Pediatrics, Pharmacology, Human Medical Genetics, Pharmacy, Biochemistry and Molecular Genetics and Rheumatology. Other members come from National Jewish Medical Research Center and Denver Health Hospital. This research base is focused upon six broad research areas:

- Pathogenesis of Type 1 Diabetes and Experimental Therapeutics
- Islet Transplantation Immunobiology
- Immunogenetics of type 1 diabetes in man
- Diabetes Related Translational Research and Epidemiology Research
- Pathogenesis and complications of Type 2 Diabetes

The DERC does not directly support research staff or fund research projects but rather provides resources in the form of Pilot and Feasibility grants to junior faculty and investigators new to diabetes research and a series of biomedical core facilities that distribute services, equipment, reagents and training for members and their associated fellows and research students. Each Core is staffed by professional research assistants and operates on a fee-for-service basis that provides state-of-the-art technology at a discounted price. They include:

- Cell and Molecular Resources Core [DERC]
- Clinical Investigation and Informatics Core [DERC]
- Histology and Flow Cytometry Core [DERC]
- Islet and Animal Resources Core [DERC]

**DNA Sequencing and Analysis Core** [UCCC: University of Colorado Cancer Center]

Websites: <http://www.uccc.info/for-healthcare-professional/cancer-center/cores/Index.aspx>

and

<http://loki.uchsc.edu/>

The CU CANCER CENTER DNA SEQUENCING CORE was established in the fall of 1995. It offers rapid sequencing of DNA to Cancer Center members as well as to academic and industrial researchers in Colorado. The Core started with two automated single-lane, four-color fluorescent slab-gel automated sequencers (ABI 373A-XL and ABI 377-XL). These have been replaced with two automated DNA sequencers; a 16-capillary (ABI 3100) and a 48-capillary (ABI 3730, the only in Colorado), which can provide over 650 and 900 bp of usable DNA sequence, respectively. The Core also offers DNA profiling for identification and authentication of cell lines. In the near future, the Core will start to offer CAP-approved screening of clinical samples for mutations in the exons of specific genes implicated in cancer (e.g., VHL, p53, pTEN, FLT3).

### **DNA Sequencing Core [Genetic–Molecular Diagnostic]**

*Website:* <http://www.uchsc.edu/dnalab/>

The UCHSC DNA Diagnostic Laboratory is a clinical molecular genetics laboratory offering full service nucleic acid-based testing. Established as a national and regional resource for the medical and genetics communities, the laboratory performs testing for a variety of genetic diseases utilizing state of the art techniques. Please see the [Test Descriptions](#) for a complete list of the tests we offer.

**Location:** RC-1 North, Room P18-4404J, Fitzsimons campus

### **Flow Cytometry Core [UCCC: University of Colorado Cancer Center]**

*Website:* <http://www.uccc.info/for-healthcare-professional/cancer-center/cores/flowcytometry/index.aspx>

The Flow Cytometry Core at the University of Colorado Cancer Center offers services to Cancer Center members, Charles C. Gates Regenerative Medicine and Stem Cell Biology Program members, academic non-members and private industry researchers. CC and RMSCB Members receive scheduling priority and a discounted rate for services. Learn more about becoming a UCCC member or a RMSCB member. (links to member pages)

Our experienced staff can analyze your samples for you or train you to run the analysis equipment for all services except cell sorting. Core staff performs all cell sorting.

### **Gene Expression Core (Microarray & PCR) [UCCC: University of Colorado Cancer Center]**

*Website:* <http://www.uccc.info/for-healthcare-professional/cancer-center/cores/gene-expression/index.aspx>

The Gene Expression Core is dedicated to providing state-of-the-art facilities and technical support and services for analysis of gene expression, which will allow UCCC members to be on the cutting edge of cancer research.

The Gene Expression Core is comprised of:

- [Microarray Core](#), with locations on the Anschutz Medical Campus and 9th Avenue Campus
- [PCR Core](#)
- Analyze gene expression using both pre-made and custom designed oligonucleotide arrays

#### **Core Objectives:**

- Facilitate gene discovery
- Accurately quantitate gene expression using real time PCR and GenomeLab GeXP technology

- Provide support for data analysis and bioinformatics by our data mining tool and our data analysis capabilities
- Remain committed to using a variety of approaches for expression analysis
- Provide consultation and educational services to help those members with limited knowledge on microarray technology and to bring the Core customers up to date as technology advances

The Gene Expression Core was established in response to the technological advances in gene array, as well as the demand for high throughput expression analysis and genomic investigation to investigate pathogenesis, therapeutics, genetic susceptibility and gene discovery in cancer research. The informatics aspect is of paramount importance, and five distinct analysis programs, as well as a network, are used to store, share and analyze the data.

To date, the Core is one of the highest volume Affymetrix microarray facilities in academia in the country, having performed more than 10,900 microarrays including test arrays over seven years for nearly 250 investigators. On average, 85% of the users are UCCC members.

**Histology and Flow Cytometry Core** [DERC: Diabetes and Endocrine Research Center]

Website: <http://www.uchsc.edu/misc/diabetes/derc/histology.htm>

The *DERC Histology and Flow Cytometry Core* provides users with access to light microscopy technologies including:

***Routine histological services*** in tissue fixation, processing, sectioning and staining with histochemical dyes and immunochemical reagents. Provision of slide and tissue banks of commonly used tissues or animal models e.g. developmental or NOD disease progression.

***Epifluorescence microscopy*** for acquisition of images and performance of morphometric analyses.

***Confocal microscopy*** for use by investigators interested in high-resolution fluorescence microscopy and live cell imaging requiring the use of FRAP and FRET analyses.

***In-situ hybridization analyses*** that include all elements from acquisition and amplification of the gene of interest, probe synthesis, optimization of hybridization conditions and performance of multigene analyses on a moderate scale.

***Higher-level microscopy*** including access to instrumentation and services in Laser Capture Microscopy, 2-photon confocal microscopy, spinning disk confocal microscopy, Total Internal Reflectance microscopy, conventional and immunoelectron microscopy.

***Flow cytometry*** within the Core and provision of cell-sorting capabilities and higher level flow cytometry through outsourcing.

**Training** of fellows and students in morphological and morphometric techniques and consultation in specific areas including microdissection and single cell microinjection, low-level computer programming.

**Location:** Barbara Davis Center at Fitzsimons, 4th floor

**Informatics Core [UCCC: University of Colorado Cancer Center]**

**Website:** <http://www.uccc.info/for-healthcare-professional/cancer-center/cores/informatics/index.aspx>

The University of Colorado Cancer Center Informatics Core, located on the 6th Floor of Building 500 on the Anschutz Medical Campus in Aurora, was established to work with researchers and clinicians to design, implement and maintain information technology applications that support the Cancer Center research enterprise.

- We build databases and integrate them with dynamic websites or client/server front ends
- We provide workstation support and network and server administration

We have developed applications in the areas of clinical trials registration, specimen tracking, clinical trials pathology and prevention and control. In addition, we have developed databases containing clinical data (prognostic clinical factors, therapies, toxicities, response to treatment and outcomes) for the Lung SPORE and for breast cancer.

Researchers who have informatics projects have a choice of funding part of an FTE or purchasing services on an hourly basis. When the informatics project is substantial and planned, funding part of an FTE is the preferred approach, since projects funded under FTEs will be given higher priority. When the project is small or unanticipated, the hourly charge back is appropriate. We offer members discounted hourly rates.

We offer the following services

1. Network administration / workstation support: web-, database-, file- and print server administration, including backups, access, and security. Workstation configuration and maintenance.
2. Website development: analysis and development of dynamic or static websites
3. Database design and development: analysis and development of table structures for appropriate security and performance.
4. Data quality assurance: loading and querying databases to ensure timely and proper data collection.
5. Report development: analysis and development of static or parameterized reports.

**Islet and Animal Resources Core [DERC: Diabetes and Endocrine Research Center]**

**Website:** <http://www.uchsc.edu/misc/diabetes/derc/bioresources.htm>

**The Bioresources Core** provides users with high-quality animal husbandry and facilities for animal manipulation and production of pancreas and islet tissue are fundamental requisites for a wide variety of projects studying the pathogenesis of Type 1 and Type 2 diabetes.

**Services include:**

***Animal Resources:*** Provision for the stringent husbandry and analysis of specific pathogen free (SPF) rodents with special attention to unique congenic/knockout/immune-deficient strains relevant to diabetes research. Generation of gene-targeted and transgenic mice through collaboration between this Core, the DERC Molecular Resources Core and the Cancer Center Transgenic Core.

***Diagnostic Services:*** Training of investigators in a variety of animal manipulations such as tail DNA collection, intravenous/intraperitoneal injection, survival and non-survival surgery, timed pregnancy and islet transplantation. More commonly requested animal manipulations and diagnostic testing are be offered as a fee-for-service.

***Pancreatic Islet Resources:*** Rodent (mouse/rat) islets are generated by experienced technical staff from the DERC-maintained animal colonies. Human islets are obtained from the Rocky Mountain Islet Transplantation Program / Islet Cell Resources Center under FDA-approved, GMP conditions. The resource is backed up by routine stringent quality control of islet viability and function. The service can provide fetal/neonatal pancreas or pro-islet tissue for investigators studying pancreatic/islet development and maintain a bank of frozen islet tissue and low passage tissue culture cell lines commonly used by islet researchers (e.g. Min6, INS-1, PANC-1, AR42J).

***Genotyping:*** Molecular genotyping to ensure genetic integrity of established lines and to track mutant alleles in investigator-derived animal strains. The service will be conducted jointly with the Molecular Core, using microsatellite marker analyses and SNP typing for the generation of "speed congenic" progeny and to facilitate other selective animal breeding projects.

***Location:*** Barbara Davis Center at Fitzsimons, 3rd floor and CLAC RC1North basement

**Laboratory Animals Core** [UCCC: University of Colorado Cancer Center]

**Website:** <http://www.uccc.info/for-healthcare-professional/cancer-center/cores/lab-animals/index.aspx>

The Laboratory Animal, Tumor Testing and Intervention Core (LAC) is a shared resource that provides state-of-the-art, quality, affordable, and accessible animal maintenance and research services to Cancer Center researchers. The Laboratory Animal Core (LAC) began operations in 1987 and now consists of animal husbandry, housing and care services, as well as animal model tumor testing, experimental treatment and intervention services.

The objective of the LAC is to facilitate basic, pre-clinical and translational cancer research and to provide Cancer Center investigators with high quality, centralized standard animal care and specialized services for reproducible and reliable animal experimentation and in vivo tumor growth studies at cost effective prices.

The LAC serves Cancer Center members at the 9th Avenue and the Fitzsimons campuses; and at the Denver Veterans Affairs Medical Center, Denver Health and Hospitals, AMC Cancer Research Center and National Jewish Medical and Research Center. The investigators served by the Core represent all eight of the Cancer Center Programs.

Planned future developments include the coordination of animal studies with the developing Animal Imaging and Radiation Sciences Cores; the expansion of pathological services with the recruitment of a board certified Veterinary Pathologist; and completion and occupation of the second phase of the move to the new facilities on the Fitzsimons campus.

**Mass Spectrometry/Proteomics Facility** [UCHSC Mass Spectrometry Shared Resource]

*Website:* <http://biomol.uchsc.edu/researchFacilities/MSCore/index.html>

The goal of the Proteomics Facility is to provide investigators with the capabilities to identify, characterize and quantify the proteins present in tissues, cells and biological fluids. Through the development of advanced methods, the Facility aims to assist members with solving difficult or previously intractable problems in biomedical research. Methods for protein and peptide isolation, separations, quantification, identification and bioinformatics analysis, together with expert guidance in study design, are integrated into expertise offered by the Facility. The Facility has access to several analytical technologies thereby allowing investigators to adopt multiple strategies and to independently verify their findings. The Facility also provides training in proteomics analysis and experimental design.

The facility is a collaborative research resource that balances applied proteomics research with the development of new and improved methods for protein identification and quantification. The facility encourages collaborations that apply the tools of proteomics to biomedical research. Prospective users are encouraged to contact Dr. Kirk Hansen (303 724-3325) or Dr. Mark Duncan

The Proteomics Facility is housed within the Mass Spectrometry Research Center on the ground floor of RC-1 South at the Fitzsimons campus.

The facility participates in a series of short courses relating to aspects of mass spectrometry and proteomics. Both lecture-based and hands-on courses are available, and these are open to outside participants. If you are interested in attending any of these please email [James Simpson](mailto:James.Simpson@uchsc.edu).

## **Metabolic Core Laboratory [CNRU: Colorado Clinical Nutrition Unit]**

Website: <http://www.uchsc.edu/nutrition/Friedman/MetabolicCoreLab.htm>

**I. Description:** The main services of the Metabolic Core are tissue procurement/preparation and processing for analysis of phosphorylation and expression of key post-receptor insulin signaling proteins that regulate insulin sensitivity and lipid metabolism at the cellular level. The Core also provides selected assays for specific hormones and metabolites that are performed at reduced cost to affiliated investigators. *This Core provides an array of assays over a broad range of species (rat, mouse, human, sheep) and tissue types (fat, muscle, liver), for multiple investigators studying the clinical consequences of nutrition-related disorders.* Gene expression analysis using quantitative real time PCR is another service provided by the Core. The Metabolic Core lab also provides members of the Center with reagents, access to equipment, and exposure to new techniques (insulin clamping, insulin signaling, real-time PCR) that have helped to expand the quantity and quality of nutrition research in the CNRU.

**II. Organization and Description of Services:** The Core services the needs of the CNRU on a reduced fee-for service basis including:

- Tissue and plasma assays for plasma lipoprotein lipase (LPL) and Hormone Sensitive Lipase (HSL), AMP kinase (AMPK).
- Radioimmunoassay of hormones including insulin, leptin, and adiponectin, Substrate determination of glucose, triglycerides and free fatty acids.
- Western blot analysis of Insulin Receptor signaling cascade including (but not limited to) IRS-1, PI 3-kinase, Akt, GSK3, JNK, TNFalpha, and GLUT4 protein levels in muscle, fat, and liver from human, rodent, and sheep. The Core measures activity and phosphorylation state (tyrosine and/or serine) where appropriate.
- Analysis of insulin/IGF-1 cell signaling via mTOR, p70S6 kinase and EIF2alpha and 4E-BP1 as cellular markers for protein synthesis, including site-specific activation in tissues and cells.
- RNA isolation, analysis, quantitation, cDNA synthesis and quantitative real-time PCR. TaqMan probes available from the Core range from genes involved in gluconeogenesis and lipogenesis to neuropeptides and transcription factors, as well as reference genes for normalization of gene expression.
- Hyperinsulinemic-euglycemic clamp procedures in mice and rats.

New investigators, particularly CNRU pilot awardees, are encouraged to consult with Dr. Friedman in advance to help plan experiments involving the services listed above.

The Metabolic Core lab is also a resource for providing expertise and technology for analysis of genetically defined mouse and rat models relevant to nutrition research. We provide experimental support and technical advice regarding measurement of insulin sensitivity in vivo (insulin clamps) and end organ-based metabolism (e.g. glucose and fatty acid uptake, oxidation, and synthesis) and metabolic biochemistry (cytokines, receptor proteins) and gene expression (RNA analysis) These services promote interaction between investigators and foster multidisciplinary research training in clinical nutrition and obesity across the UCDHSC campus.

**Facilities:** The Metabolic Core Laboratory is located within Dr. Friedman's laboratory located in the Center for Human Nutrition in the School of Medicine's new Research Complex 1 building at Fitzsimons. The laboratory is 1150 sq. ft. on the 7th floor of the School of Medicine within the division of Endocrinology and includes all of the major equipment needed for research in molecular nutrition (listed below). The lab is also set up for performing chronic animal surgeries and hormone infusion studies in mice. This section of the lab includes a general work area, surgery set-up, lamps, Harvard infusion pumps, gas tanks and water bath for performing glucose transport studies. Within the PI's laboratory is a 150 sq. ft. tissue culture facility used for growing mammalian cells, including tissue culture supplies, light microscope, CO<sub>2</sub> incubators, liquid nitrogen storage tank, sink, and two laminar flow hoods. The following major items of equipment are within the PI's lab: real-time PCR detection system, automated RNA and protein analysis system, two PCR thermal cyclers, high-speed refrigerated centrifuge, microfuges, horizontal and vertical gel electrophoresis systems and power supplies, gel documentation camera equipment and computer software for image quantification, UV spectrophotometer, walk-in cold room, three -20C freezers, and two ultra-cold -80C freezers for storing biological samples. The following major pieces of shared equipment are located on the floor of the PI's laboratory: Several refrigerated ultracentrifuges and high-speed rotors, Beckman liquid scintillation counter, autoclaves, film developer, fluorometer, luminometer, and distilled water purification system. The PI shares the maintenance contract on these items with other members of the department and has full access to this equipment.

**III. Management of Core Operation – Cost Effectiveness/Quality Control:** The extent of resource support requested by the investigator is discussed with the PI during the planning stages of the project and reviewed at a meeting with the PI prior to initiation of the project. The extent of support provided by core staff will depend largely on the type of extramural support available for the project, with priority given to those projects for which funds for personnel expenses are limited (pilot/exploratory studies, career development awards, etc). Detailed plans for prioritizing samples are based on the source of funding and the type of award, as follows:

1. Pilot project recipients and members of the research base with NIH career development (K Awards)
2. Members of the research base with federal funding. The source of funding plays a role in the prioritization as follows: 1 = federal (NIH, NSF, USDA, VAMC, AHA, ADA etc) 2 = foundation (Aging, Liver foundation, etc) 3 = industry, investigator-initiated 4 = industry, not investigator-initiated.
3. Investigators proposing projects to collect preliminary data for nutrition related NIH grant applications.
4. Members of the research base with non-federal funding for nutrition/obesity projects.
5. Members of the research base with non-federal funding for non nutrition/obesity projects.
6. Unfunded members of the research base.

The mechanisms for monitoring budgetary overlap of current funded projects and the Metabolic Core lab are handled by Dr. Friedman in consultation with other core directors. In general, due to the limited resources, assays are conducted with a charge back cost. The estimated costs for performing a western blot for example are roughly \$10 per sample. Therefore, we are currently using a charge back of \$3 per sample for each assay to offset the budget and to keep the number of samples the Core can run at a reasonable number. This Core continues to provide services at no cost to new investigators without grant funds and pilot investigations in order to help them compete at the national level for independent funding. This core lab thus provides members of the Center with reagents, access to equipment, and exposure to new techniques that have expanded the quantity and quality of nutrition research in the CNRU.

**Consultation /Research Training:** Quality control is part and parcel of the services provided by this core. Core personnel are actively involved with investigators in providing assistance with the selection of assessment methods and the design of experimental protocols to insure the samples we receive are of high quality. Investigators receive assistance in determining the most appropriate assay for a specific research study. In helping each investigator to decide on which assay is best to use, the following issues are addressed: 1) appropriateness of assay to the study, 2) appropriateness of a given assay to the scientific question, and 3) cost. To insure the samples we receive are treated appropriately, when assaying insulin sensitivity in human muscle biopsies for example, we routinely send an assistant with the investigator to ensure the first biopsies are properly dissected, frozen immediately, or placed in RNAlater for future use. For animal studies, we make sure the time of fasting is controlled for, and that to the extent possible, hormone treatments are carried out in conjunction with assay of proteins to examine phosphorylation patterns. In terms of assay quality control, for hormones we assay known standards to ensure our inter-assay and intra-assay variability is within 5%. For western blotting, we use internal controls (either manufacturer's standard, or excess sample from the study) on every blot to account for inter-blot variability, and use GAPDH as a loading control to control pipeting error and/or transfer of protein. For gene expression analyses, we run all quantitative real-time PCR reactions in duplicate and normalize the data to a reference gene.

CNRU investigators are encouraged to have their assistants, students, fellows, and junior investigators trained in the methodologies supported by the Core. In some cases, this may require not only specialized training in operating the equipment, but also safety training (e.g., radiation safety training for assays involving PI 3-kinase).

**Metabolomics Magnetic Resonance Spectrometry** [UCCC: University of Colorado Cancer Center]

Website: <http://www.uccc.info/for-healthcare-professional/cancer-center/cores/metabolomics/index.aspx>

Metabolomics, one of the “omic” sciences in systems biology, is the global assessment and validation of endogenous small-molecule biochemicals (metabolites) within a biologic system.

Metabolite detection and quantification is usually carried out by nuclear magnetic resonance spectroscopy (MRS) while mass spectrometry (MS) provides another highly sensitive metabolomics technology. The UCCC Metabolomics Core provides all MRS-related metabolomics services. Various metabolic biomarkers, related to glycolysis, mitochondrial citric cycle acid, choline and fatty acid metabolism, were recently reported to play important roles in cancer development and responsiveness to anti-cancer treatment using NMR-based metabolic profiling.

The Metabolomics Core consists of the high-resolution MRS facility, which is located at the 9th Avenue Campus (BRB 041-043). The facility will be moved to Anschutz Medical Campus, Research Complex 2 main floor in November 2008.

The facility is fully equipped for all aspects of nuclear magnetic resonance spectroscopy (1H-, 13C-, and 31P-MRS and two-dimensional NMR). We performed expanded quantitative metabolic analysis:

- on cells
- cell extracts
- human and animal tissues and biopsy extracts
- body fluids (including blood, plasma, urine, cerebral and prostatic fluids etc).

### **Microarray Core Facility [Pulmonary Sciences/Critical Care Medicine]**

*Website:* <http://microarray.uchsc.edu/index.php>

The Microarray Core Facility at UCHSC is an advanced, state-of-the-art Microarray Technology Center providing crucial research support for investigators interested in using Affymetrix GeneChips®, CombiMatrix CustomArray™ Chips or the Nanogen NanoChip®. We also host rtPCR with the Bio-Rad iCycler. Our team is dedicated to providing high-quality microarray laboratory instruction, service, and consultation to the research and clinical community affiliated with UCHSC and other research institutions in the region.

A typical microarray experiment includes the following procedures:

1. DNA or Total RNA isolation and quality assessment
2. Sample labeling (Generation of biotin-labeled nucleic acid molecules)
3. Chip processing (Hybridization / Washing / Staining / Scanning)
4. Data analysis and interpretation
5. Data validation

We are full service provider and can do all the procedures needed for your microarray experiment, but customers have the choice to perform the tasks (procedures) themselves except the procedure 3. We run hybridization, fluidics and scanning for you. If a customer chooses to do a procedure themselves, it is strongly recommended to do it in the core lab using our standardized protocols and reagents. We can help you design your

experiment and provide detailed protocols for both RNA and DNA sample preparations and labeling, RNA and DNA quantification and quality assessment. We also have the capability of providing data analysis and support services for storage of data by commercially available software. An integral part of the core is the formal relationship with the Bioinformatics group to construct and validate expression models using novel algorithms.

**Nuclear Magnetic Resource Core Facility** [The Program in Biomolecular Structure]

*Website:* <http://biomol.uchsc.edu/researchFacilities/nmr/index.html>

Nuclear Magnetic Resonance (NMR) spectroscopy is a technique that provides high resolution information about the structure and dynamics of molecules in solution at the atomic level. It used to study a wide variety of molecules from small drug like molecules to macromolecules such as proteins and nucleic acids.

The NMR Core facilities provide access to state of the art instrumentation to researchers at UCHSC and its affiliated institutions for the study of the structure and function of biological macromolecules. NMR core staff and faculty provide assistance to other users through training or through the development of collaborations.

The NMR core was established in 1996 through a grant from the [Howard Hughes Medical Institute](#) and the National Cancer Institute. Ongoing support for the NMR facility is provided primarily by the University of Colorado Cancer Center and the School of Medicine.

The facility has Varian INOVA spectrometers operating at 500 MHz and 600 MHz, and an 800 MHz NMR spectrometer, which is located at the UC Boulder campus. Recently a 900 MHz spectrometer was installed in the facility as part of the Rocky Mountain Regional NMR Resource. A variety of probes are available that are suitable for the solution NMR studies of biological macromolecules including proteins, nucleic acids and carbohydrates. There is a small wet lab that can be used for sample manipulations, and an office/computer room for visitors while using the facility.

Information on access to the core, user fees, documentation etc, can be found at our website (see link at beginning of section).

The NMR facility is located in Room L18-1300 on the first floor of the RC-1 South Building on UCHSC campus at Fitzsimons.

**Pathology Core** [UCCC: University of Colorado Cancer Center]

*Website:* <http://www.uccc.info/for-healthcare-professional/cancer-center/cores/pathology/pathology.aspx>

The University of Colorado Cancer Center Pathology Core ensures that well-characterized human tumors and materials derived from human tumors to are provided to

Cancer Center and other funded investigators for research in human cancer. The Pathology Core:

1. Establishes priorities for tissue collection. With the support of the Core, members of the UCCC have obtained separate funding to support large organ-based repositories
2. Serves as a central planning resource for these separate repositories
3. Interacts with the Biostatistics/informatics and Clinical Investigation Cores to provide an optimal infrastructure for the conduct of translation research
4. Provides supplemental and backup support for the repositories
5. Offers diagnostic assistance and tissue processing services, including histological and immunohistochemical services, to Cancer Center investigators who are not supported by a separate tissue bank

The Core provides central infrastructure for separately funded banks that are increasing in number and sophistication. In 2007, the Southwest Oncology Group solid tumor banks moved entirely to Colorado.

**Peptide and Protein Chemistry Core Facility** [The Program in Biomolecular Structure]

Website: <http://biomol.uchsc.edu/researchFacilities/peptideProteinChemistry/index.html>

The Peptide and Protein Chemistry core at the University of Colorado Fitzsimons campus provides peptide synthesis, purification and peptide/protein composition analysis as well as mass spectrometry services for academic and industrial clients.

The Peptide and Protein Chemistry core personnel help users choose and design experiments using appropriate chemistry/instrumentation, to obtain the necessary data, and interpret the results. The Core also provides instruction for graduate students and postdoctoral fellows for the use of HPLC and LC/MS approaches.

The core is equipped with state of the art instrumentation and technical support suitable for diverse applications and samples.

**Pharmacology (Pharmacokinetic) Core** [UCCC: University of Colorado Cancer Center]

Website: <http://www.uccc.info/for-healthcare-professional/cancer-center/cores/pharmacology/index.aspx>

The University of Colorado Cancer Center Pharmacology Core, located at Colorado State University in Fort Collins, was established to work with researchers and clinicians in a collaborative manner to design and implement studies to measure xenobiotics (drugs, toxicants, natural products, inc.) in biological systems and matrices.

- We are an analytical laboratory focused on drug measurement.

- We help investigators with study design, sample collection, sample analysis and data interpretation.

The mission of the Pharmacology Core is to assist in the prospective design of studies to assess drug exposure in biological systems, to measure drug levels using validated analytical assays, and to analyze, model and interpret the results.

### **Pharmacology Core Services**

We offer services based on our experience with use requests through our years of operation. We regularly modify the services we offer depending on Cancer Center members' needs and how they use the Core. We offer members [discounted fees for service](#), which are calculated either per sample or on an hourly basis.

### **We offer the following services**

1. Analyte determination and quantitation in matrix (per sample)
2. Assay setup and validation (hourly)
3. Metabolite identification and analysis (hourly)
4. Sample analysis and identification (hourly)
5. Pharmacokinetic modeling (hourly)
6. Animal treatment and sampling (hourly)

### **Small Animal Hemodynamic Core [Cardiovascular Research Institute]**

*Website:* <http://www.uchsc.edu/cardiology/hemodynamic.html>

The purpose of the Core is to provide technical services for the cardiac-pulmonary functional evaluation of small animals. Currently the core provides echocardiography for mouse and rat. Echocardiography is a powerful tool for small animal cardiac morphologic and cardiac-pulmonary functional study, as well as treatment/intervention follow-up. Echocardiography is useful in all the research fields where cardiac-pulmonary morphology and function are involved.

The major advantages of echocardiography in animals are:

- Non-invasive study, animal is kept intact for any other studies
- Multiple parameters can be obtained from the same animal
- Animal can be followed up at different time points, as many and as long as needed.
- The Small Animal Hemodynamic Core is open to anyone for its services at a nominal fee.

The following cardiac parameters can be obtained and followed up by echocardiography in sedated rats and mice:

Ventricular dimensions (systolic and diastolic):

- Left ventricle for rat and mouse
- Right ventricle for rat

Ventricular wall thickness:

- Left ventricle for rat and mouse
- Right ventricle for rat

Doppler flow of aortic, pulmonary and mitral valves

- Peak flow velocity
- Ejection time
- Pulmonary artery flow acceleration time (PAAT)
- Tricuspid regurgitation can be observed in severe pulmonary hypertension in rat

Left ventricular Fractional Shortening (FS) and Fractional Area Change (FAC) or Ejection Fraction (EF)

Right ventricular fractional shortening (FS)

Stroke volume (SV) and cardiac output (CO)

Heart rate

The Small Animal Hemodynamic Core is also performs other services that can be contracted on a fee-for-service basis. They are:

Cardiac surgery

- Transverse aortic banding in rat and mouse (pressure overload)
- Myocardial infarction in rat and mouse

Cardiac catheterization for rat and mouse

- Systolic and end diastolic pressures of left and right ventricles
- Pulmonary artery pressure and right atrium pressure
- Pressure-volume loop

Telemetry for ECG and blood pressure monitoring in conscious rat and mouse

Isolation of individual cardiac myocytes by collagenase perfusion

**Small Animal Imaging Core [UCCC: University of Colorado Cancer Center]**

*Website:* <http://www.uccc.info/for-healthcare-professional/cancer-center/cores/small-animal-imaging/index.aspx>

A major goal of the small animal imaging program is establishment of novel imaging approaches to cancer and cancer experimental therapeutics using animal models and pharmacodynamic endpoints. State-of-the-art imaging facilities are extremely expensive and require advanced technical personnel. Modern non-invasive imaging technologies include:

- Magnetic Resonance Imaging (MRI for anatomic, physiologic, and molecular imaging)

- Computed Tomography (CT for anatomic imaging)
- Positron Emission Tomography (PET for metabolic and molecular imaging)
- Optical Imaging (Bioluminescence, Fluorescence)
- Ultrasound

Our Small Animal Imaging Core is a developing resource that includes three areas:

- MRI/CT/PET, directed by Natalie Serkova, PhD
- IVES (bioilluminescence), directed by Chuan Li, PhD
- Irradiation, directed by David Raben, MD

**Structural Biology Core [UCCC: University of Colorado Cancer Center]**

*Website:* <http://www.uccc.info/for-healthcare-professional/cancer-center/cores/structural-biology/structural-biology.aspx>

The Structural Biology Core provides UCCC researchers access to instrumentation and expertise in the use of [X-ray Crystallography](#) and [Nuclear Magnetic Resonance Spectroscopy](#). The Core aims to promote structural studies in the molecular basis of cellular processes that regulate the development and progression of cancer. We enable member access to crystallization facilities, X-ray crystallography facilities, and Synchrotron X-ray data collection.

**SERVICES OFFERED**

**Structure Determination of Macromolecules (Proteins/Nucleic Acids)**

Structure determination of macromolecules is performed in collaboration with Core faculty. Faculty and staff consult with investigators in the project design, protein or nucleic acid expression, purification and sample preparation. The core staff performs data collection and data processing and work with investigators to solve and refine structures.

**Survey Research Core [UCCC: University of Colorado Cancer Center]**

*Website:* <http://www.uccc.info/for-healthcare-professional/cancer-center/cores/survey-research/survey-research.aspx>

The Survey Research Core provides technical assistance and services to University of Colorado Cancer Center members in collecting research data, with specialized expertise in computer-assisted telephone interviews (CATI). The Core collaborates in testing the effectiveness of cancer-related health education and behavioral interventions delivered by telephone.

## **SERVICES**

The Survey Research Core is experienced in delivering high-quality data collected via different surveying methods, including:

- CATI telephone interviewing
- Mail-based surveying
- Web-based surveying

Our attention to detail and accurate data collection have led to successful completion of thousands of surveys for grant-funded studies.

## **EQUIPMENT**

We use Sawtooth Ci3 software for CATI interviewing on 13 Interviewer workstations, which all operate on a dedicated, Windows-based server.

**Tissue Culture and Monoclonal Antibody Core Lab** [UCCC: University of Colorado Cancer Center]

*Website:* <http://www.uccc.info/for-healthcare-professional/cancer-center/cores/tissue-culture/index.aspx>

The Tissue Culture and Monoclonal Antibody Core, located on the Anschutz Medical Campus, offers services to UCCC members, other academic investigators and private companies. We have more than 10 years of experience with protein production in the baculovirus system cell fusion, as well as developing new monoclonal antibodies and small- to large-scale culture of a wide range of cell lines.

### **Services We Offer**

#### **Custom Hybridoma Services**

- Construction of new hybridomas
- In vitro production of monoclonal antibodies from existing hybridomas

#### **Custom Baculovirus Services**

- Construction of recombinant virus
- Amplification and titering of recombinant baculovirus stocks
- Protein production in insect cells
- Cell Line Repository

- >150 cancer cell lines, including 51 different lung cancer cell lines and 11 breast cancer cell lines

#### **On-Site Culture Media/Serum Supply Center**

Offered to all UCCC and UC Denver investigators at prices substantially below list

- Liquid cell culture medium from Invitrogen and HyClone
- Supplements
- Serum from HyClone

#### **Tissue Procurement Core [UCCC: University of Colorado Cancer Center]**

*Website:* <http://www.uccc.info/for-healthcare-professional/cancer-center/cores/pathology/tissue-procurement/index.aspx>

The Tissue Procurement Core provides well-characterized human tumors and materials derived from human tumors to Cancer Center and other funded investigators for research in human cancer. A major component of this Core is the provision of histological services, which have increased due in part to the availability of new pharmacobiological agents whose protein targets can be detected and monitored *in situ* by this technology. This Core is also developing a computerized database which will permit the formulation of meaningful clinicopathologic hypotheses.

Organ-based pathology subspecialists contribute anatomic expertise to organizing collection protocols and verify histopathological classification of specimens collected by the Core. Investigators with IRB approved protocols in collaboration with pathology subspecialists are provided with frozen tissue fragments, tissue sections, DNA, RNA, and cells purified by microdissection from tumors, preneoplastic lesions and matched normal control tissue. Central processing of tissue and aliquoting of products by the Core has permitted the distribution of small quantities of well-characterized molecular reagents to a maximum number of investigators. The Core is also charged with providing correlative histopathological, phenotypic and genotypic information related to the specimens it collects to data managers in other Cancer center programs. Correlation of this information with clinical trial data and prognosis enhances the translational impact of this Core.

#### **X-Ray Core Facility [The Program in Biomolecular Structure]**

*Website:* <http://biomol.uchsc.edu/researchFacilities/XRayCore/index.html>

The X-ray core facility was set up in 1999. The facility is fully equipped for biomolecular crystallization, crystal screening, data collection, data processing, structure-determination and model building. It currently has a Rigaku/MSR Ru-H3R X-ray generator, two Raxis IV++ area detectors, and two X-stream cryo-cooling apparatus. The facility is located in RC1 South Building Rm 1301. It is directed by Dr. Mair Churchill (Department of

Pharmacology), and is managed by Dr. Rui Zhao (Department of Biochemistry and Molecular Genetics).