

San Francisco Veterans Affairs Medical Center

Research Service

CORE LABORATORIES

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INTRODUCTION

The Research Service of the San Francisco Veterans Affairs Medical Center (SFVAMC) consists of approximately 126 research laboratories, 209 Principal Investigators and over 600 staff. This is the largest research program in the Veterans Affairs system. The Investigators at the SFVAMC generated \$62 million in direct cost awards during the past fiscal year. The growth of this research program has led to the establishment of several core laboratories or shared resources that have enhanced the research infrastructure. The continued success of this program is, in part, dependent on investigators' access to state-of-the-art technologies and expertise in the application of these procedures to their own research.

The Core Laboratories offer several amenities to the Investigators and to the research program at this institution. First, these shared resources provide sophisticated and costly equipment, as well as the related essential technical services, to the research community that individual Investigators might otherwise be unable to gain access. Second, each Core Laboratory is under the direction of a Principal Investigator and staff who are experts in their respective technologies. These individuals are available for consultation during the design phase of studies in which the use of specific shared resources and technologies is anticipated. Third, some Core Laboratories offer training in the use of their specific technologies and associated instrumentation to Investigators and their laboratory staffs. This policy is intended to make such technologies available to as many Investigators as is possible and at a reasonable cost. Fourth, the Core Laboratories afford the opportunity and the environment for Investigators with varied backgrounds and interests to interface and develop collaborations based on their common use of a particular technology.

At present, the Research Service, often in collaboration with the Northern California Institute for Research & Education (NCIRE) or the UCSF Liver Center, has established the following core facilities:

- **Imaging Core (microscopy)**
- **Molecular Core**
- **Animal Care Core**
- **Cell Analysis And Sorting Core**
- **Proteomics Core**
- **Magnetic Resonance Imaging Core**
- **Clinical Research Core**
- **Echo Imaging Core**

- **Micro CT Scanning Core**
- **X-ray Film Processor**
- **Epifluorescence Microscope**

Several of these Cores have recently been established or have undergone expansion. For example, the Proteomics Core is a very recent addition to the Research Service's armamentarium and it has recently been expanded into a new location with additional instrumentation. Shifts in Investigator research interests, in the focus of funding agencies and in the state-of-the-art technologies will, no doubt, influence the utilization of existing Core Laboratories and the development of new shared resources. Use of these core laboratories is available to all VA and NCIRE researchers. All other UCSF investigators are encouraged to utilize these core laboratories based on their availability. Representative costs for using these Cores are listed. However, these may change and interested Investigators are urged to contact the Director of each Core with specific questions pertaining to recharge costs.

CORE FACILITIES

ANIMAL CARE CORE FACILITY

Introduction

The **Animal Care Core (ACC)** is fully AAALAC accredited and provides housing, routine and specialized care and veterinary services for most animal species used in biomedical research, with the exception of non-human primates. The facility includes common research space, a fully equipped large animal surgery suite, a small animal surgical lab and a post-mortem examination room. In addition, a breeding/housing facility dedicated for transgenic mice has recently been constructed. The ACC consists of 20,000 ft² of space located in Buildings 12 and 21 and the newly constructed transgenic mouse building (Building 17), all in close proximity to one another.

Basic Facilities

Housing and Maintenance

The ACC is capable of housing and caring for almost all non-primate species, including invertebrates, amphibians, rodents, swine, sheep and most other mammals typically employed in biomedical research. A recently constructed 3000 ft² building provides for limited access housing and breeding facilities for 10,000 transgenic mice. All animals admitted to the ACC are specific pathogen-free and/or are subject to a minimum of six weeks quarantine and serological testing. Animals are housed under conditions recommended by the Guide for the Care and Use of Laboratory Animals. Rodents may be housed under conventional conditions (micro-isolation cages without autoclaving), in autoclaved micro-isolator cages (with laminar flow or BSL-2 work stations) or in autoclaved cages in Techniplast ventilated housing units. The HAVC system is capable of effecting a 100% air change throughout the facility approximately every 15 hrs. The entire facility is secured by a card access system and central alarm.

Colony rooms are available for rodents in studies employing biohazardous agents (e.g., parasites, vaccinia), chemical agents (e.g., ethionine) and radioisotopes. The facility has the capacity for BSL-2 containment. Animals are fed standard diets, but the facility provides for special diets if requested. The ACC also provides a full range of veterinary services, including consultation during experimental design, under the auspices of the University of California, San Francisco veterinary staff. The facility includes a small diagnostic laboratory capable of performing routine hematological, bacteriological and parasitological analyses, as well as urinalysis.

Surgical Suite

The large animal surgical suite consists of surgeon and animal prep areas, a completely equipped operating room and a recovery area. The facility includes a Fischer C-arm portable x-ray machine. The small animal surgery and necropsy laboratories are equipped with operating tables, lighting, anesthetic machines and ancillary equipment. These common research resources are designed to minimize the removal of animals from the ACC for experimental procedures.

Transgenic and Knockout Mice

The ACC houses breeding colonies of a number of specific transgenic and knockout mice strains. These animal models are listed under the names of the responsible Investigators.

Daniel Bikle, M.D.	IGF1	insulin-like growth factor knockout
	CaR	calcium receptor knockout
	VDR-K/O	VD receptor knockout
	25OHD	alpha hydroxylase
Peter Elias, M.D.	SB-LE	human calcium-binding protein knockout
	DBA/LAC	lipid metabolism in aging skin knockout
Sandra Erickson, Ph.D.	CYP27A	sterol 27-hydroxylase
	B6.129S-SOAT	acyl coenzyme A-sterol acyltransferase
	CYP7A1/KO	cholesterol-7 α hydroxylase gene
	ACAT	acyl coenzyme A-cholesterol gene
Joel Karliner, M.D.	PKC	Epsilon protein kinase knockout
	F8	reporter/promoter gene
	MMP-2LacZ	LAC receptor knockout
Ruby Ghadially, M.D.	B6.129-IL-2	cytokine lipid receptor keratinocytes gene
	FVB-NJ/TgN	green fluorescent protein/beta actin gene
	BALB/C-GFP	green fluorescent protein gene
Young Kim, M.D.	MUC2-343B	colonic mucin promoter/reported
	MUCtag 6	intestinal goblet cell apoptosis
	MUC2-Bc1XL	intestinal goblet cell Bc1X1 expression
	ITFTag3	spontaneous colon cancer development
	ITFTag4	spontaneous colon cancer development
	ITFTag6	spontaneous colon cancer development
	ITFTag7	spontaneous colon cancer development
	ITFTag8	spontaneous colon cancer development
Eric Huang, M.D., Ph.D.	Tg/6-cre/A21	transforming growth factor knockout
	NGF-KO	nerve growth factor
	C57BL/6-6by/Brn-3	lacking neurotrophins receptor
	C57BL/6-NC/CF	neuronal control factor
	B6.129S2-Tnf	B6X tumor necrosis factor
	BRN-3Acre	transcription factor
Bernard Halloran, Ph.D.	B6.129SF2	Bone cell aging gene
	B6.129-cd44	Osteoprotogene
Chris Lau, Ph.D.	Beta-MyHC-EGFP	green heart
	RSOA26	LacZ reporter
	Alpha-MyHC-merCremer	cardiac and inducible Cre
	PARP1 KO	PARP1 knockout (Jackson Lab)
	Floxed mSdhC-V69E	floxed mitochondrial complex II subunit C
	Floxed TSPY	floxed human TSPY gene (activated by Cre)
Floxed EGFP	floxed EGFP reporter (from Corrine Lobe)	

	PB-Cre4	prostate-specific Cre (from Roy Burman)
	TSPY-Cre	Cre directed by TSPY promoter
James McKerrow, M.D.	BALB/C-mcp	lymphocyte-deficient knockout
	B6.129S6/Tnf	interferon - γ (TNF)
	B6.129S2-Igh	immunoglobulin (IgM heavy chain) gene
	C57BL/6-Tnfrs	TNF receptor gene
	B6.129S7-Rag1	immunodeficient gene
	ABB-B2m	MHC double knockout
Theodora Mauro, M.D.	NHEI	sodium-glycogen express factor
	SERCA2	sarcoplasmic reticulum Ca ⁺⁺ gene
	A Enac	epithelial sodium factor
Benedict Yen, M.D., Ph.D.	HBV/S	hepatitis with S promoter transgenic
	HBV1-3mt	hepatitis B virus wild type
Juan Jaume, M.D. and David Lovett, M.D.	MMP2	matrix metalloproteinase reporter gene
	MMP2-8 β	beta promoter of MMP2
	F8-deletion	MMP2 lacking promoter
	F8-HGI	human growth interferon (β galactoside)
Paul Simpson, M.D.	CRE	zona pellucida promoter in oocytes from germ line cre-LOX
	α -Myosin	heavy chain promoter-Tta transactivator of tet operon;transgenic for expression of Tta in cardiac myocytes
	RASSL	tet-operon promoter-RASSL; coding transgenic for overexpression of an activated G-protein receptor
	α -Myosin heavy chain promoter-a1	Adrenergic receptor sub-type; coding transgenic for overexpression of a1A in cardiac myocytes
	Other knockouts:	AF a1-adrenergic receptors single a1A subtype single a1B subtype double a1A and a1B subtype
Raymond Swanson, M.D.	EAAT3 KO	excitatory amino acid transporter 3 KO
	PARP1 KO	poly(ADP-ribose) polymerase-1 KO
	HSP70	heat shock protein transgenic (constitutive)
Jeffrey Lawrence, M.D.	HOX A9	leukemia target knockout (B6 background)
	HOX A4	B6 background
	HOX A11	129 SV
	HOX B3, HOX B4	
	HOX B9, HOX C4	
	PBX1, PBX2	B6 backgrounds
	BCL2 (MRP8)	FVB/bone marrow knockout
	NF-1	B6/hematopoietic knockout
Robert Nissenson, Ph.D.	tTA, Type I, alpha (1)	collagen promoter tetracycline transactivator expressed in osteoblasts
	tTA	tTA driven by osteocalcin promoter

Management and Staff

The ACC is administered by the Director in conjunction with the Institutional Animal Care and Use Committee (IACUC). Investigators wishing to house animals in the ACC are required to obtain IACUC approval for their experimental protocols. All of the staff has undergone appropriate training and certification programs.

Director:

Doug Schmucker, Ph.D.
Bldg. 12, Rm 148
(415) 221-4810 ext 3412

Veterinary Medical Officer:

James Wilkerson, DVM
UCSF Pager: 719-7739

Administrative Assistant:

Mrs. Minakshi Sarkar
Office for Animal Studies
Subcommittee (IACUC)
Bldg. 12, Rm 149
(415) 221-4810 ext 2892

ACC Rates

Animal Care Per Diem Rates

Animals	Unit	Cost
Mice	cage	\$0.53
Nude/Transgenic mice	cage	\$0.75
Rats	cage	\$0.70
Hamsters	cage	\$0.62
Gerbils	cage	\$0.62
Rabbits	each	\$1.82
Guinea pigs	cage	\$1.76
Dogs	each	\$5.00
Cats	each	\$5.45
Swine	each	\$5.66
Chickens	each	\$3.89
Sheep	each	\$11.00
Frogs	each	\$0.25

Related services

Animal delivery	each	\$25.00
Technician labor	hour	\$20.00
	Overtime/hour	\$30.00
Professional labor	hour	\$50.00
Operating room*	4 hours	\$85.00

*Supplies are charged at cost



Figure 1. Exterior view of the new transgenic mouse housing facility of the ACC. This facility provides state-of-the-art care for transgenic and knockout mice.



Figure 2. View of the large animal surgical suite within the ACC.

CELL IMAGING CORE

Introduction

The Microscopy and Advanced Imaging Core Facility provides technical and instrumentation support for the SFVAMC and UCSF research communities. The facility is a fully equipped laboratory of approximately 1400 ft² located in Room B-12, Building 12 and Room 436, Building 2. The core provides full service for processing, analyzing and documenting all types of tissues, cell cultures, subcellular fractions or other biological samples using various microscopy techniques, both qualitative and quantitative.

Instrumentation

The core facility includes two Phillips electron microscopes (EM), a Tecnai 10 and a CM 10, as well as all of the ancillary equipment necessary for sample processing, routine transmission electron microscopy, and immunocytochemistry. The Tecnai is equipped with a Gatan High Resolution CCD camera and software.

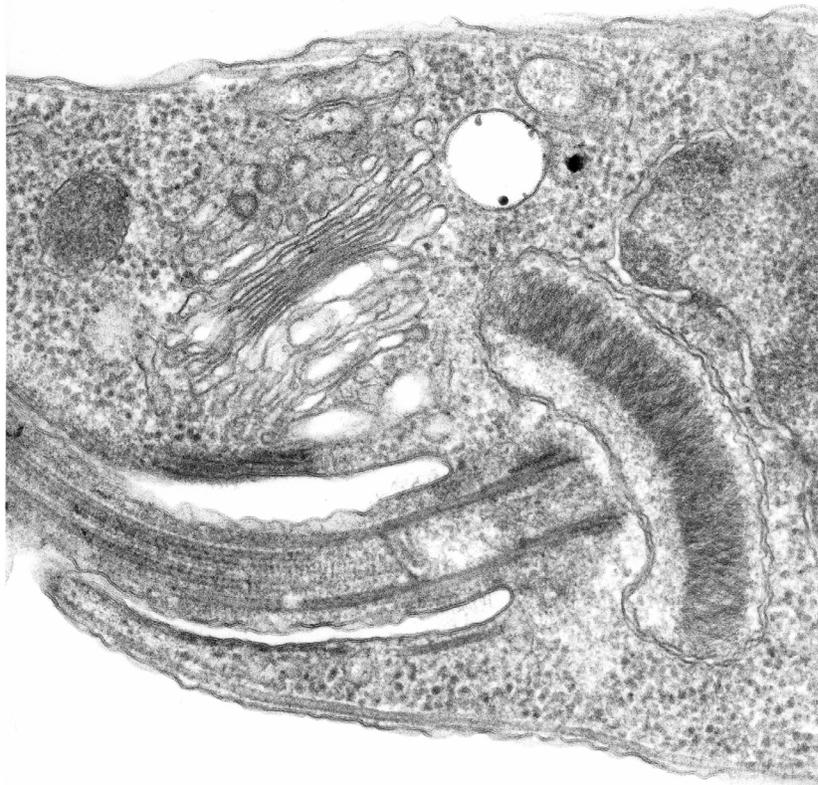


Figure 1. Transmission electron micrograph of the Golgi apparatus and the flagellar region of *T. cruzi* parasites. (65000X)



Figure 2. Transmission electron micrograph depicting immunogold labeling of the multivesicular body of *Leishmania* (frozen section). (35000X)

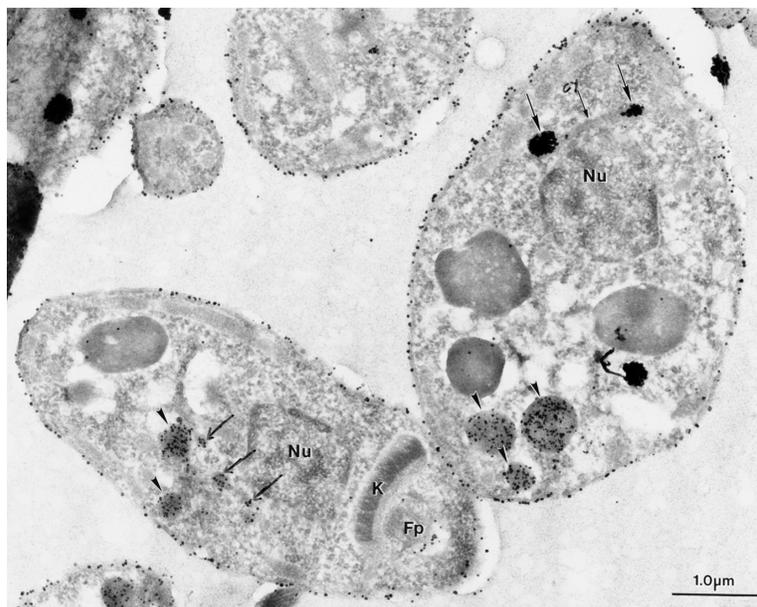


Figure 3. Transmission electron micrograph showing endocytosed nanogold particles transported to lysosomes by endocytic vesicles in *T. cruzi*. (22000X)

The facility also includes a Leica TCS-SP confocal microscope equipped with three lasers and an Acousto Optical Tunable Filter, which permits the operator to select wavelengths and intensities of the excitation source in order to compensate for relative brightness. Two photomultiplier tubes and a transmission detector permit simultaneous collection of two fluorescence emission spectra and a transmitted image. The system is also equipped with differential interference contrast (DIC) optics that permit imaging by refractive index.

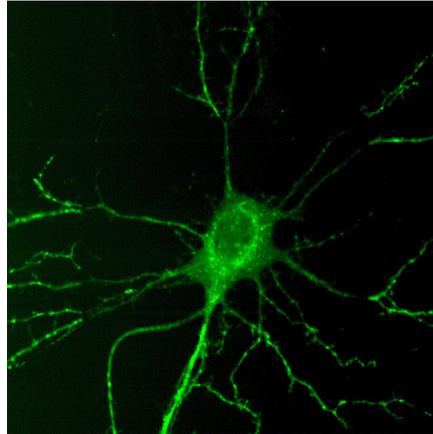


Figure 4. Confocal microscopy demonstrating neurons (400X)

Four fluorescence microscopes are available. Two are designed for high-resolution fluorescence imaging and the other two for physiological applications. The latter include (a) an Axioskop 2FS with water objectives and DIC and (b) a fully motorized Axiovert 200M equipped with fast excitation and emission shutters, high-speed filter wheel and a mechanized stage for environmental chambers. The microscopes are equipped with Hamamatsu CCD cameras operated with ImproVision software and interfaced via Ethernet connections.

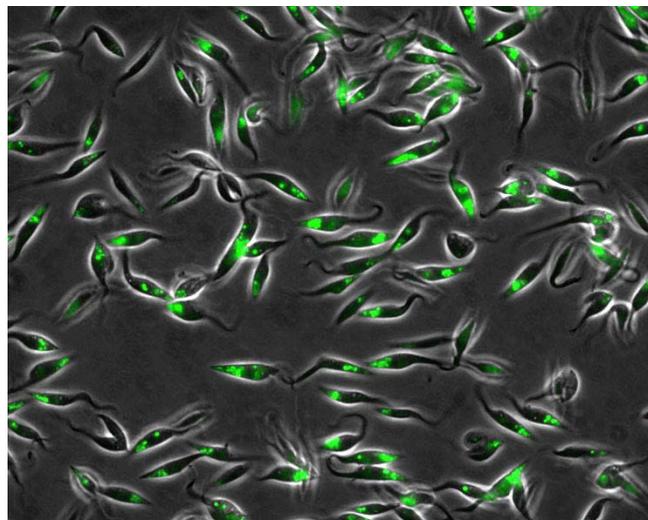


Figure 5. Contrast phase and fluorescence image of live *T. cruzi* parasites labeled with a specific fluorescent cysteine protease inhibitor. (1000X)

The laboratory also includes a fully equipped darkroom for film processing and printing, as well as designated space for tissue processing for immuno-histochemistry and in situ hybridization. In addition, the laboratory includes automated processors for fixing, dehydrating and embedding specimens for light microscopy. The laboratory staff provides technical expertise and assistance in electron, confocal, fluorescence and light microscopy, as well as in histological and cytological techniques. The Core also offers training in the use of the instrumentation.

Techniques and Procedures

- routine histology (e.g., paraffin sections, H&E)
- special staining (e.g., lipid, collagen, carbohydrates)
- cryosectioning
- immunohistochemistry
- immunofluorescence microscopy
- in situ hybridization
- confocal microscopy
- routine electron microscopy (TEM & immuno EM)
- immunocytochemistry
- quantitative microscopy
- cryo-thin sectioning

Management and Staff

Director:

Juan Engel, Ph.D.

(415) 221-4810, ext 2625

jcengel@itsa.ucsf.edu

User Fees

Charges for Electron Microscopy

	VA with Technical support	VA without Technical support	UCSF with Technical support	UCSF without Technical support
TEM Sample Processing	\$54/72 ¹	---	\$67/90 ¹	---
TEM use (per hour)	\$80	\$30	\$100	\$36
Photography (1 negative & 1 print)	\$5	---	\$5	---
Additional Prints	\$3	---	\$3	---
ImmunoEM per antibody	\$360/ ² 720	---	\$450/ ² 870	---
Immunostain per sample	\$100	---	\$125	---
EM Negative Staining	\$ 25		\$ 30	
Plates for Publication	\$140	---	\$175	---
EM training	\$350	---	\$440	---

¹ Price varies depending on number of samples requested and period of service/use

² Price varies depending on antibody source (commercially available Abs vs. other sources) and scientific information available (Publications on a particular Ab reagent in ImmunoEM assays)

Charges for Confocal Microscopy

	VAMC with Technical support	VAMC without Technical support	UCSF with Technical support	UCSF without Technical support
Confocal Microscope (per hour)	\$75	\$35	\$95	\$45
Confocal Training	\$250 ¹ \$350 ² \$500 ³	---	\$315 ¹ \$420 ² \$625 ³	---
Refreshing Training	\$150		\$190	

¹ Cost per individual with recent experience in Leica or Zeiss Confocal microscopes (Training course, 3-4 hours)

² Cost per individual with microscopy and computer experience (Training course, 6-8 hours)

³ Cost per individual without microscopy and/or computer experience, (Training course, 9-12 hours).

Charges for Fluorescent and Physiology Microscopes (Zeiss and Leica Microscopes)

Microscopes & Software	VA with Technical support	VA without Technical support	UCSF with Technical support	UCSF without Technical support
Standard Zeiss Upright Microscope (per hour)	\$ 65	\$ 15	\$ 75	\$ 25
Standard Leica Inverted Microscope (per hour)	\$ 55	\$ 15	\$ 60	\$ 25
Standard Microscope-Camera & Software Training	\$ 150	---	\$ 190	---
Physiology Scops (upright & Inverted)	\$ 75 per hour	\$25 per hour or \$100 per day	\$ 100	\$30 per hour or \$125 per day
OpenLab ¹ Software Training	\$ 200 (Core) \$ 300 (3D)	---	\$ 250 (Core) \$ 375 (3D)	---
OpenLab server Software Core	---	\$ 12	---	\$ 15

¹ Improvion's OpenLab software has a number of different application modules

Charges for Histology¹

Paraffin ¹ Embedding & 1 H&E	15	---	\$ 18	---
Paraffin Embedding (only)	10		12	
Additional sections	\$ 3 (H&E) \$3 (unstained)		\$ 3 (H&E) \$3 (unstained)	
Other stainings ¹	\$ 3-15		\$ 4-18	
In situ ² Hybridization	\$300 \$600	---	\$ 350 \$750	---

¹ Price varies depending on the number of samples, sections, and staining requested

² Price varies depending on the probe, number of samples, and sections requested

PROTEOMICS CORE

Introduction

The Proteomics Core Laboratory is located in Room 117, Bldg. 1. This core facility provides the services of protein profiling, separation, quantification and identification using mass spectrometry, HPLC and gel-based techniques.

Instrumentation

The Core includes a **Ciphergen PBSII protein chip reader** (SELDI-TOF Mass Spectrometer), Biomarker Patterns™ software, as well as equipment for sample processing and application to chips. The system provides active surface chemistries, including hydrophilic, hydrophobic, anion and cation exchange, metal-ion binding and covalent linking. In addition, the Core can provide rapid and accurate mass spectra from 1000 to 150,000 Daltons which permits comparative protein profiling, affinity profiling, protein identification (proteolytic fragment mapping) and attomole-level quantification. More information may be obtained at the Ciphergen website (www.ciphergen.com).



Figure 1. Ciphergen PBSII

The Core also includes a Dionex/LC Packings Ultimate Nanoscale Multidimensional liquid chromatography system. This system incorporates the following components:

- A FAMOS™ automated micro autosampler for sample injection out of a wide variety of well plates (96 well plates, 96 deep well plates, 384 well plates, PCR tubes and conventional 1.5 ml vials). Samples as small as 50 nanoliters may be injected.
- An UltiMate™ Micro Pump and Detection Module, including a Solvent Organizer, Micro Pump Column Oven, scanning UV/VIS Detector and UltiChrom Operating Software.
- A Switchos™ micro column switching module that incorporates two 10-port valves, a high precision loading pump and a four channel solvent selection valve. This system is appropriate for a variety of applications, including sample pre-concentration, sample clean-up, multidimensional separations, desalting, selective extraction.
- A PROBOT™ Micro fraction collector that permits the on-line collection of fractions and delivers extremely small amounts of sample (a few nanoliters) with high

reproducibility. Collection from many different types of substrates is possible, i.e., MALDI-TOF/MS targets, PVDF membranes for subsequent protein sequencing, 96, 384 or 1536-well plates or any other collection vessel. In addition, his instrument can pipette or dispense sample and reagents. More specific information concerning this system can be obtained at the Dionex website (www.dionex.com).

The laboratory also includes an Amersham/Molecular Dynamics Typhoon Multimodal Imaging System that includes the following components and capacities:

- A high performance gel and blot imager with a range of five orders of magnitude
- The capacity for three methods of detection: storage phosphor, fluorescence and chemiluminescence
- The ability to handle gel sandwiches, agarose and polyacrylamide gels, membranes, microplates and microarrays
- Red, green, and blue excitation wavelengths and a wide choice of emission filters that enable imaging of an extensive variety of fluorophores. More detailed information pertaining to this particular system may be obtained at www.mdyn.com.

Techniques and Procedures

- Protein sample mass characterization
- Comparative protein display
- Characterization of post-translational modifications
- Protein quantification
- Protein separation and isolation based on hydrophobicity, pI, metal-binding, macromolecular affinity
- Peptide mapping/Protein identification
- Fluorescent, chemiluminescent, radioisotopic gel & blot imaging

Management and Staff

Director:

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Associate Director:

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Recharge Rates and Scheduling

Ciphergen Mass Spectrometer

Ciphergen use-supervised	\$50/hr
Ciphergen use-unsupervised	\$35/hr
Unlimited Ciphergen Use:	\$3500/yr, \$350/month

Protein chips are approximately \$70 each and related supplies (e.g., sinnapinic acid, CHCA) are provided at cost.

Typhoon Multimodal Imager

Regular Use (May scan multiple gels per session)	\$3/session
Pilot Use	Arranged

Dionex capillary/nano LC system

Project Setup	\$75
Hourly Usage	\$4/hr

Use of the Proteomics Core instruments requires scheduling. Please use the Yahoo! Calendar (calendar.yahoo.com) and log in with the ID `sfvamcproteomics` and the password `proteome`. Place your name, the equipment to be used (e.g., Ciphergen, Typhoon) and contact information in the title line of the appointment cell. In the event that you are unable to keep your appointment, please delete your registration as soon as possible. In the Proteomics Core Laboratory, please use the sign-up sheets adjacent to each instrument. If you prefer to recharge a non-VA or NCIRE administered grant, please complete a Proteomics Lab User ID/Funding Source Form (this is a one time only request).

MAGNETIC RESONANCE CORE

Introduction

The Magnetic Resonance Imaging Core (MRIC) has undergone significant changes over the last few months, and now consists of two separate components, the Clinical MRIC, which studies brain changes in neurodegenerative diseases, such as Alzheimer's and Parkinson's disease using a 1.5 Tesla MRI scanner and the Advanced MRIC, which develops new imaging techniques for measuring brain changes with improved sensitivity using a new, Bruker-Siemens 4.0 Tesla whole body system. The Human Muscle MRIC, and the Animal MRIC, are no longer components of this core. This core facility performs magnetic resonance imaging (MRI) and magnetic resonance spectroscopy (MRS) experiments.

Clinical Magnetic Resonance Imaging Core

The Clinical MRIC consists of a 3400 ft² facility located on the bottom floor of Building 203. This unit includes the clinical laboratory containing a Siemens 1.5 Tesla MRI instrument, a patient waiting area, a 400ft² administration area, several offices and a number of carrels and computer workstations.



Figure 1. 1.5 Tesla Siemens MRI/MRS Magnetom VISION system

Clinical MRIC Instrumentation

This laboratory contains a 1.5 Tesla Siemens MRI/MRS Magnetom VISION system equipped with self-shielded gradients that provide echo planar imaging. A Gradient

Overdrive System allows a slew-rate that approaches current FDA limits and facilitates EPI with excellent spatial and temporal resolution. The Core has developed specialized software for a variety of applications, including co-analysis of structural MRI data with MRSI. In addition to segmentation and co-analysis with MRSI, the facility has the capacity for processing magnetic resonance spectroscopic imaging (MRSI) data, co-registered display of MRSI and MRI data and suppression of lipid artifacts within metabolite MRSI data.

A large number of MRI experiments are available on the Siemens Magnetom VISION system, including:

- T1 and T2-weighted sequences
- diffusion and perfusion sequences
- echo-planar imaging
- functional imaging

Several specialized MRI experiments have been implemented, including an arterial spin labeling procedure for improved measurement of brain perfusion.

Standard single volume localized spectroscopy experiments, including STEAM and PRESS, have been implemented. Most spectroscopy experiments in human brain employ in-house developed multiple slice 1H MRSI wherein the distribution of proton metabolites may be measured over the brain slice. An EPI-based MRSI experiment incorporating computer-optimized RF pulses has been developed to obtain data over a selected volume of the brain. In addition to sequences for MRI and 1H MRSI, this system includes a 31P and 1H decoupling channel and a double-tuned 1H/31P birdcage head coil. The system is operated by a SUN Microsystems SPARC 10 computer.

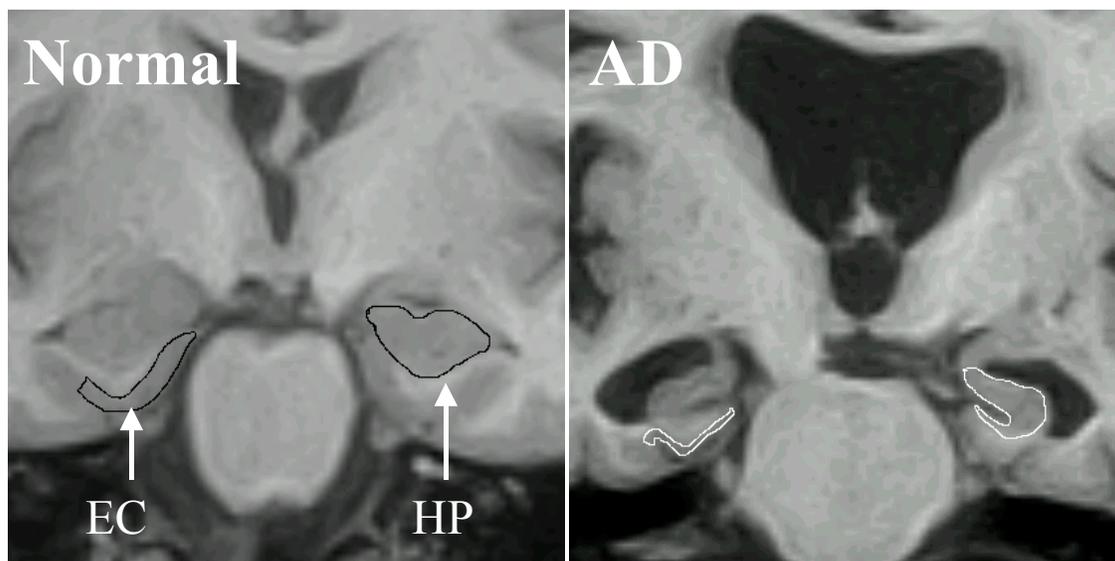


Figure 2. Brain scans of normal and Alzheimer's patients.

Advanced Magnetic Resonance Imaging Core

A new, 4.0 Tesla Bruker-Siemens whole body MRI/MRS instrument has recently been purchased, and is now installed in a new building (Building 19T) named the Advanced MRI Building, located between Building 13 and the parking garage. In addition to the 4.0 Tesla MRI instrument, the new Advanced MRI Building includes a patient waiting room and bathroom.

Advanced MRIC Instrumentation

The new 4.0 Tesla Bruker-Siemens MRI instrument represents a collaborative effort between Bruker Instruments and Siemens Medical Systems, and comes with the most recent Siemens MRI software. The system includes 40 mT/m self-shielded gradients and a variety of coils and sequences to provide state-of-the-art MRI and MRS capabilities. This new system will be one of only two such 4.0 Tesla MRI systems in Northern California.

The new 4.0 Tesla MRI instrument is able to perform the following experiments:

- T1 and T2-weighted sequences
- diffusion and perfusion sequences
- echo-planar imaging
- functional imaging
- Localized spectroscopy experiments
- susceptibility weighted imaging

Because of its higher magnetic field strength, many experimental results are enhanced over those obtained at the lower field strength of 1.5 Tesla. In particular, the results from diffusion and perfusion sequences, functional and susceptibility weighted imaging, and spectroscopy, are expected to be much improved.

Figure 3: High resolution structural MRI of the hippocampal formation

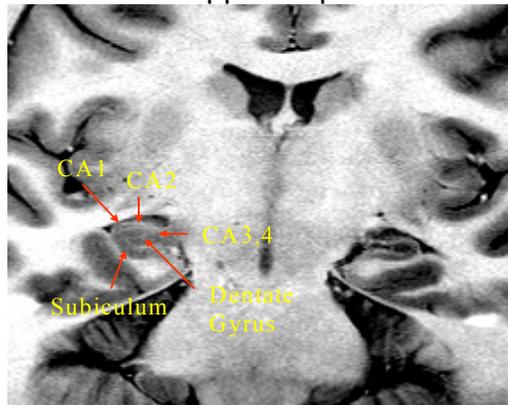
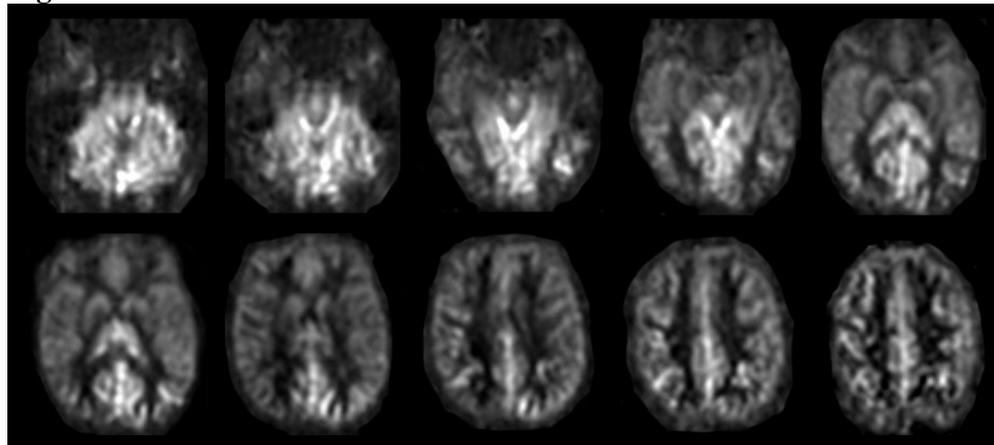


Figure 4: Perfusion MRI at Tesla



Software Development

The core facility staff has developed extensive software to process MRSI data and to display metabolite distributions co-registered to the MRI data. These software packages (a) automate quantitation of metabolite resonances based on anticipated or theoretical patterns and (b) incorporate segmentation information from the MRI data to estimate tissue type contributions to each MRSI voxel. Additional software packages permit segmentation of the brain MRI data into various tissue types (e.g., gray matter, white matter, CSF), estimates of hippocampal volume and performance of a variety of statistical analyses.

Computer Resources in the Magnetic Resonance Core

The Magnetic Resonance Imaging Core is extremely well-equipped with computer resources for collecting and analyzing data, including:

- five SUN workstations (two SPARC 20s, two SPARC 10s and one older SPARC station) running UNIX and used for computer simulation, data processing with NMR1, software development and data display using an IDL software package
- an 8 processor SUN Enterprise 3500 and an 8 node Beowulf system, each node having two Pentium III processors
- fifty additional PCs (mostly Pentium III and Pentium IV), including color monitors, printers; a variety of software packages for word-processing, spreadsheets, graphics, computation (e.g., Mathematica, Matlab, IDL, S-Plus)
- a Medtronic computer for automated measurements of hippocampal volume and shape
- all of the Sun workstations and PCs are internet connected via ethernet to permit sharing software, files, disk drives and to enable file transfer to facilitate data processing; Sun workstations run Samba to permit sharing disks with the PCs.

Management and Staff

Director:

Michael Weiner, MD
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Facilities Manager:

Gerald Matson, PhD
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jerrym@itsa.ucsf.edu

User Fees

Clinical MRIC: 1.5 Tesla MRI/MRS system: \$324 per hr
Advanced MRIC: 4.0 Tesla MRI/MRS system: \$500 per hr (anticipated)

CELL ANALYSIS AND SORTING CORE

Introduction

The FACS Core Laboratory provides instrumentation and technical expertise for fluorescence-activated cell analysis and sorting for the SFVAMC and UCSF research community. The facility also provides technical support for sample preparation, cell staining, data acquisition and data analysis. The laboratory is located in Bldg 2, Room 546. This core facility is supported by the VA Research Service, the investigators comprising the Immunology Research Laboratory (Seaman, Wofsy, Nakamura and Daikh), and user recharge fees.

Instrumentation

The FACS core facility currently has a BD-PharMingen FACScan benchtop flow cytometer that utilizes a single laser to measure up to five parameters, i.e. forward light scatter, side light scatter, and three fluorescence parameters. The FACScan can measure the pulse height, area and width of each parameter. This instrument has a computer upgrade to enhance data acquisition. The FACScan is connected to a Macintosh computer that is equipped with CellQuest software for data acquisition and analysis.



Figure 1. BD FACScan instrument

The facility will also add a BD-PharMingen FACSAria fluorescence-activated cell sorter

that will greatly expand current cell sorting capabilities at the San Francisco VA Medical Center. This is the newest generation high speed fluorescence activated sorter that incorporates a fixed-alignment flow cell. This provides much more reliable and reproducible operation. In addition, a new fiberoptics optical system provides unparalleled sensitivity. This instrument will be fitted with two lasers to measure up to nine independent parameters, including seven different fluorescent colors. This instrument will include a computer workstation supplied with FACSDiva software for running the instrument and an additional computer workstation for analyzing results.

The core facility also provides an AutoMACS instrument that provides rapid magnetic-based cell sorting. This instrument utilizes Miltenyi magnetic microbeads to isolate purified populations of cells by either positive selection or depletion. This instrument can be easily used for magnetic pre-sorting of cells before further flow cytometry cell sorting on the FACS Aria cytometer.

Together, these two instruments provide state-of-the art cell analysis and sorting capabilities at the San Francisco VA Medical center.

Technical Support

Instrument and software support is provided by BD-PharMingen as part of the annual service contract. User technical support is provided by the core facility. User training is provided to all users and is required prior to independent instrument use. Individual technical support is also provided for antibody staining, sample preparation, and data analysis. In addition, technical support for acquisition and analysis, as well as trouble shooting, is available daily from 9:00 AM to 5:00 PM. Users can elect to run samples independently or have their samples run by a technician.

Techniques and Procedures

The FACScan detects both scattered light and fluorescence from single cells moving in a fluid jet at a high flow rate. For this technique, a single cell suspension, e.g., peripheral blood lymphocytes, is prepared. Aliquots of cells are incubated ("stained") with a fluorescent-tagged monoclonal antibody against a single cell surface molecule. Stained samples are run on the FACScan and data collected and stored on computer. The particular applications that are possible with FACS are almost limitless, but the major kinds of data obtained in routine use include:

- Quantification of specific cell types and subtypes
- Phenotypic analysis of cells
- Assessment of cellular activation
- Intracellular cytokine quantification
- Screening for cell surface receptors

After data are obtained, it may be analyzed at a later time using CellQuest software on the core computer. An example of such data with analysis is attached.

The FACS Aria flow cytometer also detects scattered and fluorescent light from cells prepared by the same general method used for the FACScan. However, individual

populations of cells can be collected in individual sorting chambers. Advanced signal processing allows data acquisition at a rate of up to 70,000 events per second; thus, cells can be analyzed and sorted faster than by conventional FACS. This combination of speed and sensitivity will provide the ability to

- Purify large numbers of a single population of cells
- Purify rare populations of cells to a high degree of purity
- Simultaneously purify more than one population of cell from a complex population
- Perform multiparametric analysis on complex cell populations

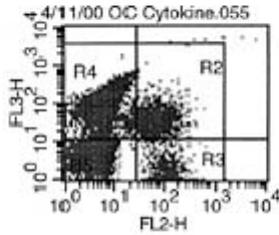
An example of such separation is shown in Figure 2.

B6

1.5 hour in vivo anti-CD3 stimulation,
 1.5 hour in vitro culture

Liver

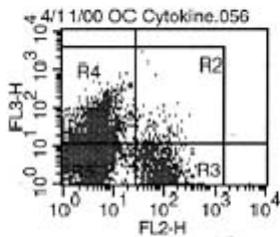
PBS



File: 4/11/00 OC Cytokine.055 Acquisition Date: 11-Apr-0
 Gate: G1 Gated Events: 17807
 Total Events: 50000 X Parameter: FL2-H (Log)
 Y Parameter: FL3-H (Log) Quad Location: 25, 12

Quad	Events	% Gated	% Total	X Mean	X Geo Mean	Y Mean	Y Geo Mean
UL	8491	47.68	16.98	7.05	6.22	119.07	92.20
UR	2083	11.70	4.17	83.72	67.91	64.27	36.34
LL	5985	33.61	11.97	4.36	3.80	4.69	4.10
LR	1248	7.01	2.50	123.86	108.89	2.22	1.61

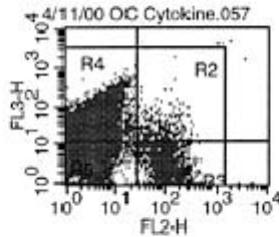
Anti-CD3
 # 1



File: 4/11/00 OC Cytokine.056 Acquisition Date: 11-Apr-0
 Gate: G1 Gated Events: 17407
 Total Events: 50000 X Parameter: FL2-H (Log)
 Y Parameter: FL3-H (Log) Quad Location: 25, 12

Quad	Events	% Gated	% Total	X Mean	X Geo Mean	Y Mean	Y Geo Mean
UL	2587	14.86	5.17	5.34	4.47	49.46	32.08
UR	117	0.67	0.23	82.10	68.05	73.85	27.71
LL	12899	74.10	25.80	3.84	3.30	5.78	5.15
LR	1804	10.36	3.61	108.70	91.52	2.66	1.93

Anti-CD3
 # 2



File: 4/11/00 OC Cytokine.057 Acquisition Date: 11-Apr-0
 Gate: G1 Gated Events: 29006
 Total Events: 50000 X Parameter: FL2-H (Log)
 Y Parameter: FL3-H (Log) Quad Location: 25, 12

Quad	Events	% Gated	% Total	X Mean	X Geo Mean	Y Mean	Y Geo Mean
UL	14111	48.65	28.22	4.96	4.25	59.40	40.88
UR	376	1.30	0.75	115.89	77.11	98.70	28.46
LL	11646	40.15	23.29	3.82	3.25	6.72	5.89
LR	2873	9.90	5.75	139.09	117.62	2.94	2.04

FL1=IFN-g (XMG1.2-FITC)
 FL2=NK1.1 (PK136-PE)
 FL3=CD3 (145-2C11-CyChrome)

Figure 2. Data on anti-CD3⁺ cells obtained with the BD FACScan.

Management & Staff

Director:

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Staff:

Erene Niemi, BS
221-4810, ext 2104

User Fees

Users must receive training on use of the FACS Core Facility instruments prior to use.

Investigators may reserve time for use and/or support of the FACScan instrument during normal working hours. In addition, special arrangements may be made for after hours use. The fees for use of the FACScan are:

\$60/hr with operator

\$40/hr without operator

Training times are charged for usage with an operator.

The FACS Aria Cell Sorter will be available by appointment with the help of the operator. The fees for use of the cell sorter will be \$100/hr

MOLECULAR CORE

Introduction

The Molecular Core provides instrumentation and expertise for performing quantitative real-time RT-PCR and related procedures. Training in the use of the equipment and the analytical software, as well as technical support for experimental design, data collection and data analysis are also available. The Core is located in Room 125, Bldg. 2.

Instrumentation and Procedures

The Molecular Core laboratory includes an **Applied Biosystems (ABI)Prism 7900HT Sequence Detector System (SDS)**, including the SDS analysis software. This specialized equipment is designed to determine quantitative and relative differences in gene mRNA copy number between samples. Multiple genes may be studied simultaneously, using either a fluorescent probe-based quantification (e.g., Taqman or intercalation of a fluorescent dye, such as the SYBR green dye I. Similarly, the 7900HT may be used for the process of allelic discrimination or single-nucleotide polymorphism detection using Taqman probes. Technical assistance in the design of primers and probes using the Primer Express program from Applied Biosystems is available.

The core also includes an **Axon Gene Pix 4000B Microarray Scanner** equipped with Gene Pix Pro 4.0 analysis software. This is specialized equipment designed to scan glass slide hybridized microarrays. The 4000B measures fluorescence from Cy5 (red) and Cy3 (green) dyes and the data are integrated into the Gene Pix Pro 4.0 software. Thousands of genes may be studied simultaneously. An accompanying computer with all associated software for data analysis and a color printer are also available. Training in the use of these instruments is available by appointment. The Molecular Core also includes a **Roche Consignment Freezer program** that offers frequently used reagents (e.g., restriction enzymes) at discounted prices.

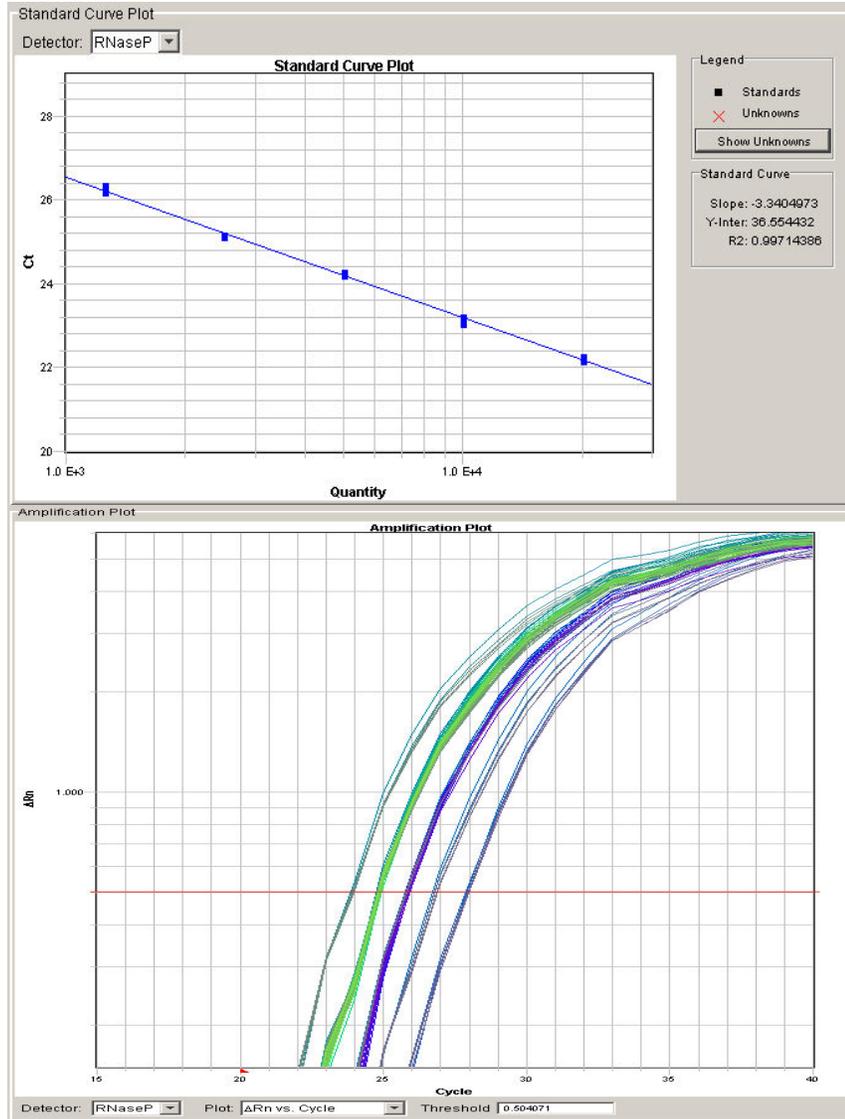


Figure 1. Standard curve and amplification plot of RNase P RNA dilution series. A) Standard curve of serial dilutions presented in B. B) Amplification plots of 2 fold serial dilutions of a known amount of reverse transcribed RNase P RNA. Plots represent greater than 3 replicates of each quantity. Data collection and analysis performed on the ABI Prism 7900HT sequence detection system and it's associated software.

A

Name	ID	Ratio of Medians	Median of Ratios	Region Ratio
ESTs	AA789015	16.50	18.27	18.24
matrix metalloproteinase 10 (stromelysin)	AA857496	5.16	5.188	5.199
ESTs	H61595	5.109	4.944	5.242
ESTs	N24949	3.87	3.946	3.737
mesoderm specific transcript (mouse) hom	AA598610	3.704	3.715	3.506
ESTs	AA005228	3.578	3.664	3.531
ESTs	H87241	3.206	3.155	3.178
ESTs	T96780	3.197	2.884	3.147
DKFZP586I1419 protein	AA187933	3.175	3.15	2.916
ESTs	W01172	2.962	3.042	3.062
ubiquitin-specific protease 1	AA099034	0.33	0.336	0.329
stimulated trans-acting factor (50 kDa)	AA083407	0.327	0.347	0.33
phospholipid scramblase 1	N25945	0.323	0.338	0.324
ESTs	N69945	0.313	0.33	0.34
Fc fragment of IgG, low affinity IIa, re	AA634109	0.305	0.293	0.292
lysozyme (renal amyloidosis)	N63943	0.269	0.281	0.276
alpha2,3-sialyltransferase	H19227	0.256	0.25	0.242

B

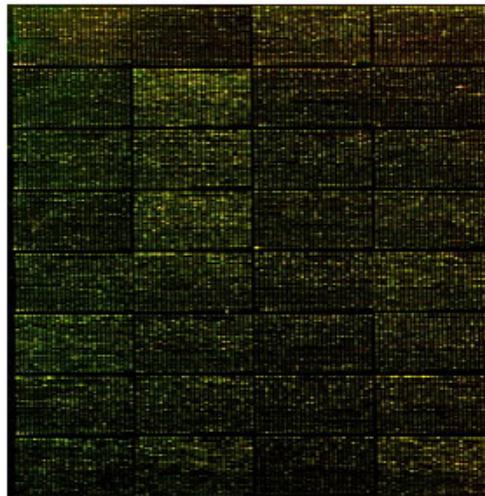


Figure 2. Microarray based gene expression profile information. A) Interesting genes report developed using the Gene Pix Pro program based on the data presented in B. B) Microarray hybridization data for thousands of genes, collected using the Axon 4000B scanner.

Management and Staff

Director:

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Associate Director:

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User Fees

Usage costs will be collected through recharge fees. Additional fees may be required for requests for specific services. The fees will vary based on the service and researcher experience base. New investigator fees will be determined on an individual basis as a percentage of their support. Use of the primary computers for data analysis is not permitted. The use of the workstation computer requires reservations and is limited to two-hour sessions.

Fees for the ABI 7900HT SDS

Service – Investigator Status	Cost per plate
Use of equipment only – General	\$60
Use of equipment only – New	variable
Performance by staff – General	\$70
Performance by staff – New	variable

The basic cost is \$30 per hour +/- 15 minutes. Most runs extend from 2 to 2.5 hours, therefore, the average cost is \$60 per plate. Technical assistance for plate set up is available for an additional \$10; assistance with data analysis is available at an additional cost of \$20

Fees for the Axon scanner

Service – Investigator status	Fee per session
Use of equipment only – General	\$20
Use of equipment only – New	variable
Performance by staff – General	\$40
Performance by staff – New	variable

There is a minimum charge of \$20 for use of the scanner to offset printer maintenance, printer cartridge costs and paper. Assistance with data collection or data analysis is available for an additional fee of \$20.

ROCHE on-site Freezer Program

ITEMS	Cat#	Qty	List Price	Discounted
<u>RESTRICTION ENDONUCLEASES</u>				
Eco RI Low Conc, 5000U	703737	2	\$33.00	\$29.70
Eco RV Low Conc, 2000U	667145	2	\$46.00	\$41.40
Hind III Low Conc, 5000U	656313	2	\$32.00	\$28.80
Xho I Low Conc, 5000U	899194	2	\$67.00	\$60.30
Bam HI Low Conc, 1000U	220612	2	\$25.00	\$22.50
Sal I Low Conc, 500U	348783	2	\$46.00	\$41.40
Nhe I Low Conc, 200U	885843	1	\$51.00	\$45.90
Xba I Low Conc, 1000U	674257	1	\$30.00	\$27.00
Sca I Low Conc, 500U	775258	1	\$33.00	\$29.70
Spe I Low Conc, 200U	1008943	1	\$68.00	\$61.20
Not I Low Conc, 200U	1014706	1	\$68.00	\$61.20
Nco I Low Conc, 200U	835315	1	\$70.00	\$63.00
Kpn I Low Conc, 5000U	899186	1	\$87.00	\$78.30
Sma I Low Conc, 1000U	220566	1	\$75.00	\$67.50
Pst I Low Conc, 3000U	621625	1	\$33.00	\$29.70
<u>INHIBITORS</u>				
Protector RNase Inhibitor - 2000 U	3335399	1	\$79	\$71.10
COMPLETE PROT. INHIB. TABLETS* 20 TABLET	1697498	0	\$260.00	\$234.00
COMPLETE MINI 25 TABS	1836153	1	\$111.00	\$99.90
COMPLETE MINI EDTA-FREE 25 TABS	1836170	1	\$111.00	\$99.90
COMPLETE EDTA-FREE 20 TABLETS	1873580	0	\$260.00	\$234.00
<u>PCR COMPONENTS</u>				
PNK 3'PHOSPHATASE FREE ** 200 UNITS	709557	1	\$199.00	\$179.10
T4-DNA POLYMERASE ** 100 U	1004786	1	\$91.00	\$81.90
T4 DNA LIGASE LOW CONC ** 100 UNITS	481220	1	\$50.00	\$45.00
RAPID DNA LIGATION KIT ** 1 KIT	1635379	1	\$129.00	\$116.10
<u>PCR COMPONENTS</u>				
AMV REVERSE TRANSCRIPTASE ** 500 U	1495062	1	\$141.00	\$126.90
TAQ DNA POLYMERASE ** 100 U	1146165	1	\$68.00	\$61.20
PCR NUCLEOTIDE MIX ** 100 REACTNS	1581295	1	\$63.00	\$56.70
EXPAND LONG TEMPLT PCR SYS. ** 100 U	1681834	1	\$94.00	\$84.60
EXPAND 20KB PLUS PCR SYSTEM** 100 U	1811002	1	\$135.00	\$121.50
EXPAND HIGH FIDELITY PLUS PCR SYS 125U**	3300242	1	\$114.00	\$102.60
TITAN (TM) 1 TUBE RT-PCR KIT **	1939823	1	\$366.00	\$329.40
PCR GRADE WATER (25 X 1 ML)**	3315932	1	\$108.00	\$97.20
<u>FUGENE 6 REAGENT 1 ML **** HAZ</u>				
DNA MOLECULAR WT MARKER I	236233	1	\$44.00	\$39.60
DNA MOLECULAR WT MARKER II	236250	1	\$49.00	\$44.10
DNA MOLECULAR WT MARKER III	528552	1	\$57.00	\$51.30

THE CLINICAL RESEARCH CENTER

Introduction

The **Clinical Research Center (CRC)** was created in 1999 as a joint venture between the San Francisco Veterans Affairs Medical Center (SFVAMC) and the Northern California Institute for Research and Education (NCIRE). The CRC provides a state-of-the-art facility to support and promote the conduct of innovative, high quality clinical research. The Center is located in the C wing of Building 203. This unit provides for the conduct of industry sponsored research, including contract negotiations, financial management, subject recruitment, clinical procedures, laboratory specimen processing and packaging, record storage and administrative support for phase I to IV pharmaceutical studies and medical device trials. The CRC has incorporated quality assurance procedures into its daily standard operating procedures. The unit follows Good Clinical Practices, ICH Guidelines, and is FDA compliant. In FY2002 the CRC administered over 140 industry-sponsored projects for 38 principal investigators.

Equipment and Facility

The CRC consists of over 1400 square feet of clinical research space including two examination rooms, a certified BSL1 lab for sample handling and processing, interim storage, meeting space for investigators, rooms for monitor visits, study file storage and administrative offices. The CRC, in collaboration with the VAMCSF, includes an on site pharmacy with a dedicated Research Pharmacist. The CRC is equipped with a -70°C freezer, a freezer inventory system, a -20°C freezer, a refrigerated centrifuge, exam tables and other ancillary equipment essential for sample collection and processing. The CRC has the capacity to conduct or support research in a wide range of specialties, including Dermatology, Endocrinology & Metabolism, Gastroenterology, General Surgery, Geriatric Medicine, Hematology, Infectious Diseases, Internal Medicine, Medical Oncology, Nephrology, Ophthalmology, Pathology, Podiatric Medicine, Prosthetics, Psychiatry, Psychology, Pulmonary Disease, Radiology, Urology, and Vascular Surgery.

Management and staff

The CRC is managed and operated by a Certified Clinical Research Coordinator and Nurse Manager who handle the CRC's daily operations. The CRC staff consists of two RNs, a BSN, research coordinators, a regulatory administrator, an experienced financial analyst, and an administrative staff.

Nurse Manager:

Kathleen Stanley, RN

Phone: 221-4810, ext 4220

e-mail: Kathleen.Stanley@med.va.gov

CRC Administrator:

Newton Ong

Phone: 221-4810, ext 3892

e-mail: Newton.Ong@med.va.gov

User Fees

Commonly Ordered Tests

Rates are based on 80% of current Medicare reimbursement rates, if available. Procedures that are not listed below require notifying the Service's contact for appropriate CPT coding and pricing.

Medicare reimbursement rates can be found at this website:

www.tricare.osd.mil/cmac/cmaclocality.cfm

Laboratory

Test	CPT Code	80% Medicare Rate
<u>Common Panels:</u>		
Electrolytes	80051	\$9.79
Lytes/Bun/Creat/Glucose/Calcium	80049	\$11.85
Liver function	80076	\$11.44
Lipid Panel	80061	\$17.99
Urine Electrolyte panel (Sodium, Potassium, Chloride)	84300,82436,84133	\$20.52
Hepatitis Panel (HbsAg, HbsAb, HbcAb, Hep A-Total, IgM, HCV AB)	80074	\$63.62
<u>Single tests:</u>		
ABO/Rh	86900	\$4.50
Fibrinogen	85384	\$11.70
Follicle Stimulating Hormone (FSH)	83001	\$24.83
Gentamicin	80170	\$21.90
Carbamazepine	80156	\$20.77
Acetaminophen	82003	\$27.02
Albumin	82040	\$6.62
Alkaline Phosphatase	84075	\$6.91
ALT (SGPT)	84460	\$7.20
Amylase	82150	\$9.00
aPTT	85730	\$9.00
AST (SGOT)	84450	\$6.90
Beta Hydroxybutyrate	82010	\$10.92
Bilirubin, Total	82247	\$6.70
BUN	84520	\$6.14
Calcium	82310	\$6.89
CBC + Auto Diff, Plts.	85022	\$7.80
CD4/CD8 Lymphocyte subset	86359	\$50.39
CEA	82378	\$25.34
Chloride, Serum	82435	\$6.14
Cholesterol	82465	\$6.00
Cortisol	82533	\$22.49
CPK	82550	\$9.30

Test	CPT Code	80% Medicare Rate
CPK MB	82553	\$15.42
Creatinine	82565	\$6.84
D-Dimer	85378	\$9.90
Digoxin	80162	\$17.74
Ethanol	82055	\$14.43
Ferritin	82728	\$18.20
Folate, RBC	82747	\$23.14
Free Thyroxine (FT4)	84439	\$14.17
Gamma GT	82977	\$9.62
Glucose	82947	\$6.00
Hepatitis A, IgM	86709	\$15.73
HbcAb	86704	\$16.11
HbsAb	86706	\$14.99
HbsAg	87340	\$13.80
HCV ab	86803	\$20.15
HCV Genotype	87902	\$347.34
HCV Viral Load	87522	\$57.22
Lutenizing Hormone (LH)	83002	\$24.74
Hemoglobin A1c	83036	\$13.19
HIV AB (HIV ½)	86703	\$18.33
HIV Genotyping	87901	\$343.90
HIV Quant. Viral Load	87536	\$164.30
Immunoglobulins (IgA, IgG, IgM)	82784x3	\$37.49
Iron	83540	\$8.66
Lactic Acid	83605	\$14.26
LDH	83615	\$8.07
Lithium	80178	\$11.25
Magnesium	83735	\$8.95
Osmolality	83930	\$8.82
Phenobarbital	80184	\$19.79
Potassium, Serum	84132	\$6.14
Prealbumin	84134	\$19.49
Procainamide-incl Napa	80190	\$22.38
Prolactin	84146	\$27.02
Protein, Total	84160	\$6.91
Prothrombin Time, INR	85610	\$6.30
PSA	84153	\$24.58
Quinidine	80194	\$19.79
Reticulocyte Count	85044	\$6.60
Rheumatoid Factor	86431	\$9.00
Salicylate	80196	\$15.90
Sed Rate	85652	\$6.00
Sodium, Serum	84295	\$6.42
Transferrin	84466	\$17.06
Testosterone	84403	\$34.49
Testosterone, Free	84402	\$34.02
Theophylline	80198	\$18.90

Test	CPT Code	80% Medicare Rate
Thrombin Time	85670	\$8.40
Timed Urine Calcium	82340	\$8.73
Timed Urine Creatinine	82570	\$8.06
Timed Urine Urea Nitrogen	84540	\$6.58
Triglycerides	84478	\$7.69
Troponin-I	84484	\$13.74
Uric Acid	84450	\$6.90
Urinalysis-no microscopic	81003	\$3.90
Urinalysis-with microscopic	81000	\$5.10
Urine Drug Screen	80100	\$19.50
Pregnancy (qual)- serum/urine	84703	\$10.65
Vitamin B12	82607	\$20.13

The listed rates include the costs of phlebotomy and processing. If only phlebotomy procedures are required, a \$5.00 fee per patient is charged. If only phlebotomy and specimen centrifugation are requested, a fee of \$7.50 per patient is charged.

Those laboratory tests that are not performed in-house by the Laboratory and are sent out to the contract reference laboratory will be charged the contracted reference lab price plus a \$5.00 administrative fee (The administrative fee will cover the time for preparing the sample, requisitioning into the reference laboratory, packaging, and reporting of results).

Note: Anatomic Pathology requests can be directed to Howard Leong, Lab Medicine Service for coordination.

Radiology

Test	CPT Code	80% Medicare Rate
CT 3D Reconstruction	76375	\$152.54
CT ABD w/o Dye	74150	\$287.24
CT ABD with Contrast	74160	\$339.47
CT Pelvis w/o Dye	72192	\$292.79
CXR PA&LAT	71020	\$35.90
Air Contrast Barium Enema	74280	\$137.90
Sonogram Popliteal Vascular	93925	\$183.26
Doppler Color Flow	93325	\$123.12
Venigram – Unilateral	75820	\$71.79
Venigram - Bilateral	75822	\$109.91

Note: A separate contract exists for MRI studies. Please contact R. Jolly Brown, ext. 5556.

Pharmacy (Dispensing Fees for Investigational Drug Services):

Note: SFVAMC Research Pharmacy cannot purchase pharmaceuticals at federal rates for non-VA funded studies.

- A. One time set-up fee based on complexity and staffing requirements.
Level 1-2 protocols: \$200.00
Level 3-4 protocols: \$400.00
- B. Level 1: \$10.00 per prescription; Initial protocol review and identification of pharmacy issues, development of dispensing procedures, preparation of drug accountability records, inventory control, verification of patient consent, meeting with study monitors, related problems and communications, off-hour arrangement, study close-out.
- C. Level 2: \$25.00 per prescription; for study prescriptions that require mailing, special/pre-packaging, off-site randomization.
- D. Level 3: \$40.00 per prescription; Preparations and dispensing of injectable drugs, compounding blinded/placebo drugs.
- E. Level 4: \$50.00 per prescription; Preparations and dispensing of bio-hazardous materials.

In-Patient stays: \$500.00 per 24 hour hospitalization in 1A (3) (formerly known as SDTU). For further information about other inpatient charges, contact Kathleen Stanley.

X-RAY FILM PROCESSING CORE

Introduction

The Research Service recently purchased an **Agfa Curix CP1000 film processor** for developing autoradiographs. This is a freestanding state-of-the-art unit that requires minimal maintenance. The instrument is located in Room 1, Building 5, a secured research area. Access to this instrument will be available on an as needed basis. A brief training session will be required prior to using the processor.

Staff

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Phone: (415) 221-4810 ext. 4986
e-mail: rebel@itsa.ucsf.edu

MICRO CT SCANNING CORE

Introduction

The Research Service and the Endocrinology Research Section have recently established a Micro CT Scanning Core for in vivo imaging of hard and soft tissues in small animals (e.g., mice, rats) on the ground floor of Building 12. The core facility is equipped with a **VivaCT 40 CT scanner (Scanco)** with a resolution of 10 μm . This instrument can be used to scan long bones, vertebrae or any other area of the skeleton, as well as soft tissues (e.g., tumors) over an extended period in order to follow changes in structure and composition. A particular advantage of this system is the ability to use each animal as its own control in longitudinal studies, thus reducing the number of animals required in cross-sectional analyses.

Management and staff

Director:

Bernard Halloran, Ph.D.

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Initial processing will be conducted by the core staff, but training, as well as support for experimental design, will be available. Staff are currently being recruited.

User fees

Exact user fees have not been determined, but are anticipated to be \$125/hr which approximates the time needed to scan a rat tibia at high resolution.

ECHO IMAGING CORE

Introduction

The Research Service and the Cardiology Research Section have established an echo imaging core for both clinical and animal studies. The **echocardiography machine** is available for evaluating cardiac function in normal subjects (screening), in patients with disease and in both small and large animals. The instrument is located in the Cardiology Research Section (Building 203, Room 3A-101), but it can be used at other sites at the Medical Center.

Technical support may be available for infrequent use or for selected projects. For more frequent use, investigators will need to provide a trained technician or physician to operate the instrument following approval by the Cardiology Section.

Management and staff

Director:

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EPIFLUORESCENCE STEREOMICROSCOPE CORE

Introduction

The epifluorescence microscope is a stereo/dissecting microscope equipped with GFP/FITC fluorescence, and a digital camera. This microscope is suitable for the visualization of fluorescence in relatively large solid objects (e.g. flies, embryos, mice). This core is located on the ground floor of building 12.

Staff

Ruby Ghadially 415- 221-4810 ext 3373
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User Fees

\$60.00 per hour