**Ducsay, 2130045**

**Major Core Equipment: Center for Perinatal Biology (Dr. Ducsay)**

Equipment available includes: 3 intracellular calcium fluorometry systems (2 Jasco; 1 Precision Technology Inst.), 2 patch clamp apparatuses (Axon) for patch clamp studies, 2 gamma spectrometers with multichannel analyzer (Packard), 2 liquid scintillation counters (Packard), radioactive spectrometer (Ludlum), a high performance liquid chromatograph (Waters, interfaced with IBM PCAT computer and appropriate software), 2 electrobalances (Cahn), 2 ultracentrifuges (Beckman), 2 refrigerated centrifuges (Sorval), 2 refrigerated Microcentrifuges (Eppendorf), 2 blood gas analyzers (Radiometer), osmometer (Advanced Digimatic), electrolyte analyzer (Amdev), 3 temperature controlled water baths (Lauda), several automatic balances, 5 low temperature freezers (Revco), and other items. We have a spectrophotometer (Biotek), and shaking water bath (Precision). For in vivo cerebral blood flow studies we have 2 laserDoppler flowmeters, with fluorescent

PO2 probes (Oxford Optronics), and electrocorticogram transducer. Also, we have a sample dehydrator (Savant SpinVac), tissue homogenizer (Eberbach), and 2 cell harvesters (Brandel). For isolated blood vessel contractility studies we have 60 custom built tissue baths with transducers, 6 microvessel myographs, 5 circulating water baths, and 2 Grass stimulators with oscilloscopes and current amplifiers. We also have glassware, automatic pipettes, onsite distilled water, refrigerators and freezers, pH meters, gas regulators, and dissection instruments. In addition, we have a cell culture facility with sterile hood (Baker), and waterjacketed CO2/O2 incubator (Forma Sci.), In our Core Imaging Facility we have a cryostat (Leica, CM3050S), 2 microscopes with fluorescence capabilities (Zeiss Axio Imager.A1 and Nikon Optiphot), microscope (Nikon, Spot Pursuit,TMS), and a Nikon SZ1 binocular microscope, 2 microscope cameras (Diagnostic Inst. 4Mp Spot Pursuit and Apogee KX 85), image analysis software (Image Pro Plus 6.0), dissecting microscope (Reichert), with fiberoptic light source for dissection (Zeiss), dual head microscope (Olympus BH2), microtome for sectioning paraffinized tissue, immunohistochemistry slide processing setup, and large format poster printer. We have also recently added a Zeiss 710 confocal laser scanner microscope. With our emphasis on cellular/biochemical approaches, a major effort has been devoted to biochemical and enzyme assays. We have a Molecular Biology Core laboratory for performing Western immunoblots and northern analysis with infrared fluorescence imager (LiCor Biosci.), real time PCR, cycler (Roche 1.5) and so forth.

**Major equipment: University of Oklahoma Health Sciences Center (Dr. Myers)**

Equipment essential to completing molecular analysis, located in Dr. Myers laboratory (Suite 470 RP1) or adjacent common space include: Sorvall RC5B refrigerated super speed centrifuge, Damon/IEC Division refrigerated centrifuge, Beckman L565 ultracentrifuge, 2 Fisher microfuges Model 235B, Alphainotec gel/image capture system, Forma upright 80 C ultralow freezer, Harris chest –80 ultralow freezer; Packard Cobra II gamma counter, Packard TriCarb 2300TR liquid scintillation counter, Savant refrigerated condensation trap, vacuum, speedvac concentrator and gel dryer, Labline environmental shaker, Forma Scientific water jacketed CO incubators (3), Forma (6ft) laminarflow hood, Dubnoff metabolic shaking incubators (2), Bright Instruments 5030 cryostat, MiltonRoy Spectronic 601 spectrophotometer, 3 Hybaid Sprint PCR machines, Brinkman Polytron homogenizer (2), Sartorius microbalance, Stratogene U.V. crosslinker; Electrophoresis power supplies (ISCO model 494; 2000 volt), Olympus BX40 photomicroscope, Olympus digital DP11 color high resolution digital camera (3.5 megapixel), imaging software loaded on a 9500 MacIntosh computer. SLTSpectra ELISA plate reader and software (Macintosh 9500). Biorad, PCR machine equipped with real-time fluorescence imaging system (4 dyes).

**Huang 2130005/2130131**

**MAJOR EQUIPMENT:**

**LLU/Zhang’s Neuroscience Lab:** Major equipment includes (1) Animal Surgery: eight sets of animal surgery equipment including operating microscopes; operating tables; lights; (2) Behavioral Testing: animal behavioral testing equipment for wire hung, beam walking etc. Water maze, rotarod systems are in the Risley Hall in the collaborator Dr. Hartman’s behavioral neuroscience laboratory (see below); (3) Molecular Biology Equipment: power supplies and apparatus for Western Blot; RTPCR, geldoc; (4) Histology Equipment: light and electron microscopies, and ultramicrotome; (5) Others: hyperbaric oxygen chamber; low and high speed centrifuges; refrigerators; 80 degree C freezers; spectrophotometer; blood pressure monitor, intracranial pressure monitor, cell culture facilities.

**LLU/Imaging Center:** Major equipment includes Bruker Avance 4.7T imager with 200 mT/m microgradients, Bruker 11.7T vertical bore microimager with a bore size of 89 mm, stereology workstations with necessary software, AIMS animal tattooing kits, American Optical/ Nikon/ Hund Wetzlar microscopes, Barnstead 18 Megaohm water polishing station, Beckman dual beam scanning spectrophotometer, Beckton Dickenson FACScalibur 4color flow cytometer, BioRad MRC1024 confocal microscope, Compucyte laser scanning cytometer, Dynatech Flourolite 1000 microplate reader, Dynatech Microplate reader, EMS Automatic Oscillating Tissue Slicer, Harshaw Thermoluminescence Dosimetry M3500, Heska “ABC Vet” animal hematology analyzers, Kodak Xray film developer Leica Kryostat, Leica Microtome, Molecular Dynamics Storm phosphor imaging system, MVE cryogenic storage systems, Olympus IX70

research microscopes, Revco/Harris ultralow freezers, Sanyo/Napco/Forma CO2 cell culture incubators, Shimadzu Spectrofluorophotometer, Spectronic Spectrophotometer, Stratagene horizontal gel electrophoresis power supplies, Stratagene posiblot membrane transfer system, VetEquip Isoflurane anesthesia units, Zeiss Axiophot fluorescence/DIC/phase microscope workstation with laser ablation and Dage CCD camera, Zeiss stereo microscopes and inverted microscopes.

**LLU/Behavioral Neuroscience (BNL) Lab:** BNL has computerized tracking equipment (Noldus Ethovision Pro) for use in tests of activity levels (e.g., open field test), learning and memory (e.g., Morris water maze, Barnes circle maze, radial arm maze, Tmaze), and emotionality (e.g., light:dark test, elevated plus maze, forced swim test, tail suspension) and addictive behaviors (e.g., place preference test). A Columbus Instruments accelerating rotarod is used to assess sensorimotor deficits. Additionally, other rodent behavioral tests can be administered, including general neurological functioning, odor / visual acuity, pain sensitivity, and social interaction.

**Kirsch 2120258**

**MAJOR EQUIPMENT:**

**LOMA LINDA UNIVERSITY MAJOR EQUIPMENT:**

Olympus FV100 confocal laser scanning microscope will be used to evaluate the tissue features in confocal images. An AO Spercer comparison microscope, and Olympus epifluorescent microscope will be used to identify the cells. Laser scanning cytometry will be used to identify and quantify molecular end points. Atomic Absorption Spectrometer (Varian) - in lab (for measuring levels of biometals)Focused Microwave Irradiation Machine (Muromachi) - in lab (for rapid euthanization of mice to preserve labile metabolites) PCR Machine (Eppendorf) - in lab (for PCR reactions) Ultra Low Temperature Freezer (New Brunswick Scientific) - in lab (for storage of samples at -80C) Refrigeratable Centrifuge (Eppendorf) - in lab (for extraction of RNA/DNA/Serum from blood samples) Access to the Radiology Department and a new 3.0 Tesla MRI Scanner 35 in vitro tissue baths, each of which includes a micrometer, force transducer, and jacketed glass tissue bath (5-25 ml, Radnotti), mounted in a custom built Plexiglas stand. The tissue baths are warmed by 4 high capacity circulating water baths. Transducer outputs are amplified by custom built low noise amplifiers, displayed on screen and logged by computer. Also available are a Cahn microbalance for determining tissue weights, and a Beckman spectrophotometer used for protein assays. Homogenates are prepared using an Eberhard system, and centrifuged at moderate speed in a Sorvall RC-3 or at high speed in a Beckman XL70 ultracentrifuge. A custom-made stainless steel piston-type mortar and pestle is also available for pulverization of tissues frozen in liquid nitrogen. Radioactivity counts are obtained from either a Packard 5-well gamma counter, or a Packard Tri-Carb 2200A. Aqueous phase protein purifications are achieved via preparative isoelectric focusing with a Bio-Rad Rotofor purification system followed by aqueous phase molecular weight separation performed using the Bio-Rad Prep Cell Model 491. Electrophoresis equipment from Bio-Rad includes Power Pac 300 and 3000 power supplies, Mini-Protean II tanks, a Mini-trans blot module, and a Mini- Sub Cell GT. Gels are imaged via filmless direct photon capture using a ChemiImager from Alphainnotech. Whole artery fluorescent photometry is performed using a pair of Jasco CAF-110 instruments that enable simultaneous measurement of contractile force and intracellular calcium concentration. All equipment necessary for completion of the proposed studies is readily available to the PI.

**Advanced Imaging Core Facility:**

Three microscopy systems are available for use including an inverted laser scanning Confocal microscope with non-linear optics for advanced imaging and two upright Brightfield and epifluorescence systems. In addition, users have access to other basic upright and dissecting steromicroscope for sample viewing or preparation and two dedicated offline analysis workstations.

**Obenaus 2130039**

**Loma Linda University Facilities and Resources**

The Obenaus laboratory is comprised of ~650 sf in the basement of the Chan Shun Pavilion.

The laboratory has 3 chemical fume hoods, along with 2 -80°C (Thermo/Revco) freezers, a -

20°C freezer (Kenmore) and 2 4°C fridges (Sanyo Medicool). In addition to the standard

laboratory workspace, we have three GrossLab (Shandon/Lipshaw) surgical work stations that

provide their own ventilation, water and light sources. These are used for undertaking various

surgical procedures for which we have 2 rat/mouse stereotactic devices. Anesthesia is delivered

via Vetequip isoflurane vaporizers. For traumatic brain injuries we use a Leica Benchmark

Impactor that allows for precisely controlled injury induction. For in vivo surgical work, we have a

Zeiss Opimed stereomicroscope on a large moveable stand for microscope dissection in living

animals.

**Obenaus Laboratory**

The laboratory is also able to undertake electrophysiological experiments both in vivo and in

vitro slices. We have a portable in vivo electrophysiology rig that is composed of Axon and WPI

amplifiers, a Master 8 timer along with a computer run Axon Instruments pClamp for data

acquisition and analysis. Our in vitro systems (2 setups) are composed of a Axon Instruments

amplifiers, Warner temperature regulators, Newport vibration isoloation tables and faraday

cages. Misc pumps and heaters for solutions complete these systems. Both setups also have

Axon Instruments pClamp for data acquisition and analysis software.

The laboratory is also equipped with 3 chemical fume hoods for various activities, including

animal perfusions and fixation. For fixation we have 2 peristaltic pumps for large rodents (rats)

and 2 syringe pumps (mice). A tissue paraffin embedding system is in the laboroatory (Leica EG

1240L, EG 1140C). We are further equipped with a cryostat (Leica CM1850) along with a

microtome (Leica RM 2135) for tissue sectioning. Various glass staining dishes are used for

standard histological staining.

The laboratory has a dissection microscope (Olympus SZ40) that is attached to a digital

Olympus camera (SZ-GV) and to a computer for digital acquisition of histological and gross

pathology specimens. We also have several copies of Image Pro Plus for analysis of

histological and immunohistochemical tissue sections. All of the laboratory computers are also

populated with Image J and Fiji software for additional histological analysis capabilities.

Finally, the laboratory has various heating pads, rototators, water baths, pipettes and other

laboratory supplies.

***Computational and Analysis****:* The Obenaus Laboratory has a dedicated image processing and

analysis lab (200 SF). We currently have seven Pentium based PCs for additional data

processing and analysis. Three 1 GHz computers with 1GB of RAM currently provide support

for 3D software for multi-modal reconstruction software. A 15 TB archival computer server is

used for data archiving and backup; a web based interface allows access to all of the data. In

addition, there is a PC computer configured with Linux for running MEDx, MatLab and IDL

software. The lab computers each have recordable CDs for data archiving. Support personnel

are available in house to maintain networks. Windows based software used for analysis of MRI

data sets include Cheshire (10 licenses), Amira (5 licenses) and Jim (1 licenses). MatLab (3

licenses) is used to develop customized software and includes various development toolkits.

Custom software is used from time-to-time for specific analysis. In house diffusion tensor

processing and analysis software was customized using Matlab (Dr. Richard Sun). Automated

volumetric analysis software has also been developed, including skull stripping and volume

extraction (Dr. Nirmalya Ghosh) and an interface allows the user to select regional changes

using Hierarchical Region Splitting (patent pending). Specialized software and toolkits are also

being used as needed (ie. LONI pipeline environment, UCLA). fMRI analysis software in use in

the laboratory includes, customized MatLab routines for image pre-processing and post processing analysis. Use of specialized tools, including Evident and REST toolkits are used as needed to process fMRI datasets. Other analysis routines are currently being developed and

used including software to determine core and pneumbra rapidly from MR images. Our analysis

armamentarium is being continuously expanded and revised for rapid automated analysis

routines to improve data extraction. All computers in the laboratory run Windows based

Microsoft Office Professional (Excel, Word, Powerpoint, Access, Outlook). A variety of statistical

programs are used in conjunction with a statistical expert (Dr. Udo Oyoyo, LLU) including SPSS,

Sigmastat and Sigmaplot.

**Research Imaging Center (Magnetic resonance imaging)**

The Non-Invasive Imaging Laboratory is a core facility (1220 SF) within the School of Medicine.

The laboratory is primarily composed of a Bruker Avance 4.7T imager with a 400 mm bore

equipped with 200 mT/m microgradients for high resolution animal MRI. In addition, we have a

11.7T vertical bore micro-imager with a bore size of 89 mm equipped with 500 mT/m

microgradients. A third MRI, a Bruker Avance 9.4T, has 310mm actively shielded horizontal

bore (Avance imaging spectrometer, console and superconducting magnet). Gradient inserts for

the 9.4T imager is a 7cm (100 G/cm), a 12cm (40 G/cm) and a 20 cm (20 G/cm). All MR units

have three-axis gradient amplifiers, gradient pre-emphasis units, room temperature 12-channel

shim sets and water chillers. A variety of RF coils are available for different size subjects (mice,

rats and dogs), including quadrature and phased array rat and mice head coils. Customized RF

coils as needed have been developed in conjunction with the National Research Council of

Canada (NRC) who have provided numerous coils including dual tuned 1H and 31P coils for

rats and mice. All magnets are broadband and multinuclear with a single channel 1H transmit,

four channel 1H receive and a single channel X-nucleus transmit/receive. These imagers are

easily capable of 60-125 um resolution using standard sequences. In an adjacent laboratory

space (350 SF), a Siemans micro-computed tomography imaging unit is available with a 100mm

bore and equipped with a 85kVP x-ray head. We also have a Siemens micro-positron emission

tomography imager with a 100 mm bore. The facility has imaged a range of species from

hummingbirds to lambs, demonstrating our ability to acquire and process complex data sets.

**Clinical:**

The Department of Radiology has several 3.0T clinical scanners that are available as needed

for this project. The Principal investigator has access to these instruments and resources as

needed.

A list of the major pieces of equipment within the laboratory or to which the laboratory has

access are:

**Other Equipment Available to the PI:**

AIMS animal tattooing kits (2), Alpha Innotech Alpha Imager 2000, Alpha Innotech

Transilluminator, American Optical/Nikon/Hund Wetzlar microscopes (7), Axon Instruments

GenePix 4000B microarray reader, Barnstead Nanopure water purification systems (3),

Beckman dual beam scanning spectrophotometer, Beckman liquid scintillation counter,

Beckman preparative and analytical ultracentrifuges (8), Beckton Dickenson FACScalibur 4-

color flow cytometer, Gilson liquid chromatography system**,** Bio-Rad MRC-1024 confocal

microscope, Olympus Fluoview FV1000 confocal microscope, Bio-Rad Pulse Controller

electroporation system, Bio-Rad vertical 2-d protein electrophoresis system, Cepheid real-time

PCR system, iCYTE imaging cytometer, Coulter Z1 cell counter, Dyad Peltier PCR Thermal

Cycler, Dynatech Flurolite 1000 microplate reader, Tecan Infinite M200 plate reader, Fisher

Model 60 Sonic Dismembrator, EMS Automatic Oscillating Tissue Slicer, Eppendorf

Thermomixers (2), Fisher Dry Bath incubators (3), Fisher Isotemp incubators (6), Forma Orbital

Shaker, Harshaw Thermoluminescence Dosimetry M3500, Heska “ABC Vet” animal hematology

analyzers (2), Jouan/Labconco/Fisher/Beckton Dickinson/Intern Equip/IEC centrifuges (13),

Labconco CentriVap System, Labconco Vacuum centrifuge/6 liter lyophilizer system, Leica

Cryostats Model #CM1850 (2), Leica Microsystems Darkfield Colony counter, Leica Microtome

(2), MinXray HF 100/30 portable veterinary X-ray unit, MJ Research PCR thermocycler,

Molecular Dynamics Storm imaging system, MVE cryogenic storage systems (2), New

Brunswick Agar Sterilizer and automated plate pouring system, Nova Biomedical Bioprofile

2000 system clinical blood analyzer, Nova Biomedical Stat Profile Phox, Olympus IX-70

research microscope with microinjection system, Olympus BX-51 fluorescence microscope with

Media Cybernetics Cool Snap Pro camera system, Olympus BX-50WI fluorescence microscope,

Revco/Harris ultralow freezers (4), Sanyo/Napco/Forma CO2 cell culture incubators (10),

Shimadzu Spectrofluorophotometer, Spectronic Spectrophotometer (2), Stratagene horizontal

gel electrophoresis power supplies, Stratagene posiblot membrane transfer system, Stratagene

RoboCycler Gradient 96 PCR thermal cycler, Stratagene UV Stratalinker 2400, Synthecon

bioreactor systems (4), Tektronix Digitizing oscilloscope, Thermolyne cryogenic storage system,

Tomtec Harvester 96, Torrey Pines/Lab-Line/Sanyo/Precision incubators (12), U.S. Filter 18

Megaohm water polishing station, VetEquip Isoflurane anesthesia units (6), Stovall Belly Dancer

orbital shaker (2), VWR Heat Block, Wallac Microbeta Scintillation/Luminscence Counter, Zeiss

Axiophot fluorescence/DIC/phase microscope workstation with laser ablation and Optronics

MicroFire camera system, Zeiss stereo microscopes and inverted microscopes (10).

Miscellaneous and minor equipment includes: balances – analytical, animal and top loading,

animal transport carts (2), autoclaves, automatic pipettors, cameras – digital and video, 3

dishwashers, dryers, hoods - animal handling, chemical and 6-foot Biogard, hybridization ovens,

ice maker, laboratory glassware, liquid handling equipment, machine shop & tools, magnetic

stir/heat plates, pH meters, refrigerator-freezers, shakers and rotators, vortex mixers, water

baths and shakers.

**The Loma Linda Behavioral Neuroscience Laboratory** (BNL) has computerized tracking

equipment (Noldus Ethovision Pro) for use in tests of activity levels (e.g., open field test),

learning and memory (e.g., Morris water maze, Barnes circle maze, radial arm maze, T-maze),

and emotionality (e.g., light:dark test, elevated plus maze, forced swim test, tail suspension) and

addictive behaviors (e.g., place preference test). A Columbus Instruments accelerating rotarod

is used to assess sensorimotor deficits. Additionally, other rodent behavioral tests can be

administered, including general neurological functioning, fine motor skills, odor / visual acuity,

pain sensitivity, and social interaction.

**Behavioral Neuroscience Laboratory – Dr. R. Hartman**

The 315 sq ft testing facility has dedicated space for a variety of commonly used behavioral

tests, including the water maze, rotarod, elevated plus maze, open field activity, and staircase

test. The testing space is contained in a suite of rooms with dedicated (separate) space for the

housing of both mice and rats, as well as a small-animal surgery room.

Dr. Hartman’s office and graduate student/meeting room, which has several Mac, Windows and

Linux-based computers for data collection, analysis, and presentation, is in the nearby

Department of Psychology.

**Loma Linda University Advanced Imaging and Microscopy Core Facility Major**

The state-of-the-art Advanced Imaging and Microscopy core facility sponsored by the National

Science Foundation and maintained by the Loma Linda University School of Medicine opened in

2011. The facility houses a Zeiss 710 multiphoton confocal microscope that can be operated

either in inverted or with the use of an adapter in an upright configuration. The system can be

used for a wide-array of different types of imaging ranging from routine histochemistry, live cell

imaging, photoconversion including Fluorescence Resonance Energy Transfer (FRET) and

Fluorescence Recovery after Photo Bleaching (FRAP), multi-dimension imaging (x,y,x,t,λ), and

for imaging living animals. There are several peripheral devices available to investigators. For

whole-animal studies, there is a stage platform, a Harvard apparatus stereotaxic unit for mice

and rats, and equipment for whole-animal anesthesia and ventilation. For myography studies,

there are Danish Myo Systems Technology pressure as well as wire confocal myographs. For

cell electrophysiology, there is a HEKA 2-channel patch voltage-clamp subsystem available. In

addition, there are two wide field epifluorescent systems and a stereomicroscope available for

routine imaging and tissue preparation. To enhance image processing, the facility has two

offline analysis workstations available for users. The primary purpose of the facility is to serve

the imaging needs of investigators at Loma Linda University including the Loma Linda University

Medical Center and Pettis Veterans Affairs Medical Center as well as investigators elsewhere in

Southern California. Use of the core is facilitated by providing technical staff that offer an

integrated training program and assist with imaging, and by providing 24/7 access to users,

granting access to a monitored online (google) calendar reservation system and public access

to standard operating procedures and other essential materials at http://microscopy.llu.edu.

The Advanced Imaging and Microscopy Core have three microscopy systems that are available

for use. There are two upright wide field epifluorescence and brightfield systems for routine

imaging and an inverted laser scanning confocal microscope with non-linear optics for more

advanced imaging. In addition, there are two dedicated offline analysis workstations that are

available for use and a stereomicroscope for sample preparation.

Equipment:

**Microscopy Imaging workstations**

Confocal Station 1. Zeiss LSM 710 NLO laser scanning confocal microscope workstation. The

core has an Axio Observer Z1 inverted confocal imaging workstation that provides a wide

variety of imaging technologies including multiphoton excitation and spectral analysis. The

system has a Violet HeNe (405 nm); Argon Multiline laser (458, 488, 514 nm); Green DPSS

laser (561 nm); Orange HeNe (594 nm); Red HeNe laser (633 nm); and Coherent Chameleon

Vision II Ti:sapphire laser (680-1080 nm) for multiphoton spectroscopy as well as an X-Cite

metal halide lamp for epifluorescence. The system has a 34 channel QUASAR multispectral

scanning module, a transmitted-light PMT detector, and 2-non-descanned detectors. For

epifluorescence work, the system has a Zeiss HRm CCD camera, which provides high

resolution monochrome image capture, low light fluorescence imaging, and time-lapse imaging.

The microscope is equipped with a motorized stage suitable for generating high resolutions

mosaic images from large preparations and a fast peizo motorizer for rapid Z-axis acquisition.

The objectives include a EC Plan NEO 5X 0.3 NA; EC Plan NEO 10X 0.3 NA; Plan-APO 20X

0.8 NA; LD A-plan 40x; Plan APO 63X 1.4 NA Oil; Plan APO 100X 1.4 NA Oil; C-Plan APO 10X

0.8 NA W; C-Plan APO 63X 1.2 NA W.

For cell electrophysiology, the system also has a patch voltage-clamp subsystem (HEKA

EPC10 double) and a Patchstar double manipulator. For vessel studies we have Danish

Myo Technology pressure (CP120) and wire (CW120) myographs, with an AD

Instruments powerlab data logging system and a Dell Dimension workstation. For livecell

imaging, there is a PECON heating and environmental control system and an 8

channel Automate Scientific programmable perfusion system with Teflon valves. For

multiphoton imaging in an “upright” configuration and live animal studies, the Zeiss 710

workstation is outfitted with an LSM Tech Objective Inverter, stage platform, a Harvard

apparatus stereotaxic unit for mice and rats, and equipment for whole-animal anesthesia

and ventilation. The inverter system has an Apochromatically corrected DIC 40X W

Plan-Apochromat with an NA of 1.0. This is an immersion objective designed for

multiphon imaging as well as electrophysiology recordings on an upright microscopy

workstation.

Epifluorescence & brightfield Station 2. The core has a Zeiss Axio Imager A1 upright

microscope with multiple objectives (4X, 10X, 20X, 40X, 100X), and an HBO lamp

source. For fluorescence, the microscope is equipped with Zeiss filter set 17 (excitation:

BP 485/20nm, emission: BP 515-565nm), filter set 20 (excitation: BP 546/12nm,

emission: BP 575-640nm), filter set 49 (excitation: G 365nm, emission: BP 445/50nm),

and filter set 50 (excitation: BP 640/30nm, emission: BP 690/50nm). For image capturing,

the microscope is fitted with a Spot Pursuit 4MP digital camera that is used together with

Image Pro Plus 6.3 software for image analysis of fluorescent-labeled samples.

Epifluorescence & brightfield Station 3. The core also has an Olympus BH2 fluorescence

microscope with multiple objectives (4X, 10X, 20X, 40X, 60X), and a halogen lamp source. The

microscope has 3 viewing position (100% viewer, 100% Camera, 50/50 split) with blue, green,

and DAPI/UV fluorescence filters. For image capturing, the microscope is equipment with a Spot

digital camera and image analysis soft.

Stereomicroscope Station 4. The core facility has a Zeiss stereomicroscope and halogen

light source for tissue and imaging chamber preparation.

Offline analysis systems Station 5. The core facility has two offline analysis systems. One is

equipped with a Dell Dimension Computer and fully functional copy of Zeiss Zen software, and

Image J. In addition, the facility has a second copy of Image Pro plus 6.3 on a dedicated

analysis computer.

**Other**:

Machine shop services are provided under contract with Inland Technical Services Inc. has

been exceptional at providing stereotactic devices for imaging, custom devices for our

electrophysiological and general support hardware for our experiments. Customized RF coils as

needed have been developed in conjunction with the National Research Council of Canada

(NRC) who have provided numerous coils including dual tuned 1H and 31P coils for rats and

mice.

The scientific environment within the Obenaus laboratory is rich and varied. There is a broad

range of imaging resources (computational, physics, biological) that are unique within our

environment. This collection of staff and resources allows a broad range of discussions and

intellection interactions from the molecular and cellular levels to imaging of whole animals. Our

colleagues in the clinical fields of Radiology, Radiation Medicine and Pediatrics provide a touch

stone and many ideas on making our research endeavors clinically relevant. The PI has been

previously successful in building the Research Imaging Center within the School of Medicine

that is composed of a large collection of unique instruments (MRI, CT, PET, confocal imaging,

electrophysiology) which provides many of the necessary resources. Our ongoing collaborations

with UCR (Electrical Engineering, Bioengineering, UCR Stem Cell Center) UCLA (LONI,

Laboratory of Neuroimaging) provide additional important computational resources that we will

can use in this grant and help guarantee the success of our research endeavors

**Singh 2130002**

 Laboratory

The Adventist Health Study at Loma Linda University (School of Public Health) has wet lab facilities for up to 9 IMV liquid nitrogen refrigerators, each 50” in diameter, to house aliquots from 50,000 cohort study subjects. The floor space is 700 square feet.

Computer The Adventist Health Study has 25 work stations and three servers. Data files for the 97,404 cohort members are maintained on closed servers and there is continuous back up to tape.

Major Equipment An NCS 5000i scanner that can scan from 5,000 sides or paper per hour and make a TIFF image of each. This is used for processing the biennial questionnaires.

**Watts 2120335**

**Laboratory**: The PI (Watts) and co-investigator (Johnson) each have dedicated, contiguous, modern laboratories of 600 square feet (Rooms 102 and 120, Alumni Hall). The two laboratories have a total of 14 benches, of which six contain equipment and eight are dedicated to personal lab space. The PIs laboratory was recently renovated and most of the equipment in the laboratory is only 1 or 2 years old. Centrifuges, spectrophotometers, autoclaves, a sonicator, French press and -80°C freezers are conveniently located on the same floor. There is a 150 square foot

room located near both laboratories dedicated to an anaerobic hood. The Department also has a radioactive workroom, a darkroom and walk-in warm and cold rooms.

**Computer**: The PI’s laboratory has three general use computers including a new 27 inch iMac 2.93 GHz Intel Core i7, a new 24 inch 2.7 GHz Intel Core i5, and an older hp compaq PC. The co-investigators laboratory has two iMac 1.25 GHz PowerPC G4s and an AMD Duron 950 MHz dedicated to the HPLC.

**Other**: The Scientific Environment

The PI and co-investigator have complementary skills that are vital to the success of this project. Also relevant to the project are specialized equipment like custom gas perfusion chambers with multi-gas input proportioners, available only at Loma Linda University. The PI and co-investigator work in two large, well-equipped laboratories and most of the equipment needed to complete this project is available within the lab itself or is within close proximity. The PI has access to a post-doctoral scientist (Daniel Salcedo) and graduate student (Darysbel Perez)

that are already well versed in signal transduction and have many of the skills needed to complete this project.

Daniel Salcedo has three years experience purifying chemosensory system proteins and performing in vitro reconstitution assays. The PI and co-investigator also have access to Basic Sciences graduate students that rotate through the laboratories and to undergraduate and high school students in the National Center on Minority Health and Health Disparities summer program at Loma Linda University (some of whom helped obtain preliminary data

for this application).

**Major Equipment:**Watts laboratory: -80°C freeezer (Revco), Innova 43 large floor shaker (New Brunswick Scientific), SterilGard Class II hood, fume hood, centrifuges (that accommodate 0.2 ml to 50 ml tubes), orbital shakers, Gene pulser electroporator, pH meter, multi-therm shaker, balances, water baths, DNA and protein running and protein transfer equipment, biomate 3S spectrophotometer (Fisher Scientific), sonicator (Fisher Scientific) and a Veriti 96 well thermal cycler (Applied Biosystems). Johnson laboratory: Shimadzu Gradient HPLC system with diode array detector, Fiber Optic spectrophotometer (WPI), 2 Leitz microscopes (each with video and photographic accessories), oxygen meters, incubators, shaking water baths, anaerobic hood (Coy), fume hood, centrifuges, 2720 thermal cycler (Applied Biosystems), two UV/ visible spectrophotometers, and 3 light boxes with circumscribed lighting for viewing swarm plates.

Department (same floor of Alumni Hall): Scintillation counter, Sorvall preparative centrifuges, Beckman ultracentrifuge, Savant Speed-vac system, Bio-Rad gel dryer, 2720 thermal cycler, Storm 860 Molecular Dynamics phosphorimager, UVP BioSpectrum 500 Imaging System, large floor shakers, a GE Healthcare ÄKTA FPLC system with a Frac-950 fraction collector, and an Olympus IX71 fluorescence microscope.

**Department (adjacent building, Mortensen Hall):** Varian Cary-300 UV-Vis spectrophotometer, Model T PTIspectrofluorometer (Photon Technology International), Jasco 400 FTIR and Jasco J715 circular dichroism spectrometers, Two Waters Ultima QTOF, one Thermo-Fisher LCQ Deca XP ion trap, one Agilent 6410 triplequadrupole, two Agilent GC/MS (6890 series GC), one Waters Ultima GCT, one UPLC 2D LC-LTQ-Orbitrap Velos\_ETD system, and a Veeco Multimode 8 Atomic Force microscope.

**Wilson , Sean 2130038**

**Major Equipment**

**Equipment Located in Dr. Wilson’s laboratory *–*** *Room 1561 (1st floor) Medical Research Wing*

An Inonoptix Ca2+ photometry and edge-detection system is abvailable for monitoring Ca2+ and measuring arterial reactivity simultaneously. The system is on a TS100F microscope with 20X and 40X S-Fluor objectives. Excitation is provided by a computer controlled stepper filter with a xenon arc lamp. The bright-field signal is collected with a CCD and the fluorescent signal collected with a photomultiplier subsystem. A pressurized arterial workstation with a living systems instruments single vessel bath chamber and self heater unit is also with this system. In addition the DMT pressure and wire myographs hosted in the Advanced Microscopy Core are available for use on this system. *The system can be used as a backup to the recordings made on the* *confocal microscope associated with studies of Specific Aim 3.*

A patch voltage-clamp workstation is available for electrophysiological recordings. The system has a HEKA EPC10 amplifier with Patchmaster software, Zeiss Axiovert 25 microscope, vibration isolation table, Faraday Cage, sutter micromanipulator, 8 channel automate bath perfusion valve controller. *The system will be used for* *future studies that examine coupling of ryanodine receptors to potassium channels and will be used to* *measure whole-cell potassium currents, spontaneous transient outward currents, and membrane potential.*

Sutter P97 horizontal puller is available for making patch pipettes and sharp electrodes*.*

Narishigi Microforge is available for fire polishing patch pipettes.

Two Wire Myography workstations. System 1 has 13 5ml radnotti organ baths and system 2 has 16 10ml radnotti organ baths. Both systems are available for contraction studies. These systems have Radnotti force transducers, lauda circulating waterbaths, and A/D collection systems connected to PC computers. System 1 has an AD intruments powerlab and system 2 has a biopac Inc datalogging system. *They can be used as a* *backup to the DMT wire myograph to generate data associated with Specific Aim 3.*

Oxygen sensing electrodes. There are two separate oxygen sensing electrodes. System 1 is a single channel oxygen electrode from microelectrodes inc. System 2 is a 4 channel TBR 4100 from World Precisions Instruments that has oxygen electrodes but can be used to measure other gasses as needed. *These oxygen* *electrodes will be used to ensure the oxygen concentration is at appropriate levels (normoxia or hypoxia)* *during the studies of Specific Aim 3.*

A sharp electrode workstation is available for making intracellular membrane potential measurements and *will be used in future experiments to monitor membrane potenital.* The system includes a WPI electrometer andmanipulator that is connected to an AD instruments A/D collection system connected to a PC computer.

Dissection Microscope workstations (2) are available for arterial isolations and sample prepration for confocal studies and wire myography. *These will be used for experiments of all experimental aims.*

For Western blot the PI has a power supply, gel boxes, transfer apparatus and related equipment. Additional equipment is available through core facilities in the department. *These systems will be used for the* *phosphorylation studies of Specific Aim 2.*

**Center for Perinatal Biology Core Facilities Major Equipment**

*Located in multiple rooms on the floors below (A level) and above (2nd floor) Dr. Wilson’s laboratories. All laboratories in the Center for Perinatal Biology are accessible with a single key, which facilitates equipment use.*

**Functional Core Resources**

Ca2+ photometry equipment that is available for the proposed studies. *This equipment will be used as a backup for the simultaneous confocal imaging and vessel tension studies of Specific Aims 1 and 3.* Jasco Ca2+ photometry and myography workstations (3) located on the A level of the Medical Research Wing.These core instruments can perform measurements of arterial tone and simultaneously measure intracellularCa2+ using Fura-2 ratiometric techniques. The systems are attached to PC computers for acquisition of data.PTI photometry and myography workstation (1) located on the A level of the Medical Research Wing. This coreinstrument is similar to the “Jasco’s” except that it has a monachromater based excitation source, which

provides additional flexibility for performing studies with various dye combinations. The system is attached to a PC computer for acquisition of data. Ionoptix Fluoroplex and myography workstation (2 baths) located on the A level of the Medical Research Wing.

This core instrument is similar to the “Jasco’s” except that it has a fiberoptic light guide that is placed into a vertical Radnotti bath. This system is attached to a PC computer for acquisition of data.

**Laboratory Resources:** I am assigned ~600 sq. ft. in the Center for Perinatal Biology, and located in the Research Wing of the Loma Linda University Medical Center, is dedicated for the proposed studies. The PI has a suite of laboratory spaces which contains a larger wet-lab area (~400 sq ft) as well as two smaller rooms (~100sq ft each), which house patch-voltage clamp, sharp electrode, and contractility workstations, as well as office space for the post-doctoral fellow who will be hired. The wet lab area also will be used for tissue and cell dissections, dispersions, and for making solutions. Minor equipment and resources in this space includes

equipment for solution preparation, tissue harvesting and enzymatic isolation of individual myocytes. This includes dissection tools, balances, water baths, Accumet pH and ion selective (Ca2+) meter, refrigerators and freezers. The Center for Perinatal Biology has nine main laboratories, each with about 500 sq ft of space, located in the Research Wing of the Loma Linda University Medical Center. One of these laboratories houses a Core Molecular Biology facility and another houses imaging equipment for gels and immunoblots. Both of these

facilities will be used for the proposed studies. In addition, there are eleven smaller rooms (about 200 sq ft each) for various studies including intracellular calcium imaging, RT-PCR, preparation of histochemical sections, and cell and tissue culture, and long-term sample storage.

**Molecular Core resources**

Infrared fluorescence imager (Li-Cor Biosci) located on the 2nd floor of Medical Research Wing is available for analyzing western immunoblots with fluorescent probes. *We intend to use highly sensitive infrared imaging* *techniques for our phosphorylation Western Immunoanalyses described in Specific Aim 2.*

Chemiluminescent Imager (Alpha Innotech) located on the 2nd floor of Medical Research Wing is available for analyzing western immunoblots with traditional HRP probes. *This system will be used as a backup for the Li-* *Cor system.*

Real Time quantative PCR cycler systems (BioRad iQ5 and Roche 1.5) located on the A level of the Medical Research Wing are available for analysis of small samples using capillary tubes (Roche 1.5) and multiwall plates (BioRad iQ5). Other large equipment located in the Medical Research Wing (A level, 1st floor and 2nd floor)

2 ultracentrifuges (Beckman), 2 refrigerated centrifuges (Sorval), 2 refrigerated microcentrifuges (Eppendorf),osmometer (Advanced Digimatic), 3 temperature-controlled water baths (Lauda), several automatic balances, 8 low-temperature freezers (Revco), and other items. We have a spectrophotometer (Biotek), and shaking water bath (Precision). Also, we have a sample dehydrator (Savant Spin-Vac) and tissue homogenizer (Eberbach).

**Microscopy Facility Major Equipment**

Zeiss LSM 710 NLO laser scanning confocal microscope workstation This inverted (Axio Observer Z1) confocal imaging workstation provides a wide variety of imaging technologies including multiphoton excitation (MPE) and spectral analysis. The system has a Violet HeNe (405 nm); Argon Multiline laser (458, 488, 514nm); Green DPSS laser (561 nm); Orange HeNe (594 nm); Red HeNe laser (633 nm); and CoherentChameleon Vision II Ti:sapphire laser (680-1080 nm) for MPE spectroscopy as well as an X-Cite metal halide lamp for epifluorescence. The system has a 34 channel QUASAR multispectral scanning module, a transmitted-light PMT detector, and 2-non-descanned detectors. For epifluorescence work, the system has a

Zeiss HRm CCD camera, which provides high resolution monochrome image capture, low light fluorescence imaging, and time-lapse imaging. The microscope is equipped with a motorized stage suitable for generating high resolutions mosaic images from large preparations and a fast peizo motorizer for rapid Z-axis acquisition.The objectives include a EC Plan NEO 5X 0.3 NA; EC Plan NEO 10X 0.3 NA; Plan-APO 20X 0.8 NA; LD Aplan 40x; Plan APO 63X 1.4 NA Oil; Plan APO 100X 1.4 NA Oil; C-Plan APO 10X 0.8 NA W; C-Plan APO 63X 1.2 NA W. *This system was used to generate the whole-cell Ca2+ recordings for analysis with LC Pro, the dual*

*dye recordings with Fura-red and Fluo-4, and the cGMP Ca2+ spark recordings shown in the preliminary data and . This system will be used for the imaging experiments of each specific aim.*

Patch voltage-clamp subsystem (HEKA EPC10 double) and a Patchstar double manipulator. This system has its own dedicated PC workstation. *This system will be used for simultaneous patch voltage-clamp and imaging* *studies in the future.*

Myography Subsystems Danish Myo Technology pressure (CP120) and wire (CW120) myographs are available for vessel bath studies, with an AD Instruments powerlab data logging system and a Dell Dimension workstation. Notably, these vessel baths can also be used in conjunction with the Ionoptix photometry system and with the sharp electrode system in the PI’s laboratory. *The wire myograph will be used in Specific Aim 3 to* *record vessel tension and fluorescence simultaneously.*

Environmental Control and Perfusion Systems There is a PECON heating and environmental control system and an 8 channel Automate Scientific programmable perfusion system with Teflon valves for live-cell imaging. This system can regulate the oxygen tension of the recording chamber. *This environmental control system will* *be used in conjunction with the DMT myographs to tightly regulate the oxygen tension of the solution.*

Objective Inverter for “upright” imaging For multiphoton imaging in an “upright” configuration and live animal studies, the Zeiss 710 workstation is outfitted with an LSM Tech Objective Inverter, stage platform, a Harvard apparatus stereotaxic unit for mice and rats, and equipment for whole-animal anesthesia and ventilation. The inverter system has an Apochromatically corrected DIC 40X W Plan-Apochromat with an NA of 1.0. This is an immersion objective designed for electrophysiology recordings on an upright microscopy workstation. *We use*

*the upright configuration for many studies where we do rapid bath exchanges because it provides better solution exchange.*

Wide-Field Epifluorescence workstation. The core has a Zeiss Axio Imager A1 upright microscope with multiple objectives (4X, 10X, 20X, 40X, 100X), and an HBO lamp source that is available for shared-use purposes. For fluorescence, the microscope is equipped with Zeiss filter set 17 (excitation: BP 485/20nm, emission: BP 515- 565nm), filter set 20 (excitation: BP 546/12nm, emission: BP 575-640nm), filter set 49 (excitation: G 365nm, emission: BP 445/50nm), and filter set 50 (excitation: BP 640/30nm, emission: BP 690/50nm). For image

capturing, the microscope is fitted with a Spot Pursuit 4MP digital camera (Diagnostic Instruments, Sterling Heights, MI) with pixel resolution of 2048x2048/ 7.4 μm square pixels, that is used together with Image Pro Plus 6.3 software (Media Cybernetics, Bethesda, MD) for image analysis of fluorescent-labeled samples. Software is run on a high capability PC computer with Microsoft XP operating system adjacent to the microscope.

Offline analysis systems The core facility has an offline analysis system equipped with a Dell Dimension Computer and fully functional copy of Zeiss Zen software, and Image J. In addition, there is another analysis dongle that can be checked out by facility users. The offline analysis system and analysis dongle are free for facility users. In addition, a second copy of Image Pro plus 6.3 resides on a dedicated analysis computer to maximize productivity from the wide-field imaging system. These systems will be used to perform analysis on collected data.

Dissection Microscope workstation A zeiss stereomicroscope is available in the imaging core facility for sample prepration for confocal studies. *This will be used for mounting arteries associated with each specific aim.*

**Radiobiology Laboratories Microscopy Facility**

*Located in the Chan Shun Pavilion near the Dr. Wilson’s laboratory. Access is during working hours only.*

Olympus FV 1000 Laser Scanning confocal microscope on an IX81 inverted miscroscope. The system has the following laser lines; 405 nm, 458 nm, 488 nm, 515 nm, 561 nm, 633 nm. The system is equipped with a motorized x,y, and z stage and thus is capable of performing multidimensional imaging and tiling. The system is also equipped with a CO2 incubator, heater and perfusion system for live-cell imaging. The microscope has U plan S-APO 10X and 20X non-immersion objectives and 40X and 60X Plan APO oil immersion objectives.

This system is available for limited use and can be used to generate images from fixed as well as live-cell preparations. *This system can be used to generate Ca2+ sparks.*

**XIAO 2130029**

Major Equipment: The applicant’s laboratory contains all resources necessary for the proposed studies: Power lab 16/SP and Chart v. 4 , AD Instruments and a whole set of telemetry system with a data acquisition software for measurement of arterial blood pressure and heart in vivo; electrophoresis equipment; Techne Hybridiser HB-2D; Perkin-Elmer GeneAmp PCR system 2400; GS Gene Linker UV Chamber; Perkin Elmer HTS 7000 Plus Bio Assay Reader; Eppendorff 5417R refrigerated centrifuge; Kodak gel documenting system; SPOT cooled CCD

digital camera system with Olympus fluorescence microscope with UV source & power supply; single cell fluorescence imaging system with Nikon Diaphot inverted Microscope; Zeiss LSM710 laser scanning confocal microscope; Jasco CAF-110 intracellular fluorescence analyzer; Sievers 270B nitric oxide analyzer; cell culture facility with SterilGard Hood (Baker) and water-jacketed CO2/O2 incubator; 8 tissue contraction apparatuses, a complete blood vessel perfusion system; Beckman GS-6R tabletop refrigerated centrifuge. Other major equipments in the Center available to this project include aqueous phase protein purification system (Bio-Rad),

Beckman Optima XL-70 ultracentrifuge, scintillation counters, storage freezers, spectrophotometers. Equipment such as scanning densitometer, phosphoimager, DNA sequences, oligonucleotide synthesizers, and Perkin Elmer 7700 Taq-Man unit in the Center for Molecular Biology and Gene Therapy are also available for this project.

**Yuan, Xiangpeng**  **2130006**

**MAJOR EQUIPMENT:**

Major equipment includes Bruker Avance 4.7T imager with 200 mT/m microgradients, Bruker

11.7T vertical bore microimager with a bore size of 89 mm, stereology workstations with

necessary software (2), AIMS animal tattooing kits (2), Beckman dual beam scanning

spectrophotometer, Beckton Dickenson FACScalibur 4color flow cytometer, Compucyte laser

scanning cytometer, Dynatech Flourolite 1000 microplate reader, Dynatech Microplate reader,

EMS Automatic Oscillating Tissue Slicer, Leica Microtome (2), Leica VT1000 S, Molecular

Dynamics Storm phosphor imaging system, MVE cryogenic storage systems (2), , Revco/Harris

ultralow freezers (2), Sanyo/Napco/Forma CO2 cell culture incubators (4), Shimadzu

Spectrofluorophotometer, Spectronic Spectrophotometer, VetEquip Isoflurane anesthesia units

(6), Olympus BH2 fluorescence microscope with multiple objectives (4X, 10X, 20X, 40X, 60X)

and a Spot digital camera and image analysis software, Zeiss Axio Imager A1 upright

microscope with multiple objectives and Zeiss filter set 17 and a motorized stage with Stereo

Investigator software, Zeiss LSM 710 NLO laser scanning confocal microscope workstation that

provides a wide variety of imaging technologies including multiphoton excitation and spectral

analysis and is equipped with a motorized stage suitable for generating high resolutions mosaic

images from large preparations and a fast peizo motorizer for rapid Zaxis acquisition.

 **Zhang, John 2120333**

 Research Imaging Center

The Research Imaging Center, within the School of Medicine, provides instrumentation and services related to research-based MRI, PT and CT imaging. The Research Imaging Center is a comprised of space (1220 SF) that contains three high-field magnetic resonance imagers (MRI), a micro-computed tomography unit and a micro-positron emission tomography unit. The laboratory is primarily composed of a Bruker Avance 4.7T imager with a 400 mm bore equipped with 200 mT/m microgradients for high resolution animal MRI. In addition, we have a 11.7T vertical bore micro-imager with a bore size of 89 mm equipped with 500 mT/m microgradients. A third MRI, a Bruker Avance 9.4T is currently undergoing installation and testing. The 9.4T imager has 310mm actively shielded horizontal bore (Avance imaging spectrometer, console and superconducting magnet). Gradient inserts for the 9.4T imager are a 7cm (100 G/cm), a 12cm (40 G/cm) and a 20 cm (20 G/cm). All MR units have three-axis gradient amplifiers, gradient pre-emphasis units, room temperature 12-channel shim sets and water chillers.

A variety of RF coils are available for different size subjects (mice, rats and dogs), including quadrature and phased array rat and mice head coils. Customized RF coils as needed have been developed in conjunction with the National Research Council of Canada (NRC) who has provided numerous coils including dual tuned 1H and 31P coils for rats and mice. All magnets are broadband and multinuclear with a single channel 1H transmit, four channel 1H receive and a single channel X-nucleus transmit/receive. These imagers are easily capable of 60-125 um resolution using standard sequences. The facility has imaged a range of species from hummingbirds to lambs, demonstrating our ability to acquire and process complex data sets.

In an adjacent laboratory space (350 SF), a Siemans micro-computed tomography imaging unit is available with a 100mm bore and equipped with a 85kVP x-ray head. We also have a Siemens micro-positron emission tomography imager with a 100 mm bore.

The Research Imaging Center is a dedicated image processing and analysis lab (400 SF). We currently have seven Pentium based PCs for additional data processing and analysis. Three 1 GHz computers with 1GB of RAM currently provide support for 3D software for multi-modal reconstruction software. A 15 TB archival computer server is used for data archiving and backup; a web based interface allows access to all of the data. In addition, there is a PC computer configured with Linux for running MEDx, MatLab and IDL software. The lab computers each have recordable CDs for data archiving. Support personnel are available in house to maintain networks. Windows based software used for analysis of MRI data sets include Cheshire (10 licenses), Amira (5 licenses) and Jim (1 licenses). MatLab (3 licenses) is used to develop customized software and includes various development toolkits. Custom software is used from time-to-time for specific analysis. In house diffusion tensor processing and analysis software was customized

using Matlab (Dr. Richard Sun). Automated volumetric analysis software has also been developed, including skull stripping and volume extraction (Dr. Nirmalya Ghosh) and an interface allows the user to select regional changes using Hierarchical Region Splitting (patent pending). Specialized software and toolkits are also being used as needed (ie. LONI pipeline environment, UCLA). fMRI analysis software in use in the laboratory includes, customized MatLab routines for image pre-processing and post-processing analysis. Use of specialized tools, including Evident and REST toolkits are used as needed to process fMRI datasets.

Other analysis routines are currently being developed and used including software to determine core and pneumbra rapidly from MR images. In addition, specialized software Statistical Processing in MRI (SPIN, Biomedical Institute, Detroit, MI; courtesy Dr. M. Haacke) is used to process susceptibility weighted imaging data sets. Our analysis armamentarium is being continuously expanded and revised for rapid automated analysis routines to improve data extraction. All computers in the laboratory run Windows based Microsoft Office Professional (Excel, Word, Powerpoint, Access, Outlook). A variety of statistical programs are used in

conjunction with a statistical expert (Dr. Udo Oyoyo, LLU) including SPSS, Sigmastat and Sigmaplot.

The Research Imaging Center currently has two in vitro and one in vivo electrophysiology setups. The two in vitro electrophysiology stations are identical and are capable of maximizing data acquisition. Both setups use Axon Instruments amplifiers and data acquisition components. All in vitro experiments are undertaken using custom designed in vitro chambers capable of either submersed or super fused tissue slices. These in vitro chambers reside atop two Newport isolation tables to minimize vibrations. The electrophysiological setups are capable of both extracellular and intracellular recordings. Patch clamp recordings can be obtained

following some minor modifications. The in vivo electrophysiology setup can be used for implantation, recording and data analysis of electroenceplagraphy (EEG) or implanted extracellular recording electrodes. Dedicated staff are available for these experiments. More recently we have obtained and used a MED 64 chip electrophysiological workstation that allows simultaneous recordings from 64 electrodes. This piece of equipment allows rapid surveys of tissues.

Other Equipment Available within the Department of Radiation Medicine:

As an adjunct member of the Radiation Medicine Department, Dr. Obenaus has access to the following equipment as needed. A list of the major pieces of equipment within the laboratory or to which the laboratory has access are: AIMS animal tattooing kits (2), Alpha Innotech Alpha Imager 2000, Alpha Innotech Transilluminator, American Optical/Nikon/Hund Wetzlar microscopes (7), Axon Instruments GenePix 4000B microarray reader, Barnstead Nanopure water purification systems (3), Beckman dual beam scanning spectrophotometer, Beckman liquid scintillation counter, Beckman preparative and analytical ultracentrifuges(8), Beckton Dickenson FACScalibur 4-color flow cytometer, Gilson liquid chromatography system, Bio-Rad

MRC-1024 confocal microscope, Olympus Fluoview FV1000 confocal microscope, Bio-Rad Pulse Controller electroporation system, Bio-Rad vertical 2-d protein electrophoresis system, Cepheid real-time PCR system, iCYTE imaging cytometer, Coulter Z1 cell counter, Dyad Peltier PCR Thermal Cycler, Dynatech Flurolite 1000 microplate reader, Tecan Infinite M200 plate reader, Fisher Model 60 Sonic Dismembrator, EMS Automatic Oscillating Tissue Slicer, Eppendorf Thermomixers (2), Fisher Dry Bath incubators (3), Fisher Isotemp incubators (6), Forma Orbital Shaker, Harshaw Thermoluminescence Dosimetry M3500, Heska “ABC Vet” animal hematology analyzers (2), Jouan/Labconco/Fisher/Beckton Dickinson/Intern Equip/IEC

centrifuges (13), Labconco CentriVap System, Labconco Vacuum centrifuge/6 liter lyophilizer system, Leica Cryostats Model #CM1850 (2), Leica Microsystems Darkfield Colony counter, Leica Microtome (2), MinXray HF 100/30 portable veterinary X-ray unit, MJ Research PCR thermocycler, Molecular Dynamics Storm imaging system, MVE cryogenic storage systems (2), New Brunswick Agar Sterilizer and automated plate pouring system, Nova Biomedical Bioprofile 2000 system clinical blood analyzer, Nova Biomedical Stat Profile Phox, Olympus IX-70 research microscope with microinjection system, Olympus BX-51 fluorescence

microscope with Media Cybernetics Cool Snap Pro camera system, Olympus BX-50WI fluorescence microscope, Revco/Harris ultralow freezers (4), Sanyo/Napco/Forma CO2 cell culture incubators (10), Shimadzu Spectrofluorophotometer, Spectronic Spectrophotometer (2), Stratagene horizontal gel electrophoresis power supplies, Stratagene posiblot membrane transfer system, Stratagene RoboCycler Gradient 96 PCR thermal cycler, Stratagene UV Stratalinker 2400, Synthecon bioreactor systems (4), Tektronix Digitizing oscilloscope,

Thermolyne cryogenic storage system, Tomtec Harvester 96, Torrey Pines/Lab-Line/Sanyo/Precision incubators (12), U.S. Filter 18 Megaohm water polishing station, VetEquip Isoflurane anesthesia units (6), Stovall Belly Dancer orbital shaker (2), VWR Heat Block, Wallac Microbeta Scintillation/Luminscence Counter, Zeiss Axiophot fluorescence/DIC/phase microscope workstation with laser ablation and Optronics MicroFire camera system, Zeiss stereo microscopes and inverted microscopes (10). Miscellaneous and minor equipment includes: balances – analytical, animal and top loading, animal transport carts (2),

autoclaves, automatic pipettors, cameras – digital and video, 3 dishwashers, dryers, hoods – animal handling, chemical and 6-foot Biogard, hybridization ovens, ice maker, laboratory glassware, liquid handling equipment, machine shop & tools, magnetic stir/heat plates, pH meters, refrigerator-freezers, shakers and rotators, vortex mixers, water baths and shakers.

**John Zhang 2130004/2130011**

Major Equipment: Animal Surgery and Behavioral Testing:

Eight Sets of Animal Surgery Equipment: operating microscopes; operating tables; lights. Some animal behavioral testing equipment for wire hung, beam walking etc. Water maze, rotarod systems are in the Risley Hall.

Molecular Biology Equipment:

Power supplies and apparatus for Western Blot; RT-PCR, gel-doc.

Histology Equipment:

Light and Electron Microscopies, and ultramicrotome.

Others:

Hyperbaric Oxygen Chamber; low and high speed centrifuges; refrigerators; -80 degree C freezers; spectrophotometer; blood pressure monitor, intracranial pressure monitor, cell culture facilities.

**Lubo Zhang 2130048**

**Major Equipment**

The PI’s laboratory contains all resources necessary for the proposed studies: the equipment system of Langendorff apparatus for measuring cardiac function; the system for measuring pressurized myogenic tone from Living Systems Instrumentation; IonOptix fluorescence imaging/contractility system; Power lab 16/SP and Chart v.4 AD Instruments with a data acquisition software and telemetry pressure foundation system for measurement of arterial blood pressure and cardiac function *in vivo*; 8-bath wire myography with accompanying amplifiers, transducers and Power Lab; multiple electrophoresis equipment with Power Pac 300 and 3000 power supplies; scanning densitometer; Icycler Thermal cycler real-time PCR system from Bio-Rad; MWG-Biotech Primus 96 thermocycler; GS Gene Linker UV chamber; Perkin Elmer HTS 7000 Plus bioassay reader; multiple Eppendorff 5417R refrigerated centrifuges; Kodak gel documenting system; SPOT cooled CCD digital camera system with Olympus fluorescence microscope; single cell fluorescence imaging system with Nikon Diaphot inverted microscope; Jasco CAF-110 intracellular fluorescence analyzer; cell culture facility and two water-jacketed CO2/O2 incubator; two CO2 incubators with 1-40% O2 control; Sorvall RC-24 super speed centrifuge; complete blood vessel perfusion system. Other major equipment in the Center available to this project includes wide-field epifluorescence workstation with Zeiss Axio Imager A1 upright microscope and Spot Pursuit 4MP digital camera with Image Pro Plus 6.3 software for image analysis; Zeiss LSM 710 NLO laser scanning confocal microscope workstation; patch voltage-clamp subsystem (HEKA EPC10 double) and a Patchstar double manipulator for cell electrophysiology; aqueous phase protein purification system; Beckman Optima XL-70 ultracentrifuge; Li-Cor Odyssey infrared imaging system; Alpha Innotech imaging system; scintillation counters, multiple -80C storage freezers, spectrophotometers. Additional major equipment available to this project on the campus includes phosphoimager; X-Ray developer; DNA sequencers; oligonucleotide synthesizers; Mass Spectrometry Facility with seven mass spectrometers including three Agilent GC/MS, one Waters Ultima QTOF, one Thermo-Scientific LCQ-Deca, one Agilent triple-quadruple, and one LTQ-Orbitrap-Velos-ETD.

**Fletcher, Hansel 2130093**

**Major Equipment**

PI’s Laboratory Coy Anaerobic Chamber, pulse field electrophoresis, UV trans-illuminator, micro centrifuge, New Brunswick Scientific G76 bath shaker, incubator, gel electrophoresis apparatus, sonicator, PCR thermo cycler, microscopes with video and photographic

accessories, and oxygen meters, Alpha Innotech Corporation digital imaging system, Sorvall preparative centrifuges, Beckman DU650 spectrophotometer with temperature controller, Bio-Rad Protean IEF Cell for two dimensional gel electrophoresis, Bio-Rad micro plate reader, Cepheid smart cycler II and Amersham Biosciences AKTA

Department Bruker Multimode 8 atomic force microscope (AFM) equipped with (120 x 120 um2) and (10 x 10 um2) scanners. The AFM is also fitted with liquid cell and scanning tunneling microscopy capabilities. Mass Spectrometry Core Laboratory (adjacent building): Two Waters Ultima QTOF coupled with Waters' nano-HPLC, Hewlett-Packard GC/MS, one Finnigan LCQ Deca XP ion-trap coupled with HPLC and one Agilent 6410 triple-quardruple coupled with Agilent 1200 HPLC and Leap auto-sampler, all have electro spray ionization source. Two agilent GC/MS (6890 series GC) and one Waters ultima GC/MS instruments. Five stand-alone HPLC system (scales from nano to semi-preparative). Thermo Fisher Scientific LTQ Orbit rap Velos with ETD

**Pardo, Andrea 2130098**

**Loma Linda University Advanced Imaging and Microscopy Core Facility**

**Major Equipment:**

The Advanced Imaging and Microscopy Core have three microscopy systems that are available for use. There are two upright wide field epifluorescence and brightfield systems for routine imaging and an inverted laser scanning confocal microscope with non-linear optics for more advanced imaging. In addition, there are two dedicated offline analysis workstations that are available for use and a stereomicroscope for sample preparation. Microscopy imaging workstations Confocal Station 1. Zeiss LSM 710 NLO laser scanning confocal microscope workstation. The core has an Axio Observer Z1 inverted confocal imaging workstation that provides a wide variety of imaging technologies including multiphoton excitation and spectral analysis. The system has a Violet HeNe (405 nm); Argon Multiline laser (458, 488, 514 nm); Green DPSS laser (561 nm); Orange HeNe (594 nm); Red HeNe laser (633 nm); and Coherent Chameleon

Vision II Ti: sapphire laser (680-1080 nm) for multiphoton spectroscopy as well as an X-Cite metal halide lamp for epifluorescence. The system has a 34 channel QUASAR multispectral scanning module, a transmitted-light PMT detector, and 2-non-descanned detectors. For epifluorescence work, the system has a Zeiss HRm CCD camera, which provides high resolution monochrome image capture, low light fluorescence imaging, and time-lapse imaging. The microscope is equipped with a motorized stage suitable for generating high resolutions mosaic images from large preparations and a fast peizo motorizer for rapid Z-axis acquisition. The objectives include a EC Plan NEO 5X 0.3 NA; EC Plan NEO 10X 0.3 NA; Plan-APO 20X 0.8 NA; LD A-plan 40x; Plan APO 63X 1.4 NA Oil; Plan APO 100X 1.4 NA Oil; C-Plan APO 10X 0.8 NA W; C-Plan APO 63X 1.2 NA W. For cell electrophysiology, the system also has a patch voltage-clamp subsystem (HEKA EPC10 double) and a Patchstar double manipulator. For vessel studies we have Danish Myo Technology pressure (CP120) and wire (CW120) myographs, with an AD Instruments power lab data logging system and a Dell Dimension workstation. For live-

cell imaging, there is a PECON heating and environmental control system and an 8

channel Automate Scientific programmable perfusion system with Teflon valves. For multiphoton imaging in an “upright” configuration and live animal studies, the Zeiss 710

workstation is outfitted with an LSM Tech Objective Inverter, stage platform, a Harvard

apparatus stereotaxic unit for mice and rats, and equipment for whole-animal anesthesia and ventilation. Epifluorescence & brightfield Station 2. The core has a Zeiss Axio Imager A1 upright microscope with multiple objectives (4X, 10X, 20X, 40X, 100X), and an HBO lamp source. For fluorescence, the microscope is equipped with Zeiss filter set 17 (excitation: BP 485/20nm, emission: BP 515-565nm), filter set 20 (excitation: BP 546/12nm, emission: BP 575-640nm), filter set 49 (excitation: G 365nm, emission: BP 445/50nm), and filter set 50 (excitation: BP 640/30nm, emission: BP 690/50nm). For image capturing, the microscope is fitted with a Spot Pursuit 4MP digital camera that is used together with Image Pro Plus 6.3 software for image analysis of fluorescent-labeled samples. Epifluorescence & brightfield Station 3. The core also has an Olympus BH2 fluorescence microscope with multiple objectives (4X, 10X, 20X, 40X, 60X), and a halogen lamp source. The microscope has 3 viewing position (100% viewer, 100% Camera, 50/50 split) with blue, green, and DAPI/UV fluorescence filters. For image capturing, the microscope is equipment with a Spot digital camera and image analysis soft. 8Stereomicroscope Station 4. The core facility has a Zeiss stereomicroscope and

halogen light source for tissue and imaging chamber preparation. Offline analysis systems Station 5. The core facility has two offline analysis systems. One is

equipped with a Dell Dimension Computer and fully functional copy of Zeiss Zensoftware, and Image J. In addition, the facility has a second copy of Image Pro plus 6.3 on a dedicated analysis computer.

Animal: Loma Linda’s AALAC-accredited Animal Care Facility consists of 20,400-sq. ft. and is isolated and controlled for temperature and humidity; a 12-hr light/dark cycle is maintained. Specifically assigned rooms are available for conventional and immunocompromised animals, as well as for animals treated with biohazardous agents. All animal care is under the direct supervision of a board certified veterinarian. Animals are obtained from and housed in the Loma Linda University Medical Center Animal Care Facilities that can be accessed by a 200 ft hallway allowing for easy transport of animals.

**Huang, Helen 2130108**

**MAJOR EQUIPMENT:**

LLU/Zhang’s Neuroscience Lab:

Major equipment includes (1) Animal Surgery:

eight sets of animal surgery equipment including operating microscopes; operating tables; lights; (2) Cardiopulmonary resuscitation device: chest compressor synchronized with ventilator for rodent; defibrillator(3) Behavioral Testing: animal behavioral testing equipment for wire hung, beam walking etc. Water maze, rotarod systems are in the Risley Hall in the

collaborator Dr. Hartman’s behavioral neuroscience laboratory(see below); (4)Molecular Biology Equipment: power supplies and apparatus for Western Blot; RT-PCR, gel-doc; (5) Histology Equipment:lightand electron microscopies, and ultramicrotome; (6) Others: hyperbaric oxygen chamber; low and high speed centrifuges; refrigerators; -80 degree C freezers; spectrophotometer; blood pressure monitor, intracranial pressure monitor, cell culture facilities.

LLU/Imaging Center:

Major equipment includes Bruker Avance 4.7T imager with 200 mT/m microgradients, Bruker 11.7T vertical bore micro-imager with a bore size of 89 mm, stereology workstations with necessary software, AIMS animal tattooing kits, American Optical/ Nikon/ Hund Wetzlar microscopes, Barnstead 18 Mega-ohm water polishing station, Beckman dual beam scanning spectrophotometer, Beckton Dickenson FACScalibur 4-color flow cytometer, BioRad MRC-1024 confocal microscope, Compucyte laser scanning cytometer, Dynatech Flourolite 1000 microplate reader, Dynatech Microplate reader, EMS Automatic Oscillating Tissue Slicer, Harshaw Thermoluminescence Dosimetry M3500, Heska “ABC Vet”animal

hematology analyzers, Kodak X-ray film developerLeica Kyostat, Leica Microtome, Molecular Dynamics Storm phosphor imaging system, MVE cryogenic storage systems, OlympusIX-70research microscopes, Revco/Harris ultralow freezers, Sanyo/Napco/Forma CO2cell culture incubators, Shimadzu Spectrofluorophotometer, Spectronic Spectrophotometer, Stratagene horizontal gel electrophoresis power supplies, Stratagene posiblot membrane transfer system, VetEquip Isoflurane anesthesia units, Zeiss Axiophot

fluorescence/DIC/phase microscope workstation with laser ablation and Dage CCD camera, Zeiss stereo microscopes and inverted microscopes

LLU/Behavioral Neuroscience (BNL)Lab:

BNL has computerized tracking equipment (Noldus Ethovision Pro) for use in tests of activity levels (e.g., open field test), learning and memory (e.g., Morris watermaze, Barnes circle maze, radial arm maze, T-maze), and emotionality (e.g., light:dark test, elevated plus maze, forced swim test, tail suspension) and addictive behaviors

(e.g., place preference test). A Columbus Instruments accelerating rotarod is used toassess sensorimotor deficits. Additionally, other rodent behavioral tests can be administered, including general neurological functioning, odor / visual acuity, pain sensitivity, and social interaction.

**Kearns-Jonker, Mary 2130109**

**MAJOR EQUIPMENT:**

The major equipment in the Kearns-Jonker lab includes a PCR machine, power supplies and gel boxes, centifuges, waterbaths, a pH meter, a spectrophotometer, a -20oC freezer, a -80oC freezer, two refrigerators, a shared cryostat, a gel doc, two baterial incubators and several shakers. Tissue culture work can be done in two laminar flow hoods and incubators. A dishwasher, walk in cold room, and autoclave facilities are shared on the first floor. A Zeiss confocal LSM 710 NSO laser-scanning microscope and a microscope with fluorescent capabilities is available as shared equipment. A MACSquant flow cytometer is available for use as a component of the flow cytometry core at Loma Linda.

**Gatto, Nicole 2130110**

**Major equipment**

We have a NCS 5000i scanner that can scan from 5,000 sides of paper per hour and make a TIFF image of each.

**Obenaus, Andre 2130118**

**Major equipment**

The Advanced Imaging and Microscopy Core have three microscopy systems that are available for use. There are two upright wide field epifluorescence and brightfield systems for routine imaging and an inverted laser scanning confocal microscope with non-linear optics for more advanced imaging. In addition, there are two dedicated offline analysis workstations that are available for use and a stereomicroscope for sample preparation

Other Equipment Available to the PI: A list of the major pieces of equipment within the laboratory or to which the laboratory has access are: AIMS animal tattooing kits

(2), Alpha Innotech Alpha Imager 2000, Alpha Innotech Transilluminator, American Optical/Nikon/Hund Wetzlar microscopes (7), Axon Instruments GenePix 4000B microarray reader, Barnstead Nanopure water purification systems (3), Beckman dual beam scanning spectrophotometer, Beckman liquid scintillation counter, Beckman preparative and analytical ultracentrifuges (8), Beckton Dickenson FACScalibur 4-color flow cytometer, Gilson liquid chromatography system, Bio-

RadMRC-1024 confocal microscope, Olympus Fluoview FV1000 confocal microscope, Bio-Rad Pulse Controller electroporation system, Bio-Rad vertical 2-protein electrophoresis system, Cepheid real-time PCR system, iCYTE imaging

cytometer, Coulter Z1 cell counter, Dyad Peltier PCR Thermal Cycler, Dynatech Flurolite1000 microplate reader, Tecan Infinite M200 plate reader, Fisher Model 60

Sonic Dismembrator, EMS Automatic Oscillating Tissue Slicer, Eppendorf Thermomixers (2), Fisher Dry Bath incubators (3), Fisher Isotemp incubators (6), Forma Orbital Shaker, Harshaw Thermoluminescence Dosimetry M3500, Heska “ABC Vet” animal hematology analyzers (2), Jouan/Labconco/Fisher/Beckton Dickinson/Intern Equip/IEC centrifuges (13), Labconco CentriVap System, Labconco

Vacuum centrifuge/6 liter lyophilizer system, Leica Cryostats Model #CM1850 (2), Leica Microsystems Darkfield Colony counter, Leica Microtome (2), MinXray HF 100/30 portable veterinary X-ray unit, MJ Research PCR thermocycler, Molecular Dynamics Storm imaging system, MVE cryogenic storage systems (2), New Brunswick Agar Sterilizer and automated plate pouring system, Nova Biomedical Bioprofile 2000 system clinical blood analyzer, Nova Biomedical Stat Profile Phox, OlympusIX-70 research microscope with microinjection system, Olympus BX-51 fluorescence microscope with Media Cybernetics Cool Snap Procamera system,

Olympus BX-50WI fluorescence microscope, Revco/Harris ultralow freezers (4), Sanyo/Napco/Forma CO2 cell culture incubators (10),Shimadzu Spectrofluorophotometer, Spectronic Spectrophotometer (2), Stratagene horizontal gel electrophoresis power supplies, Stratagene posiblot membrane transfer system, Stratagene RoboCycler Gradient 96 PCR thermal cycler, Stratagene UV Stratalinker 2400, Synthecon bioreactor systems (4), Tektronix Digitizing oscilloscope, Thermolyne cryogenic storage system, Tomtec Harvester 96, Torrey Pines/Lab- Line/Sanyo/Precision incubators (12), U.S. Filter 18 Megaohm water polishing station, VetEquip Isoflurane anesthesia units (6), Stovall Belly Dancer orbital shaker (2), VWR Heat Block, Wallac Microbeta Scintillation/Luminscence Counter, Zeiss Axiophot fluorescence/DIC/phase microscope workstation with laser ablation and Optronics MicroFire camera system, Zeiss stereo microscopes and inverted microscopes (10). Miscellaneous

and minor equipment includes: balances – analytical, animal and top loading, animal transport carts (2), autoclaves, automatic pipettors, cameras – digital and video, 3 dishwashers, dryers, hoods – animal handling, chemical and 6-foot Biogard, hybridization ovens, ice maker, laboratory glassware, liquid handling equipment, machine shop & tools, magnetic stir/heat plates, pH meters, refrigerator-freezers, shakers an rotators, vortex mixers, water baths and shakers.

**Krafft, Paul 2130126**

**Major equipment**

In addition to what is mentioned above, the following equipment and facilities will also be

accessible to Dr. Krafft: Spectrophotometer, balances, pH meters, centrifuges, an oven, surgical microscopes, stereotaxic head frames with infusion pumps, freezer/refrigerators, tissue homogenizer, a thermocycler, several blood pressure monitors, respirators, heating blankets, as well as all equipment necessary for general molecular biology and biochemistry experiments. Dr. Krafft will also have access to fume hoods, a cryostat, image analysis systems for Western blotting and for morphological assessment of brain sections, as well as to gas anesthesia systems. He has additional access to the equipment in Drs. Payne and Nie’s laboratories, which includes a Becton Dickinson 4-color FACSCalibur flow cytometer as well as a high performance MACSQuantTM Analyzer. The MACSQuantTM Analyzer is a 7-color flow cytometer that uses 3 lasers and employs two light scatter channels and 7 fluorescence channels with absolute cell counting. It features an automated start-up procedure that includes calibration and compensation, as well as automated cleaning and shut down. Individualized instrument settings and gating strategies can be saved as experimental templates. Dr. Nie’s laboratory is within a fully functional proton treatment center with 4 treatment rooms, 2 clinical fixed beam lines, 3 proton gantries, and 3 fixed research beam lines. Other major equipment includes a Bruker Avance 4.7T imager with 200 mT/m microgradients, Bruker 11.7T vertical bore micro-imager with a bore size of 89 mm, stereology workstations with necessary software, American Optical/Nikon/Hund Wetzlar microscopes, a Beckman dual beam scanning spectrophotometer, a Olympus Fluoview Scanning FV1000 confocal microscope, a Compucyte laser scanning

cytometer, a TECAN infite MD200 (Magellan V6.3) microplate reader, Harshaw Thermolumin escence Dosimetry M3500, Heska “ABC Vet” animal hematology analyzers, Kodak X-ray film developer, a Molecular Dynamics Storm phosphor imaging system, as well as a Eldorado Cobalt-60 Teletherapy Unit.

**Zhang, John 2130138**

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| **Major Equipment** |
| Animal Surgery and Behavioral Testing: Eight Sets of Animal Surgery Equipment: operating microscopes; operating tables; lights. Some animal behavioral testing equipment for wire hung, beam walking etc. Water maze, rotarod systems are in the Risley Hall. Molecular Biology Equipment: Power supplies and apparatus for Western Blot; RT-PCR, gel-doc. Histology Equipment: Light and Electron Microscopies, and ultramicrotome. Others: Hyperbaric Oxygen Chamber; low and high speed centrifuges; refrigerators; -80 degree C freezers; spectrophotometer; blood pressure monitor, intracranial pressure monitor, cell culture facilities.  |

**Xiao, DaLiao 2130155**

**Major equipment**

The applicant’s laboratory and the Center contain all resources necessary for the proposed studies: Powerlab 16/SP and Chart v. 4, AD Instruments and a whole set of telemetry system with a data acquisition software for measurement of arterial blood pressure and heart in vivo; electrophoresis equipment; Techne Hybridiser HB-2D; Perkin-Elmer GeneAmp PCR system 2400; GS Gene Linker

UV Chamber; Perkin Elmer HTS 7000 Plus Bio Assay Reader; Eppendorff 5417R refrigerated centrifuge; Kodak gel documenting system; SPOT cooled CCD digital camera system with Olympus fluorescence microscope with UV source & power supply; single cell fluorescence imaging system with Nikon Diaphot inverted Microscope; Zeiss LSM710 laser scanning confocal microscope; Jasco CAF-110 intracellular fluorescence analyzer; Sievers 270B nitric oxide analyzer; cell culture facility with SterilGard Hood (Baker) and water jacketed CO2/O2 incubator; 8 tissue contraction apparatuses, a complete bloodvessel perfusion system; Beckman GS-6R tabletop refrigerated centrifuge. Other major equipments in the Center available to this project include aqueous phase protein purification system (Bio-Rad), Beckman Optima XL-70 ultracentrifuge, scintillation counters, storage freezers, spectrophotometers. Equipment such as scanning densitometer, phosphoimager, DNA sequencers, oligonucleotide synthesizers, and Perkin Elmer 7700 Taq-Man unit in the Center for Molecular Biology and Gene Therapy are also available for this project.

**Zhang, Lubo 2130159**

**Major equipment**

The PI’s laboratory contains all resources necessary for the proposed studies: the equipment system for measuring pressurized myogenic tone from Living Systems Instrumentation; IonOptix fluorescence imaging/contractility system; patch voltage-clamp subsystem (HEKA EPC10 double) and a Patchstar double manipulator for cell electrophysiology; Powerlab 16/SP and Chart v.4 AD Instruments with a data acquisition software and telemetry pressure foundation system for measurement of arterial blood pressure and cardiac function in vivo; 8-bath wire myography with accompanying amplifiers, transducers and PowerLab; multiple electrophoresis equipment with Power Pac 300 and 3000 power supplies; scanning densitometer; Icycler Thermal cycler real-time PCR system from Bio-Rad; MWG-Biotech Primus 96 thermocycler; GS Gene Linker UV chamber; Perkin Elmer HTS 7000 Plus bioassay reader; multiple Eppendorff 5417R refrigerated centrifuges; Kodak gel documenting system; SPOT cooled CCD digital camera system with Olympus fluorescence microscope; single cell fluorescence imaging system with Nikon Diaphot inverted microscope; Jasco CAF-110 intracellular fluorescence analyzer; cell culture facility and two water-jacketed CO2/O2 incubator; Sorvall RC-24 superspeed centrifuge; complete blood vessel perfusion system. Other major equipment in the Center available to this project includes wide-field epifluorescence workstation with Zeiss Axio Imager A1 upright microscope and Spot Pursuit 4MP digital camera with Image Pro Plus 6. 3 software for image analysis; Zeiss LSM 710 NLO laser scanning confocal microscope workstation; aqueous phase protein purification system; Beckman Optima XL-70 ultracentrifuge; Li-Cor Odyssey infrared imaging system; Alpha Innotech imaging system; scintillation counters, multiple -80C storage freezers, spectrophotometers.

Additional major equipment available to this project on the campus includes phosphoimager; X-Ray developer; DNA sequencers; oligonucleotide synthesizers; Mass Spectrometry Facility with seven mass spectrometers including three Agilent GC/MS, one Waters Ultima QTOF, one Thermo-Scientific LCQ-Deca, one Agilent triple-

quadruple, and one LTQ-Orbitrap-Velos-ETD.

**Blood, Arlin 2130161**

**Major Equipment**

Advanced Imaging and Microscopy Core Facility. The state-of-the-art Advanced Imaging and Microscopy core facility sponsored by the National Science Foundation and maintained by the Loma Linda University School of Medicine opened in the Center for Perinatal Biology in 2011. The facility houses a Zeiss 710 multiphoton confocal microscope that can be operated either in inverted or with the use of an adapter in an upright configuration. The system can be used for a wide-array of different types of imaging ranging from routine histochemistry, live cell imaging, photoconversion including Fluorescence Resonance Energy Transfer (FRET) and Fluorescence Recovery after Photo Bleaching (FRAP), multi-living animals. There are several peripheral devices available to investigators. For whole-animal studies, there is a stage platform, a Harvard apparatus stereotaxic unit for mice and rats, and equipment for whole-animal anesthesia and ventilation. For myography studies, there are Danish

Myo Systems Technology pressure as well as wire confocal myographs. For cell

electrophysiology, there is a HEKA 2-channel patch voltage-clamp subsystem available. In addition, there are two wide field epifluorescent systems and a stereomicroscope available for routine imaging and tissue preparation. To enhance image processing, the facility has two offline analysis workstations available for users. The primary purpose of the facility is to serve the imaging needs of investigators at Loma Linda University including the Loma Linda University Medical Center and Pettis Veterans Affairs Medical Center as well as investigators elsewhere in Southern California. Use of the core is facilitated by providing technical staff that offer an integrated training program and assist with imaging, and by providing 24/7 access to users, granting access to a monitored online calendar reservation system and public access to standard operating procedures and other essential materials at http://microscopy.llu.ed.

**Analytical Equipment.**

Dr. Blood's laboratory is equipped a rapid scanning spectrophotometer

(Cary-50), two Sievers Chemiluminescence Nitric Oxide Analyzers (Model 280i) for NO detection, one chemilumin escence nitric oxide analyzer (, four Clark-type oxygen electrodes and two ISO-NO NO electrodes for measurement of O2and NO with a 4-

channel recording module (World Precision Instruments), and an Agilent HP 5973 GC/MS analyzer with autosampler. For HPLC, the laboratory houses a Waters 717 autosampler, 515 pump, 2489 UV/Vis detector, and 600 controller with Millennium software. For protein analysis, the lab is equipped with two BioRad gel electrophoresis and transfer systems, and the Center for Perinatal Biology houses a Molecular Biology Core laboratory for performing Western immunoblots and northern analysis with 2 infrared fluorescence imagers (Li-Cor Biosci.), 2 real-time PCR cyclers (BioRad iQ5 and Roche 1.5), Chemi Imaging system (Alpha Innotech Corp.); microfuge centrifuge (Beckman).Research Non-invasive Imaging Center (Magnetic resonance imaging) Core Facility. The Non-Invasive Imaging Laboratory is a core facility (1220 SF) within the School of Medicine. The laboratory is primarily composed of a Bruker Avance 4.7T imager with a 400 mm bore equipped with 200 mT/m microgradients for high resolution animal MRI. In addition, we have a 11.7T vertical bore micro-imager with a bore size of 89 mm equipped with 500 mT/m microgradients. A third MRI, a Bruker Avance 9.4T, has 310mm actively shielded horizontal bore (Avance imaging spectrometer, console and superconducting magnet). Gradient inserts for the 9.4T imager are a 7cm (100 G/cm), a 12cm (40 G/cm) and a 20 cm (20 G/cm). All MR units have three-axis gradient amplifiers, gradient pre-emphasis units, room temperature 12-channel shim sets and water chillers. A variety of RF coils are available for different size subjects (mice, rats and dogs), including quadrature and phased array rat and mice head coils. Customized RF coils as needed have been developed in conjunction with the National Research Council of Canada (NRC) who have provided numerous coils including dual tuned 1H and 31P coils for rats and mice. All magnets are broadband and multinuclear with a single channel 1H transmit, four channel 1H receive and a single channel X-nucleus transmit/receive. These imagers are easily capable of 60-125 um resolution using standard sequences. In an adjacent laboratory space (350 SF), a Siemans micro-computed tomography imaging unit is available with a 100mm bore and equipped with an 85kVP x-ray head. We also have a Siemens micro-positron emission tomography imager with a 100 mm bore. The facility has imaged a range of species from hummingbirds to lambs, demonstrating our ability to acquire and process complex data sets.

**Xiao, DaLiao 2130167**

**Major equipment**

The applicant’s laboratory and the Center contain all resources necessary for the proposed studies:Powerlab 16/SP and Chart v. 4, AD Instruments and a whole set of telemetry system with a data acquisition software for measurement of arterial blood pressure and heart in vivo; electrophoresis equipment; Techne Hybridiser HB-2D; Perkin-Elmer GeneAmp PCR system 2400; GS Gene Linker

UV Chamber; Perkin Elmer HTS 7000 Plus Bio Assay Reader; Eppendorff 5417R refrigerated centrifuge; Kodak gel documenting system; SPOT cooled CCD digital camera system with Olympus fluorescence microscope with UV source & power supply; single cell fluorescence imaging system with Nikon Diaphot inverted Microscope; Zeiss LSM710 laser scanning confocal microscope; Jasco CAF-110 intracellular fluorescence analyzer; Sievers 270B nitric oxide analyzer; cell culture facility with SterilGard Hood (Baker) and water-jacketed CO2/O2 incubator; 8 tissue contraction apparatuses, a complete blood vessel perfusion system; Beckman GS-6R tabletop refrigerated centrifuge. Other major equipments in the Center available to this project include aqueous phase protein purification system (Bio-Rad), Beckman Optima XL-70 ultracentrifuge, scintillation counters, storage freezers, spectrophotometers. Equipment such as scanning densitometer, phosphoimager, DNA sequencers, oligonucleotide synthesizers, and Perkin Elmer 7700 Taq-Man unit in the Center for

Molecular Biology and Gene Therapy are also available for this project.

**Kirsch, Wolff 2130196**

**Major equipment**

In addition to his own well equipped research laboratory on the lobby level of the medical center, Dr. Kirsch has the following list of equipment available. Tissue culture facility available in P.I.s lab. Olympus FV100 confocal laser scanning microscope will be used to evaluate the tissue features in confocal images. An AO Spencer comparison microscope, and Olympus epifluorescent microscope and will be used to identify the cells. Laser scanning cytometry will be used to identify and quantify molecular end points. Atomic Absorption Spectrometer (Varian) - in lab (for measuring levels of biometals). Focused Microwave Irradiation Machine (Muromachi) - in lab (for rapid euthanization of mice to preserve labile metabolites). PCR Machine (Eppendorf) - in lab (for PCR reactions). Ultra Low Temperature Freezer (New Brunswick Scientific) - in lab (for storage of samples at -80C. Refrigeratable Centrifuge (Eppendorf) - in lab (for extraction of RNA/DNA/Serum from blood samples).Mass spectrometry facility: The mass spectrometry resources available in the Department of Biochemistry and Microbiology include a Thermofinnigan LCQ Deca XP Ion trap mass spectrometer, two Agilent 6890N GC/5973N MSD instruments, a HP 5890GC/5970MSD system, two Micromass Q-TOF Ultima mass spectrometers each with Waters CapLC system, and an Agilent Technologies 6410 Triple-Quadrapole mass spectrometer with 1200 series LC system. A Bruker Autoflex MALDI-TOF mass spectrometer is also available. Analytical instrumentation: Three Waters HPLC systems and a Biotage flash chromotography system are available in a shared instrumental laboratory. This instrumental laboratory also houses two modern UV/VIS spectrometers and a JASCO 715 CD spectrometer.NMR spectrometer: A Bruker 500 MHz Avance NMR spectrometer with a 1H, 13C, and 15N xyz-gradient probe is housed in the Radiobiology department. The PI has access to as much NMR time as needed. Endourologic equipment: The endourologic equipment provided by the Department of Urology includes standard laparoscopic instrumentation (laparoscope, stapler, scissors, graspers, ports, sutures, syringes, insufflations tanks, clip appliers, Veress needles, scalpels, pickups, needle drivers, hysteroscopes, electrocautery devices, etc.) as well as a Covidien bariatric 5mm harmonic scalpel, Power Shot S40 Canon Camera, Cambridge Endo Flexible Electrocautery Device, Olympus Tower with Right Angle Camera, Stryker 2.9mm laparoscope, and LSI

Solutions Sew-Right and Ti-Knot devices. Nitrogen Plasma Instrument: Located at North Carolina State University. See research strategy text for description.

**Obenaus, Andre 2130199**

**Major equipment**

The Obenaus laboratory is comprised of ~650 sf in the basement of the Chan Shun Pavilion. The laboratory has 3 chemical fume hoods, along with 2 -80°C (Thermo/Revco) freezers, a -20°C freezer (Kenmore) and 2 4°C fridges (Sanyo Medicool). In addition to the standard laboratory workspace, we have three GrossLab (Shandon/Lipshaw) surgical work stations that provide their own ventilation, water and light sources. These are used for undertaking various surgical procedures for which we have 2 rat/mouse stereotactic devices. Anesthesia is delivered via Vetequip isoflurane vaporizers. For traumatic brain injuries we use a Leica Benchmark Impactor that allows for precisely controlled injury induction. For in vivo surgical work, we have a Zeiss Opimed stereomicroscope on a large moveable stand for microscope dissection in living animals.

The laboratory is also able to undertake electrophysiological experiments both in vivo and in vitro slices. We have a portable in vivo electrophysiology rig that is composed of Axon and WPI amplifiers, a Master 8 timer along with a computer run Axon Instruments pClamp for data acquisition and analysis. Our in vitro systems (2 setups) are composed of Axon Instruments amplifiers, Warner temperature regulators, Newport vibration isoloation tables and faraday cages. Misc pumps and heaters for solutions complete these systems. Both setups also have Axon Instruments pClamp for data acquisition and analysis software.

The laboratory is also equipped with 3 chemical fume hoods for various activities, including animal perfusions and fixation. For fixation we have 2 peristaltic pumps for large rodents (rats) and 2 syringe pumps (mice). A tissue paraffin embedding system is in the laboroatory (Leica EG 1240L, EG 1140C). We are further equipped with a cryostat (Leica CM1850) along with a microtome (Leica RM 2135) for tissue sectioning. Various glass staining dishes are used for standard histological staining.

The laboratory has a dissection microscope (Olympus SZ40) that is attached to a digital Olympus camera (SZ-GV) and to a computer for digital acquisition of histological and gross pathology specimens. We also have several copies of Image Pro Plus for analysis of histological and immunohistochemical tissue sections. All of the laboratory computers are also populated with Image J and Fiji software for additional histological analysis capabilities.

Finally, the laboratory has various heating pads, rototators, water baths, pipettes and other laboratory supplies.

*Computational and Analysis:* The Obenaus Laboratory has a dedicated image processing and analysis lab (200 SF). We currently have seven Pentium based PCs for additional data processing and analysis. Three 1 GHz computers with 1GB of RAM currently provide support for 3D software for multi-modal reconstruction software. A 15 TB archival computer server is used for data archiving and backup; a web based interface allows access to all of the data. In addition, there is a PC computer configured with Linux for running MEDx, MatLab and IDL software. The lab computers each have recordable CDs for data archiving. Support personnel are available in house to maintain networks. Windows based software used for analysis of MRI data sets include Cheshire (10 licenses), Amira (5 licenses) and Jim (1 licenses). MatLab (3 licenses) is used to develop customized software and includes various development toolkits. Custom software is used from time-to-time for specific analysis. In house diffusion tensor processing and analysis software was customized using Matlab (Dr. Richard Sun). Automated volumetric analysis software has also been developed, including skull stripping and volume extraction (Dr. Nirmalya Ghosh) and an interface allows the user to select regional changes using Hierarchical Region Splitting (patent pending). Specialized software and toolkits are also being used as needed (ie. LONI pipeline environment, UCLA). fMRI analysis software in use in the laboratory includes, customized MatLab routines for image pre-processing and post-processing analysis. Use of specialized tools, including Evident and REST toolkits are used as needed to process fMRI datasets. Other analysis routines are currently being developed and used including software to determine core and pneumbra rapidly from MR images. Our analysis armamentarium is being continuously expanded and revised for rapid automated analysis routines to improve data extraction. All computers in the laboratory run Windows based Microsoft Office Professional (Excel, Word, Powerpoint, Access, Outlook). A variety of statistical programs are used in conjunction with a statistical expert (Dr. Udo Oyoyo, LLU) including SPSS, Sigmastat and Sigmaplot.

Offices and Personnel Support:

Dr. Obenaus has a 150 sf office directly across from the imaging suite. Graduate students (2), post-doctoral fellows (1) and technical staff (2) occupy an approximate cumulative space of 250 sf in a separate area within the Obenaus laboratory. A conference room is available is adjacent to the Obenaus Laboratory. As an adjunct member of the Division of Interdisciplinary Studies, School of Behavioral Health we also have a office and a large conference room.

**Research Imaging Center (Magnetic Resonance Imaging) Core Facility**

The Non-Invasive Imaging Laboratory is a core facility (1220 SF) within the School of Medicine. The laboratory is primarily composed of a Bruker Avance 4.7T imager with a 400 mm bore equipped with 200 mT/m microgradients for high resolution animal MRI. In addition, we have a 11.7T vertical bore micro-imager with a bore size of 89 mm equipped with 500 mT/m microgradients. A third MRI, a Bruker Avance 9.4T, has 310mm actively shielded horizontal bore (Avance imaging spectrometer, console and superconducting magnet). Gradient inserts for the 9.4T imager are a 7cm (100 G/cm), a 12cm (40 G/cm) and a 20 cm (20 G/cm). All MR units have three-axis gradient amplifiers, gradient pre-emphasis units, room temperature 12-channel shim sets and water chillers. A variety of RF coils are available for different size subjects (mice, rats and dogs), including quadrature and phased array rat and mice head coils. Customized RF coils as needed have been developed in conjunction with the National Research Council of Canada (NRC) who have provided numerous coils including dual tuned 1H and 31P coils for rats and mice. All magnets are broadband and multinuclear with a single channel 1H transmit, four channel 1H receive and a single channel X-nucleus transmit/receive. These imagers are easily capable of 60-125 um resolution using standard sequences. In an adjacent laboratory space (350 SF), a Siemans micro-computed tomography imaging unit is available with a 100mm bore and equipped with a 85kVP x-ray head. We also have a Siemens micro-positron emission tomography imager with a 100 mm bore. The facility has imaged a range of species from hummingbirds to lambs, demonstrating our ability to acquire and process complex data sets.

Across the hall from the Research Imaging Center is an animal care room (100 SF) maintained by the LLU Animal Care Facility personnel. This room is temperature and humidity controlled and is maintained on a 12-hr light/dark cycle. Animals from outside LLU that undergo imaging are typically housed in this facility. We have the ability to host immunocompromised animals as well. Finally, with stringent decontamination procedures, animals with various viruses etc, can be housed and imaged here.

**Clinical:**

The Department of Radiology has several 3.0T clinical scanners that are available as needed for this project. The Principal investigator has access to these instruments and resources as needed.

**Loma Linda University Advanced Imaging and Microscopy Core Facility**

The state-of-the-art Advanced Imaging and Microscopy core facility sponsored by the National Science Foundation and maintained by the Loma Linda University School of Medicine opened in 2011. The facility houses a Zeiss 710 multiphoton confocal microscope that can be operated either in inverted or with the use of an adapter in an upright configuration. The system can be used for a wide-array of different types of imaging ranging from routine histochemistry, live cell imaging, photoconversion including Fluorescence Resonance Energy Transfer (FRET) and Fluorescence Recovery after Photo Bleaching (FRAP), multi-dimension imaging (x,y,x,t,), and for imaging living animals. There are several peripheral devices available to investigators. For whole-animal studies, there is a stage platform, a Harvard apparatus stereotaxic unit for mice and rats, and equipment for whole-animal anesthesia and ventilation. For myography studies, there are Danish Myo Systems Technology pressure as well as wire confocal myographs. For cell electrophysiology, there is a HEKA 2-channel patch voltage-clamp subsystem available. In addition, there are two wide field epifluorescent systems and a stereomicroscope available for routine imaging and tissue preparation. To enhance image processing, the facility has two offline analysis workstations available for users. The primary purpose of the facility is to serve the imaging needs of investigators at Loma Linda University including the Loma Linda University Medical Center and Pettis Veterans Affairs Medical Center as well as investigators elsewhere in Southern California. Use of the core is facilitated by providing technical staff that offer an integrated training program and assist with imaging, and by providing 24/7 access to users, granting access to a monitored online (google) calendar reservation system and public access to standard operating procedures and other essential materials at http://microscopy.llu.edu.

**Equipment:**

The Advanced Imaging and Microscopy Core have three microscopy systems that are available for use. There are two upright wide field epifluorescence and brightfield systems for routine imaging and an inverted laser scanning confocal microscope with non-linear optics for more advanced imaging. In addition, there are two dedicated offline analysis workstations that are available for use and a stereomicroscope for sample preparation.

Microscopy Imaging workstations

Confocal Station 1. Zeiss LSM 710 NLO laser scanning confocal microscope workstation.The core has an Axio Observer Z1 inverted confocal imaging workstation that provides a wide variety of imaging technologies including multiphoton excitation and spectral analysis. The system has a Violet HeNe (405 nm); Argon Multiline laser (458, 488, 514 nm); Green DPSS laser (561 nm); Orange HeNe (594 nm); Red HeNe laser (633 nm); and Coherent Chameleon Vision II Ti:sapphire laser (680-1080 nm) for multiphoton spectroscopy as well as an X-Cite metal halide lamp for epifluorescence. The system has a 34 channel QUASAR multispectral scanning module, a transmitted-light PMT detector, and 2-non-descanned detectors. For epifluorescence work, the system has a Zeiss HRm CCD camera, which provides high resolution monochrome image capture, low light fluorescence imaging, and time-lapse imaging. The microscope is equipped with a motorized stage suitable for generating high resolutions mosaic images from large preparations and a fast peizo motorizer for rapid Z-axis acquisition. The objectives include a EC Plan NEO 5X 0.3 NA; EC Plan NEO 10X 0.3 NA; Plan-APO 20X 0.8 NA; LD A-plan 40x; Plan APO 63X 1.4 NA Oil; Plan APO 100X 1.4 NA Oil; C-Plan APO 10X 0.8 NA W; C-Plan APO 63X 1.2 NA W.

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Stereomicroscope Station 4.The core facility has a Zeiss stereomicroscope and halogen light source for tissue and imaging chamber preparation.

Offline analysis systems Station 5. The core facility has two offline analysis systems. One is equipped with a Dell Dimension Computer and fully functional copy of Zeiss Zen software, and Image J. In addition, the facility has a second copy of Image Pro plus 6.3 on a dedicated analysis computer.

**Animal Care:**

Loma Linda’s AALAC-accredited Animal Care Facility consists of 20,400-sq. ft. and is isolated and controlled for temperature and humidity; a 12-hr light/dark cycle is maintained. Specifically assigned rooms are available for conventional and immunocompromised animals, as well as for animals treated with biohazardous agents. All animal care is under the direct supervision of a board certified veterinarian. Animals are obtained from and housed in the Loma Linda University Medical Center Animal Care Facilities that can be accessed by a 200 ft hallway allowing for easy transport of animals. Furthermore, directly across from the MRI is a small animal care room in which we host animals from outside LLU.

**Other Equipment Available to the PI:**

A list of the major pieces of equipment within the laboratory or to which the laboratory has access are:

AIMS animal tattooing kits (2), Alpha Innotech Alpha Imager 2000, Alpha Innotech Transilluminator, American Optical/Nikon/Hund Wetzlar microscopes (7), Axon Instruments GenePix 4000B microarray reader, Barnstead Nanopure water purification systems (3), Beckman dual beam scanning spectrophotometer, Beckman liquid scintillation counter, Beckman preparative and analytical ultracentrifuges (8), Beckton Dickenson FACScalibur 4-color flow cytometer, Gilson liquid chromatography system**,** Bio-Rad MRC-1024 confocal microscope, Olympus Fluoview FV1000 confocal microscope, Bio-Rad Pulse Controller electroporation system, Bio-Rad vertical 2-d protein electrophoresis system, Cepheid real-time PCR system, iCYTE imaging cytometer, Coulter Z1 cell counter, Dyad Peltier PCR Thermal Cycler, Dynatech Flurolite 1000 microplate reader, Tecan Infinite M200 plate reader, Fisher Model 60 Sonic Dismembrator, EMS Automatic Oscillating Tissue Slicer, Eppendorf Thermomixers (2), Fisher Dry Bath incubators (3), Fisher Isotemp incubators (6), Forma Orbital Shaker, Harshaw Thermoluminescence Dosimetry M3500, Heska “ABC Vet” animal hematology analyzers (2), Jouan/Labconco/Fisher/Beckton Dickinson/Intern Equip/IEC centrifuges (13), Labconco CentriVap System, Labconco Vacuum centrifuge/6 liter lyophilizer system, Leica Cryostats Model #CM1850 (2), Leica Microsystems Darkfield Colony counter, Leica Microtome (2), MinXray HF 100/30 portable veterinary X-ray unit, MJ Research PCR thermocycler, Molecular Dynamics Storm imaging system, MVE cryogenic storage systems (2), New Brunswick Agar Sterilizer and automated plate pouring system, Nova Biomedical Bioprofile 2000 system clinical blood analyzer, Nova Biomedical Stat Profile Phox, Olympus IX-70 research microscope with microinjection system, Olympus BX-51 fluorescence microscope with Media Cybernetics Cool Snap Pro camera system, Olympus BX-50WI fluorescence microscope, Revco/Harris ultralow freezers (4), Sanyo/Napco/Forma CO2 cell culture incubators (10), Shimadzu Spectrofluorophotometer, Spectronic Spectrophotometer (2), Stratagene horizontal gel electrophoresis power supplies, Stratagene posiblot membrane transfer system, Stratagene RoboCycler Gradient 96 PCR thermal cycler, Stratagene UV Stratalinker 2400, Synthecon bioreactor systems (4), Tektronix Digitizing oscilloscope, Thermolyne cryogenic storage system, Tomtec Harvester 96, Torrey Pines/Lab-Line/Sanyo/Precision incubators (12), U.S. Filter 18 Megaohm water polishing station, VetEquip Isoflurane anesthesia units (6), Stovall Belly Dancer orbital shaker (2), VWR Heat Block, Wallac Microbeta Scintillation/Luminscence Counter, Zeiss Axiophot fluorescence/DIC/phase microscope workstation with laser ablation and Optronics MicroFire camera system, Zeiss stereo microscopes and inverted microscopes (10). Miscellaneous and minor equipment includes: balances – analytical, animal and top loading, animal transport carts (2), autoclaves, automatic pipettors, cameras – digital and video, 3 dishwashers, dryers, hoods - animal handling, chemical and 6-foot Biogard, hybridization ovens, ice maker, laboratory glassware, liquid handling equipment, machine shop & tools, magnetic stir/heat plates, pH meters, refrigerator-freezers, shakers and rotators, vortex mixers, water baths and shakers.

**Goyal, Ravi 2130229/2130205**

**Major equipment**

The Center for Perinatal Biology has 12 main laboratories, each with about 500 sq ft of space, located in the Research Wing of the Loma Linda University Medical Center. My laboratory (Biosafety Level 2) is located in the Research Wing, Loma Linda University Medical Center. The laboratory is well equipped with instruments needed to conduct the proposed research. Following are the major equipments available in the laboratory.

1. A cell-culture laminar flow hood,

2. Two cell culture incubator- One is kept in normoxic conditions, and other has a chamber to regulate oxygen concentration from 0 to 20%.

3.3 Table-top centrifuge

4. Two dissecting microscope

5. One up-right microscope for examining cell culture slide

6. EVOS fluorescence microscope

7. Muse Cell Analyzer

8. Millipore automated cell-counter

9. Cell Asic Microfluidic system to culture segments of arteries and cells in laminar fluid flow with different oxygen concentration.

10.12 organ-baths for contractility experiments

11. Two sets of Western blot apparatus

12. Biorad Thermocycler

13. DNA Gel electrophoresis equipment

14. Dissection instruments,

15. Four refrigerators (one -80º C, one -40º C, and two 4º and -20º C)

16. Separate RNA/DNA and protein experiment area with pipette sets.

17. Water bath, sonicator, shakers, vortexer, heating plate, magnetic stirrers. Also, we have a sample dehydrator (Savant Spin-Vac), tissue homogenizer (Eberbach), and a cell harvester (Brandel). We also have glassware, automatic pipettes, on-site distilled water, pH meters, and gas regulators.

**Molecular Biology Core Laboratory**

The Center for Perinatal Biology has a core molecular biology laboratory with following major instruments:

Infrared fluorescence imagers (Licor Odyssey, Li-Cor Biosci.)

2 real-time PCR cyclers (BioRad iQ5 and Roche 1.5)

Chemi Imaging system (Alpha Innotech Corp.)

Gel-logic Gel Imager

2 gamma spectrometers with multichannel analyzer (Packard),

2 electrobalances (Cahn), 2 ultracentrifuges (Beckman),

2 refrigerated centrifuges (Sorval),

2 refrigerated microcentrifuges (Eppendor

**Kearns-Jonker, Mary 2130230**

**Major equipment**

The major equipment in the KearnsJonker lab includes a PCR machine, power supplies and gel boxes, centifuges, waterbaths, a pH meter, a spectrophotometer, a -20oC freezer, a -80oC freezer, two refrigerators, a shared cryostat, a gel doc, two bacterial incubators and several shakers. Tissue culture work can be done in two laminar flow hoods and incubators. A dishwasher, walk in cold room, and autoclave facilities are shared on the first floor. A confocal microscope and a microscope with fluorescent capabilities is shared and a

Proox Model C21 oxygen and CO2 monitoring system is available for cell culture under hypoxic conditions. The AAALAC approved vivarium includes space specifically designed for housing large animals onsite in the medical center.

**Wall, Nathan 2130234**

**Major eequipment**

Other CHDMM equipments available to Dr. Wall include a LiCor Odyssey, a Lonza Amaxa Nucleofector, one Perkin-Elmer 9600 thermocycler, 2 adjustable temperature bacterial shakers and incubators, a Beckman DU640 spectrophotometer, 2 Nanodrop ND-1000 Spectrophotometers, a Gene-Pulser apparatus for electroporation, a cryostat, a phosphorimager, a MicroLumat Plus LB/96V luminometer, two histology Olympus microscopes with x10–x100 objectives (1X70 & BX50), a CCD video camera, monitor and image intensifier are all connected to a high quality digital color printer (Sony). The images are analyzed using a MetaMorph software and montaged using the Photoshop software. Dr. Wall has unrestricted access to 3400 sq.ft. of CHDMM common resources, including tissue culture facilities (equipped with additional laminar flow hoods, incubators, refrigerated centrifuges and microscopes), constant temperature rooms, darkroom, isotope room and an autoclave and glass-washing facilities. The Flow Cytometry Core Facility is located on the same floor of Mortensen Hall as the PI’s Laboratory and is equipped with a FACS Calibre and Miltenyi Biotec MACSQuant Instruments. All equipment is readily accessible and so far is never used to capacity. These instruments are run by myself and my trainees and have no for-fee operation. The CHDMM offers introductory and advanced courses in the use and upkeep of these instruments on a yearly basis. Dr. Wall also has full access to the Computational Biology Facility, also in Mortensen Hall, which provides single and dual processor computers running Microsoft Windows XP, SGI Irix 6.5, or Redhat Linux Workstation 3.1 operating systems. The Computational Biology Facility has a perpetual license to the molecular modeling package InsightII with the modules for predicting protein structure, computational drug design and evaluation, and general molecular modeling of biological macromolecules. The complete Open Eye modeling software is also available for use. CHDRMM laboratories have full access to all Loma Linda University core facilities, including libraries, photographics, machine shops, and biomedical computing. In the Department of Biochemistry is the Mass Spectrometry Core Facility which has an LTQ-

Orbitrap Velos with ETD, GC/MS with electron impact ionization, chemical ionization, an Agilent triple quadruple mass spectrometer with an Agilent 1200 HPLC and PAL autosampler, a Waters Q-TOF-API-US and a LCQ Deca XP. This facilities provides services that include: Protein Identification from SDS-

PAGE gel bands/spots, differential protein expression analysis (biomarker identification), protein post-translation modification analyses and qualitative and quantitative analysis of small molecules by LC/MS and GC/MS.Dr. Wall has full access to the Advanced Imaging and Microscopy (AIM) core facility which contains two upright wide field epifluorescence and brightfield systems for routine imaging (Zess Axio Imager A1 & Olympus BH2) and an inverted laser scanning confocal microscope with non-linear optics for more advanced imaging (Zeiss LSM 710 NLO). In addition, there is an upright microscope with a camera, a Zeiss stereomicroscope and two dedicated offline analysis workstations that are available for use.

**Xiao, DaLiao 2130236**

**Major equipment**

The applicant’s laboratory and the Center contain all resources necessary for the proposed studies:Powerlab 16/SP and Chart v. 4, AD Instruments and a whole set of telemetry system with a data acquisition software for measurement of arterial blood pressure and heart in vivo; Heart ischemia/reperfusion Langendorff working system; electrophoresis equipment; Techne Hybridiser HB-2D; Perkin-Elmer GeneAmp PCR system 2400; GS Gene Linker UV Chamber; Perkin Elmer HTS 7000 Plus Bio Assay Reader; Eppendorff 5417R refrigerated centrifuge; Kodak gel documenting system; SPOT cooled CCD digital camera system with Olympus fluorescence microscope with UV source & power supply; single cell fluorescence imaging system with Nikon Diaphot inverted Microscope; Zeiss LSM710 laser scanning confocal microscope; Jasco CAF-110 intracellular fluorescence analyzer; Sievers 270B nitric oxide analyzer; cell culture facility with SterilGard Hood (Baker) and water-jacketed CO2/O2 incubator; 8 tissue contraction apparatuses, a complete blood vessel perfusion system; Beckman GS-6R tabletop refrigerated centrifuge. Other major equipments in the Center available to this project include aqueous phase protein purification system (Bio-Rad), Beckman Optima XL-70 ultracentrifuge, scintillation counters, storage freezers, spectrophotometers. Equipment such as scanning densitometer, phosphoimager, DNA sequencers, oligonucleotide synthesizers, and Perkin Elmer 7700 Taq-Man unit in the Center for Molecular Biology and Gene Therapy are also available for this project.

**Obenaus, Andre 2130241**

**Major equipment**

The Obenaus laboratory is comprised of ~650 sf in the basement of the Chan Shun Pavilion. The laboratory has 3 chemical fume hoods, along with 2 -80°C (Thermo/Revco) freezers, a -20°C freezer (Kenmore) and 2 4°C fridges (Sanyo Medicool). In addition to the standard laboratory workspace, we have three GrossLab (Shandon/Lipshaw) surgical work stations that provide their own ventilation, water and light sources. These are used for undertaking various surgical procedures for which we have 2 rat/mouse stereotactic devices. Anesthesia is delivered via Vetequip isoflurane vaporizers. For traumatic brain injuries we use a Leica Benchmark Impactor that allows for precisely controlled injury induction. For in vivo surgical work, we have a Zeiss Opimed stereomicroscope on a large moveable stand for microscope dissection in living animals.

The laboratory is also able to undertake electrophysiological experiments both in vivo and in vitro slices. We have a portable in vivo electrophysiology rig that is composed of Axon and WPI amplifiers, a Master 8 timer along with a computer run Axon Instruments pClamp for data acquisition and analysis. Our in vitro systems (2 setups) are composed of Axon Instruments amplifiers, Warner temperature regulators, Newport vibration isoloation tables and faraday cages. Misc pumps and heaters for solutions complete these systems. Both setups also have Axon Instruments pClamp for data acquisition and analysis software.

The laboratory is also equipped with 3 chemical fume hoods for various activities, including animal perfusions and fixation. For fixation we have 2 peristaltic pumps for large rodents (rats) and 2 syringe pumps (mice). A tissue paraffin embedding system is in the laboroatory (Leica EG 1240L, EG 1140C). We are further equipped with a cryostat (Leica CM1850) along with a microtome (Leica RM 2135) for tissue sectioning. Various glass staining dishes are used for standard histological staining.

The laboratory has a dissection microscope (Olympus SZ40) that is attached to a digital Olympus camera (SZ-GV) and to a computer for digital acquisition of histological and gross pathology specimens. We also have several copies of Image Pro Plus for analysis of histological and immunohistochemical tissue sections. All of the laboratory computers are also populated with Image J and Fiji software for additional histological analysis capabilities.

Finally, the laboratory has various heating pads, rototators, water baths, pipettes and other laboratory supplies.

*Computational and Analysis:* The Obenaus Laboratory has a dedicated image processing and analysis lab (200 SF). We currently have seven Pentium based PCs for additional data processing and analysis. Three 1 GHz computers with 1GB of RAM currently provide support for 3D software for multi-modal reconstruction software. A 15 TB archival computer server is used for data archiving and backup; a web based interface allows access to all of the data. In addition, there is a PC computer configured with Linux for running MEDx, MatLab and IDL software. The lab computers each have recordable CDs for data archiving. Support personnel are available in house to maintain networks. Windows based software used for analysis of MRI data sets include Cheshire (10 licenses), Amira (5 licenses) and Jim (1 licenses). MatLab (3 licenses) is used to develop customized software and includes various development toolkits. Custom software is used from time-to-time for specific analysis. In house diffusion tensor processing and analysis software was customized using Matlab (Dr. Richard Sun). Automated volumetric analysis software has also been developed, including skull stripping and volume extraction (Dr. Nirmalya Ghosh) and an interface allows the user to select regional changes using Hierarchical Region Splitting (patent pending). Specialized software and toolkits are also being used as needed (ie. LONI pipeline environment, UCLA). fMRI analysis software in use in the laboratory includes, customized MatLab routines for image pre-processing and post-processing analysis. Use of specialized tools, including Evident and REST toolkits are used as needed to process fMRI datasets. Other analysis routines are currently being developed and used including software to determine core and pneumbra rapidly from MR images. Our analysis armamentarium is being continuously expanded and revised for rapid automated analysis routines to improve data extraction. All computers in the laboratory run Windows based Microsoft Office Professional (Excel, Word, Powerpoint, Access, Outlook). A variety of statistical programs are used in conjunction with a statistical expert (Dr. Udo Oyoyo, LLU) including SPSS, Sigmastat and Sigmaplot.

Offices and Personnel Support:

Dr. Obenaus has a 150 sf office directly across from the imaging suite. Graduate students (2), post-doctoral fellows (1) and technical staff (2) occupy an approximate cumulative space of 250 sf in a separate area within the Obenaus laboratory. A conference room is available is adjacent to the Obenaus Laboratory. As an adjunct member of the Division of Interdisciplinary Studies, School of Behavioral Health we also have a office and a large conference room.

**Research Imaging Center (Magnetic resonance imaging) Core Facility**

The Non-Invasive Imaging Laboratory is a core facility (1220 SF) within the School of Medicine. The laboratory is composed of a 11.7T vertical bore micro-imager with a bore size of 89 mm equipped with 500 mT/m microgradients. A second MRI, a Bruker Avance 9.4T, has 310mm actively shielded horizontal bore (Avance imaging spectrometer, console and superconducting magnet). Gradient inserts for the 9.4T imager are a 7cm (100 G/cm), a 12cm (40 G/cm) and a 20 cm (20 G/cm). All MR units have three-axis gradient amplifiers, gradient pre-emphasis units, room temperature 12-channel shim sets and water chillers. A variety of RF coils are available for different size subjects (mice, rats and dogs), including quadrature and phased array rat and mice head coils. Customized RF coils as needed have been developed in conjunction with the National Research Council of Canada (NRC) who have provided numerous coils including dual tuned 1H and 31P coils for rats and mice. All magnets are broadband and multinuclear with a single channel 1H transmit, four channel 1H receive and a single channel X-nucleus transmit/receive. These imagers are easily capable of 60-125 um resolution using standard sequences. In an adjacent laboratory space (350 SF), a Siemans micro-computed tomography imaging unit is available with a 100mm bore and equipped with a 85kVP x-ray head. We also have a Siemens micro-positron emission tomography imager with a 100 mm bore. The facility has imaged a range of species from hummingbirds to lambs, demonstrating our ability to acquire and process complex data sets.

Across the hall from the Research Imaging Center is an animal care room (100 SF) maintained by the LLU Animal Care Facility personnel. This room is temperature and humidity controlled and is maintained on a 12-hr light/dark cycle. Animals from outside LLU that undergo imaging are typically housed in this facility. We have the ability to host immunocompromised animals as well. Finally, with stringent decontamination procedures, animals with various viruses etc, can be housed and imaged here.

**Clinical:**

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**Other Equipment Available to the PI:**

A list of the major pieces of equipment within the laboratory or to which the laboratory has access are:

AIMS animal tattooing kits (2), Alpha Innotech Alpha Imager 2000, Alpha Innotech Transilluminator, American Optical/Nikon/Hund Wetzlar microscopes (7), Axon Instruments GenePix 4000B microarray reader, Barnstead Nanopure water purification systems (3), Beckman dual beam scanning spectrophotometer, Beckman liquid scintillation counter, Beckman preparative and analytical ultracentrifuges (8), Beckton Dickenson FACScalibur 4-color flow cytometer, Gilson liquid chromatography system**,** Bio-Rad MRC-1024 confocal microscope, Olympus Fluoview FV1000 confocal microscope, Bio-Rad Pulse Controller electroporation system, Bio-Rad vertical 2-d protein electrophoresis system, Cepheid real-time PCR system, iCYTE imaging cytometer, Coulter Z1 cell counter, Dyad Peltier PCR Thermal Cycler, Dynatech Flurolite 1000 microplate reader, Tecan Infinite M200 plate reader, Fisher Model 60 Sonic Dismembrator, EMS Automatic Oscillating Tissue Slicer, Eppendorf Thermomixers (2), Fisher Dry Bath incubators (3), Fisher Isotemp incubators (6), Forma Orbital Shaker, Harshaw Thermoluminescence Dosimetry M3500, Heska “ABC Vet” animal hematology analyzers (2), Jouan/Labconco/Fisher/Beckton Dickinson/Intern Equip/IEC centrifuges (13), Labconco CentriVap System, Labconco Vacuum centrifuge/6 liter lyophilizer system, Leica Cryostats Model #CM1850 (2), Leica Microsystems Darkfield Colony counter, Leica Microtome (2), MinXray HF 100/30 portable veterinary X-ray unit, MJ Research PCR thermocycler, Molecular Dynamics Storm imaging system, MVE cryogenic storage systems (2), New Brunswick Agar Sterilizer and automated plate pouring system, Nova Biomedical Bioprofile 2000 system clinical blood analyzer, Nova Biomedical Stat Profile Phox, Olympus IX-70 research microscope with microinjection system, Olympus BX-51 fluorescence microscope with Media Cybernetics Cool Snap Pro camera system, Olympus BX-50WI fluorescence microscope, Revco/Harris ultralow freezers (4), Sanyo/Napco/Forma CO2 cell culture incubators (10), Shimadzu Spectrofluorophotometer, Spectronic Spectrophotometer (2), Stratagene horizontal gel electrophoresis power supplies, Stratagene posiblot membrane transfer system, Stratagene RoboCycler Gradient 96 PCR thermal cycler, Stratagene UV Stratalinker 2400, Synthecon bioreactor systems (4), Tektronix Digitizing oscilloscope, Thermolyne cryogenic storage system, Tomtec Harvester 96, Torrey Pines/Lab-Line/Sanyo/Precision incubators (12), U.S. Filter 18 Megaohm water polishing station, VetEquip Isoflurane anesthesia units (6), Stovall Belly Dancer orbital shaker (2), VWR Heat Block, Wallac Microbeta Scintillation/Luminscence Counter, Zeiss Axiophot fluorescence/DIC/phase microscope workstation with laser ablation and Optronics MicroFire camera system, Zeiss stereo microscopes and inverted microscopes (10). Miscellaneous and minor equipment includes: balances – analytical, animal and top loading, animal transport carts (2), autoclaves, automatic pipettors, cameras – digital and video, 3 dishwashers, dryers, hoods - animal handling, chemical and 6-foot Biogard, hybridization ovens, ice maker, laboratory glassware, liquid handling equipment, machine shop & tools, magnetic stir/heat plates, pH meters, refrigerator-freezers, shakers and rotators, vortex mixers, water baths and shakers.

**Other:**

Machine shop services are provided under contract with Inland Technical Services Inc. has been exceptional at providing stereotactic devices for imaging, custom devices for our electrophysiological and general support hardware for our experiments. Customized RF coils as needed have been developed in conjunction with the National Research Council of Canada (NRC) who have provided numerous coils including dual tuned 1H and 31P coils for rats and mice.

**SCIENTIFIC ENVIRONMENT: Contribution to the probability of success.**

The scientific environment within the Obenaus laboratory is rich and varied. There is a broad range of imaging resources (computational, physics, biological) that are unique within our environment. This collection of staff and resources allows a broad range of discussions and intellection interactions from the molecular and cellular levels to imaging of whole animals. Our colleagues in the clinical fields of Radiology, Radiation Medicine and Pediatrics provide a touch stone and many ideas on making our research endeavors clinically relevant. The PI has been previously successful in building the Research Imaging Center within the School of Medicine that is composed of a large collection of unique instruments (MRI, CT, PET, confocal imaging, electrophysiology) which provides many of the necessary resources. Our ongoing collaborations with UCR (Electrical Engineering, Bioengineering, UCR Stem Cell Center) UCLA (LONI, Laboratory of Neuroimaging) provide additional important computational resources that we will can use in this grant and help guarantee the success of our research endeavors.

**Angeles, Danilyn 2130286**

**Major Equipment**

Laboratory equipment includes: two gas chromatographer/mass spectrometer (GC/MS)with Electron impact Ionization, one GC/MS with Chemical Ionization, one liquid chromatographer/MS (LC/MS)with electrospray ionization ion trap MS, one LC-triple quadrupole MS, one GC-time of flight(ToF)High Resolution GC/MS, one LC-ToF with Capillary LC, one LC-ToF with Nano LC, one MALDI-ToF, three HPLC w/ PDA, one HPLC w/ photodiode array (PDA) detector and fluorescence detector, one HPLC w/ Electrochemical detector, one fast protein liquid chromatography (FPLC)and several Carey scanning uv/vis with thermal control. Other equipment includes 2 refrigerators, a (-) 80º freezer, pH meters, gas regulators, and incubation and dessication ovens. All resources necessary for reagent preparation are available in the PI’s lab including balances, glassware, automatic pipettes and on-site distilled water

**Fletcher, Hansel 2130117**

**Major Equipment**

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| Dr. Fletcher has a 1200 ft2 laboratory conveniently located near two common rooms, which contain centrifuges, scintillation counters, autoclaves, growth room, anaerobic hood and a -80o C freezer. The laboratory and the common rooms contain all the necessary equipment to perform the proposed work. Dr. Pearce maintains two 400 square foot labs among approximately ten such labs that make up the Center for Perinatal Biology. At present, the Center staff includes 8 full-time basic science faculty, 12 postdoctoral fellows, 15 graduate students, 13 technicians, and 2 full-time secretaries Among these, 5 graduate students, and 2 technicians work in the principal investigator's lab. The lab has two microsurgical dissection stations complete with stereo microscopes (Nikon NK1), fiberoptic light sources, and microdissection instruments. All resources necessary for reagent preparation are also available in the PI’s lab including balances, glassware, automatic pipettes, and on-site distilled water. Other available equipment includes 2 refrigerators, a –80 oC Revco freezer, pH meters, gas regulators, incubation and desiccation ovens, ground glass homogenization mortars and pestles of various sizes, and a ventilation hood. Dr. Duerksen-Hughes' group occupies two 600 square foot laboratories within Mortensen Hall equipped for general molecular biology and cell culture work. Within these laboratories is desk and bench space for seven researchers, as well as general molecular and cell biological equipment and materials including microcentrifuges, protein and DNA electrophoresis units, shakers, waterbaths, pipettors, pippettmen and a thermal cycler for PCR analysis. Adjacent to the PI’s laboratories are common equipment areas which contain laminar flow hoods, CO2 incubators, -80o and -20o freezers, multipurpose centrifuges, inverted and standard microscopes, balances, and multiple liquid nitrogen tanks with space to store nearly 6000 cryopreservation vials. Also available are both a Becton Dickinson 4-color FACSCalibur flow cytometer and a high performance MACSQuantTM Analyzer. The MACSQuantTM Analyzer is a 7-color flow cytometer that uses 3 lasers and employs two light scatter channels and 7 fluorescence channels with absolute cell counting. |

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| Clinic Resources |
| The Loma Linda University Medical Center is the largest teaching hospital serving the Inland Empire of Southern California with a state-of-the-art 627 bed facility. It serves as a resource for basic research and is a potential venue for future clinical studies. The community served by the medical center includes the largest counties in the U.S, San Bernardino and Riverside, with a population of over 3.5 million. It is estimated that by 2015, over 55% of the population in the Inland Empire region will belong to ethnic group (i.e., Hispanics and African American) that traditionally have a low socioeconomic status and disadvantaged background. In addition, the Inland Empire currently exhibits one of the fastest population growths in California, while ranking second to last in average annual income among major metropolitan areas in the U.S. and ranking among the lowest in health status in the state. |

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| Animal Resources |
| The Animal Care Facility, under the direction of Dr. David L. Wolf, DVM, PhD, has been fully accredited by AAALAC since 1967. It includes approximately 20,000 ft2 of space in the University Medical Center and 43,200 ft2 in satellite animal facilities on the University campus. The facility was designed to provide appropriate housing for common laboratory species. Cage washing facilities, as well as food storage and preparation areas and arrangements for waste disposal are included. Services, including operating theaters and areas for preparation and recovery of animals, as well as radiology and fluoroscopy are provided. The Animal Care Facility is staffed with an on site veterinarian, animal health technician, executive secretary, and seven animal care technicians.  |

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| Computer Resources |
| Dr. Fletcher is equipped with office and laboratory computers and LaserJet printers. The laboratory and office are linked to the internet via the university network. Two Silicon Graphics workstations in the Department and two personal computers in the mass spectrometer laboratory are available for data or word processing, etc. Dr. Pearce's laboratory is served by the campus fiber-optic network, which provides internet, e- Mail, and file sharing access to all computers in the Center. Internet access via wireless network is also available throughout the Center. The lab includes 5 desktop Macintosh computers, an HP system connected to a microscope with a high-resolution camera used for image analysis, 2 laser printers, and a large format HP printer used to print posters. All data generated during experiments are logged using National Instrument's LabView software/hardware system for the Macintosh, which runs custom-written data logging routines. Data analysis is largely automated via macro routines written in Microsoft Excel for the Macintosh, statistical analyses are computed using SPSS v16, and non-linear regression is performed using custom written Solver! routines in Microsoft Excel. Graphic representations of the data are prepared using Deltagraph Pro from Deltapoint, Adobe Photoshop and Adobe Illustrator. Word processing is done using Microsoft WORD for the Macintosh. All operating systems and software versions are regularly updated and are the latest available. The office and laboratory of Dr. Duerksen-Hughes are equipped with several personal computers, printers and scanners that are connected to the campus network. Additional common use computers and printers (including color laser printers) are available. Office and laboratory computers are equipped with software for word processing, spreadsheet analysis, graphics imaging, and reference management. One of the computers has access to Ingenuity Pathway Analysis (IPA) software. On the second floor of our building is the Basic Science Computational Biology Facility, which includes state-of-the-art resources for molecular modeling. This approximately 300 square foot facility houses two Silicon Graphics workstations (SGI Indigo and SGI O2), four PC workstations (HP Dual Xeon 2.66 GHz PC, HP Pentium 4 2.5 GHz PC, and Compac Pentium 4 PC), one Macintosh workstation (Mac Dual 1.2 GHz PowerPC G4), a Sun server, and HP ColorLaserJet 4600DN, HP Laser Jet 5000N, and HP ScanJet 6200C. |

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| Office Resources |
| Dr. Fletcher has a separate 140 ft2 office. The PI’s office and laboratories are linked to the internet. Dr. Pearce has a private office of 200 square feet, and each member of the laboratory has a desk and their own laptop computer. A separate room within the Center provides individual office carrels with phone and computer network access for postdoctoral fellows. The Center’s main office is staffed with 2 full-time secretaries and is equipped with copiers, a FAX machine, an HP color printer, and 2 IBM Pentium computers tied to the campus network for word processing and file sharing. Drs. Duerksen-Hughes occupies approximately 100 square feet of office space near her laboratory space. Secretarial assistance is available. |

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| Other Resources |
| Loma Linda University provides a rich interactive environment that houses the Schools of Medicine, Dentistry, Pharmacy, Nursing, Public Health and Allied Health. The Basic Sciences of the School of Medicine host a weekly seminar series that attracts world-class speakers from a variety of biomedical disciplines. LLU is in close proximity to both the LLU Medical Center (within 100 m) and the Jerry L. Pettis VA Memorial Medical Center (a few blocks), promoting cross-fertilization and exchange of ideas between clinicians, clinical researchers and basic science researchers. |

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| Major Equipment |
| Dr. Fletcher's Laboratory: Coy Anaerobic Chamber, pulsefield electrophoresis, UV trans-illuminator, microcentrifuge, New Brunswick Scientific G76 bath shaker, incubator, gel electrophoresis apparatus, sonicator, PCR thermocycler, microscopes with video and photographic accessories, and oxygen meters, Alpha Innotech Corporation digital imaging system, Sorvall preparative centrifuges, Beckman DU650 spectrophotometer with temperature controller, Bio-Rad Protean IEF Cell for two dimensional gel electrophoresis, Bio-Rad microplate reader, Cepheid smartcycler II and Amersham Biosciences AKTAFPLC. Department: Bruker Multimode 8 atomic force microscope (AFM) equipped with (120 x 120 um2) and (10 x 10 um2) scanners. The AFM is also fitted with liquid cell and scanning tunneling microscopy capabilities. Mass Spectrometry Core Laboratory (adjacent building): Two Waters Ultima QTOF coupled with Waters' nano-HPLC, Hewlett-Packard GC/MS, one Finnigan LCQ Deca XP ion-trap coupled with HPLC and one Agilent 6410 triple-quardruple coupled with Agilent 1200 HPLC and Leap auto-sampler, all have electrospray ionization source. Two agilent GC/MS (6890 series GC) and one Waters ultima GC/MS instruments. Five stand-alone HPLC system (scales from nano to semi-preparative). ThermoFisher Scientific LTQ Orbitrap Velos with ETD. |

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**Tang, Xiaolei 2130235**

**Major Equipment**

1. **Major Equipments, Located On the Same Floor Where the PI’s Laboratory Is Stationed and Within the Division of Regenerative Medicine in the Department of Medicine at LLU Medical Center, Include:** cell culture necessities (e.g. three biosafety cabinets, three CO2 incubators, four high-speed centrifuges, and three Olympus microscopes); a BD FACSAria II cell sorter; an AB Applied Biosystems 7500 fast real-time PCR system; a Synergy HT multi-mode microplate reader; an Amaxa biosystems Nucleofactor II; an Agilent 2100 bioanalyzer for quantification of DNA, RNA, and protein; a New Brunswick Excella E24 temperature-controlled benchtop shaker for bacterial growth; a Robbins Scientific model 1000 hydridization incubator; a Thermo Scientific Barnstead D11931 water purification system; a Tuttnauer 2540EA autoclave; multiple thermal cyclers for PCR; multiple eppendorf centrifuges; two Ph meters; two –80oC freezers; several –20oC freezers; numerous refrigerators among others. In addition, *the histology core* contains a Leica RM 2255-rotary microtome; a Fisher Scientific microm STP 20 spin tissue processor; a thermo scientific microm EC 350 modular tissue embedding center; and a precision vertical diamond wire saw 3241. *The special imaging core* includes an Olympus BX51 microscope for fluorescence detection; an Olympus 1x71 inverted microscope for immunohistochemistry detection; and an Odyssey infrared imaging system for western blot detection.

**2. Major Equipments, Located in Other Core Facilities Within the School of Medicine and Walking Distance to the PI’s Laboratory, Include:**

***2.1 The Advanced Imaging and Microscopy Core:*** contains a Zeiss LSM 710 NLO laser scanning confocal microscope workstation; a Zeiss Axio Imager A1 upright brightfield and epifluorescence; an olympus BH2 upright brightfield and epifluorescence; a stereomicroscope brightfield; a Nikon Alphaphot-2; and an analysis Workstation.

***2.2 The Atomic Absorption Core:*** contains a Varian atomic spectrophotometer that operates in both atomic absorption and emission modes.

***2.3 The Mass Cpectrometry Core:*** contains a LTQ-Orbitrap Velos with ETD; a GC/MS with electron impact ionization (EI) and chemical ionization (CI); an Agilent triple quadruple mass spectrometer linked with an Agilent 1200 HPLC and PAL autosampler that can house six 96-well plates; a Waters Q-TOF linked with Waters capillary HPLC and a LCQ Deca XP.

***2.4 The Magnetic Resonance Imaging Core:*** contains a wide-bore 500 MHz Bruker NMR spectrometer; a Jasco J715 circular dichroism spectrometer; and a Photon Technology International T-format spectrofluorometer.

**Zhang, Xiaobing, 2130250**

**Major Equipment**

Major equipment in the Division of Regenerative Medicine:

• Agilent Bioanalyzer 2100

• Amaxa Nucleofector: for non-viral transfection of DNA/RNAs.

• Applied Biosystems 7500 Fast Real-Time PCR System

• Applied Biosystems Veriti 96-Well Thermal Cycler: the fast PCR machine for regular PCR.

• BSL2 biosafety hoods: For cell culture and virus production.

• C02 incubators: For cell culture and virus production.

• FACSAria II: Equipped with green and red lasers. For 7-color flow cytometric analysis and 4-way sorting.

• Freezers (-80°C)

• Leica RM 2255: For histology.

• LI-COR Odyssey: Odyssey Infrared Imaging System for Western blot.

• Microm EC350-2: Modular tissue embedding center for histology.

• Microm STP120: Spin Tissue Processor for histology.

• Nanodrop 2000: Micro-Volume UV-Vis Spectrophotometer for Nucleic Acid and Protein Quantitation.

• Olympus (inverted) Fluorescence Microscopes.

• Sorvall Legand XTR Centrifuge: For lentiviral vector concentration and Adenoviral vector purification.

• Synergy HT Multi-Mode Microplate Reader.

We also have access to ***Equipment in CHDMM***, which is 200 yards away from the Lab. The ET Flow Core includes a Becton Dickinson 4-color FACSCalibur flow cytometer and a high performance MACSQuantTM Analyzer. The MACSQuantTM Analyzer is a 7-color flow cytometer that uses 3 lasers and employs two light scatter channels and 7 fluorescence channels with absolute cell counting. It features an automated startup procedure that includes calibration and compensation, as well as automated cleaning and shut down. Individualized instrument settings and gating strategies can be saved as experimental templates. The director of the facility and the primary user of these instruments is Dr. Kimberly, who is the PI’s collaborator.

***Department of Radiation Medicine Research***: A cytogenetics core service is provided for all the investigators in the Loma Linda University. A dedicated computer for G-banding and FISH analysis is installed with Applied Spectral Imaging software package, which includes Band View, a complete band karyo typing system. The computer is equipped with a big 30 inch HP LCD screen, and connected to a Nikon microscope that is equipped with a 12-bit digital CCD-camera (1280x1024 pixels). In this Department, there is other equipment that is related to this project: Typhoon FLA 9000 imaging system. Typhoon FLA 9000 is a versatile laser scanner with the widest range of imaging modes. The system provides phosphor imaging, multiplex fluorescence and digitization at any time.

***Advanced Imaging Core***: The state-of-the-art Advanced Imaging Core facility was developed with a grant from the National Sciences Foundation and with support by the Loma Linda University School of Medicine in 2010. This facility's primary goal is to serve the research, training, and education needs of investigators, staff, and students at Loma Linda University, including the Loma Linda University Medical Center and the Pettis Veterans Affairs Medical Center, in brightfield and confocal microscopy. Its first priority is to serve the Loma Linda research community.

**Angeles, Danilyn 2130286**

**Major Equipment**

Laboratory equipment includes two gas chromatographer/mass spectrometer (GC/MS) with Electron impact Ionization, one GC/MS with Chemical Ionization, one liquid chromatographer/MS (LC/MS) with electrospray ionization ion trap MS, one LC- triple quadrupole MS, one GC- time of flight (ToF) High Resolution GC/MS, one LC-ToF with

Capillary LC, one LC-ToF with Nano LC, one MALDI-ToF, three HPLC w/ PDA, one

HPLC w/ photodiode array (PDA) detector and fluorescence detector, one HPLC w/ Electrochemical detector, one fast protein liquid chromatography (FPLC) and several Carey scanning uv/vis with thermal control. Other equipment includes 2 refrigerators, a (-) 80º freezer, pH meters, gas regulators, incubation and dessication ovens. All resources necessary for reagent preparation are available in the PI’s lab including balances, glassware, automatic pipettes and on-site distilled water

**Wall, Nathan 2130287**

 **Major Equipment**

Other CHDMM equipments available to Dr. Wall include a LiCor Odyssey, a Lonza Amaxa Nucleofector, one Perkin-Elmer 9600 thermocycler, 2 adjustable temperature bacterial shakers and incubators, a Beckman DU640 spectrophotometer, 2 Nanodrop ND-1000 Spectrophotometers, a Gene-Pulser apparatus for electroporation, a cryostat, a phosphorimager, a MicroLumat Plus LB/96V luminometer, two histology Olympus microscopes with x10–x100 objectives (1X70 & BX50), a CCD video camera, monitor and image intensifier are all connected to a high quality digital color printer (Sony). The images are analyzed using a MetaMorph software and montaged using the Photoshop software. Dr. Wall has unrestricted access to 3400 sq.ft. of CHDMM common resources, including tissue culture facilities (equipped with additional laminar flow hoods, incubators, refrigerated centrifuges and microscopes), constant temperature rooms, darkroom, isotope room and an autoclave and glass-washing facilities. The Flow Cytometry Core Facility is located on the same floor of Mortensen Hall as the PI’s Laboratory and is equipped with a FACS Calibre and Miltenyi Biotec MACSQuant Instruments. All equipment is readily accessible and so far is never used to capacity. These instruments are run by myself and my trainees and have no for-fee operation. The CHDMM offers introductory and advanced courses in the use and upkeep of these instruments on a yearly basis. Dr. Wall also has full access to the Computational Biology Facility, also in Mortensen Hall, which provides single and dual processor computers running Microsoft Windows XP, SGI Irix 6.5, or Redhat Linux Workstation 3.1 operating systems. The Computational Biology Facility has a perpetual license to the molecular modeling package InsightII with the modules for predicting protein structure, computational drug design and evaluation , and general molecular modeling of biological macromolecules. The complete OpenEye modeling software is also available for use. CHDRMM laboratories have full access to all Loma Linda University core facilities, including libraries, photographics, machine shops, and biomedical computing.

In the Department of Biochemistry is the Mass Spectrometry Core Facility which has an LTQ-Orbitrap Velos with ETD, GC/MS with electron impact ionization, chemical ionization, an Agilent triple quadruple mass spectrometer with an Agilent 1200 HPLC and PAL autosampler, a Waters Q-TOF-API-US and a LCQ Deca XP. This facilities provides services that include: Protein Identification from SDS-PAGE gel bands/spots, differential protein expression analysis (biomarker identification), protein post-translation modification analyses and qualitative and quantitative analysis of small molecules by LC/MS and GC/MS.

Dr. Wall has full access to the Advanced Imaging and Microscopy (AIM) core facility which contains two upright wide field epifluorescence and brightfield systems for routine imaging (Zess Axio Imager A1 & Olympus BH2) and an inverted laser scanning confocal microscope with non-linear optics for more advanced imaging (Zeiss LSM 710 NLO). In addition, there is an upright microscope with a camera, a Zeiss stereomicroscope and two dedicated offline analysis workstations that are available for use.

**Bellinger, Denise 2130304**

**Major Equipment**

***Laboratory:*** Dr. Bellinger’s research space consists of 3 laboratories, rooms 315, 318, and 320, occupying a total space of ~2,000 sq. ft, and a microscopy/photography room (~120 sq. ft.) in Shryock Hall, a building adjacent to Alumni Hall. Each of the 3 laboratory spaces has (1) a sink with hot/cold/distilled water, (2) ample bench space for sample preparation and running assays relevant to this proposal, (3) a small fume hood for use as needed, (4) cabinet and shelf space for appropriate storage of chemicals, laboratory notebooks, catalogs from vendors, etc., and (5) a refrigerator/freezer, -20 °C and ultralow freezers for storage of samples, kits, reagents, and other materials, etc, as appropriate. **Room 315** is a general histology/neurochemistry laboratory where routine histology, histofluorescence for catecholamines, immunohistochemistry and HPLC will be performed. It houses several tissue sonifiers and homogenizers, ESA Coulochem III HPLC system with Compaq computer with EZChrom Elite software for analyzing the chromatograms, and a printer, which will be used to determine catecholamine content in samples from this project. Equipment for tissue sectioning, including an AO sliding microtome for cutting free-floating section and a Hacker cryostat for cutting frozen tissue sections are present in Room 315. For staining methods proposed in this project, there several orbital shakers, a small utility Isotemp oven and slide warmer. This room also has an area for making solution/reagents, which contains a pH meter, hot plate/stirrers, several microfuges, ice machine, Mettler balance, and a refrigerated Eppendorf 5810R centrifuge. There is dedicated bench space for carrying out ELISA in this room, and it houses a Biotek plate washers and µQuant plate reader connected to a computer with KC4 software for data analyses. Finally, surgical instruments for animal surgeries and sacrifices to harvest tissue samples are sterilized a Hydroclave MC10 housed in this room. Room 320 is an immunology/pharmacology laboratory; tissue culture, cell harvesting, receptor binding, and western blots are performed in this space. Relevant to this project, it contains equipment needed for cell culture and related assays, including a 6 ft. laminar flow hoods, a dual-chamber humidified CO2 incubator, Z1 Coulter counter, Banson 250 sonifier, a Brandel harvester, Wallac-Trilux scintillation counter, Wallac 1470 Wizard automatic gamma counter, 3 water baths with small, medium and large water capacity, and a vortexer. Refrigerated centrifuges needed for preparing cell suspensions are housed in rooms 318 and 315. ELISA are also run in this room. Room 318 is used for sample preparation, western blots and ELISA, multiplexed ELISA and data acquisition for multiplexed ELISA Relevant to this project, This room houses a 4 ft. laminar flow hood (allows an additional person to prepare cells for culture) and 2 refrigerated Eppendorf centrifuges (5430R and 5810R). For running multiplexed ELISA, it contains a Luminex 100 analyzer with a Luminex XY™ plate handling platform, a Luminex SD™ sheath delivery system and a PC with Microsoft Windows XP with Masterplex CT software version 1.2.07 for data acquisition and the Masterplex QT 2010 for multiplex quantitative analysis curve-fitting software. Other equipment in this space includes microfuges, Tekmar tissumizer, vortexer, and rotating shaker plates. Across the hallway from Dr. Bellinger’s laboratory is a conference room available for convening lab meetings, journal club, etc., and further down the hallway is a classroom that can be used for presenting seminars, vendor shows, demonstrations, and presentations, and discussing research projects. The microscope room houses a Zeiss Axiomat photomicroscope equipped for bright field, fluorescence and phase contrast microscopy that is connected to an image analysis system