INTRODUCTION

About the Handbook

This Handbook is intended to be an instructive guide for research staff which includes UA associate-researchers, student workers, and volunteers. It has been designed to inform University of Arizona College of Medicine, Phoenix (UA COM-P) laboratory members about key laboratory compliance regulations mandated by OSHA that require oversight by UA COM-P Manager of Laboratory Operations, and the Research Administration Office.

Included in the Handbook are the following areas:

- Laboratory Training Requirements
- Laboratory Safety Orientation
- Appropriate Dress in the Laboratory
- Food or Drink in Laboratory Areas
- OSHA Regulations Governing the Safety of Minors in Hazardous Workplaces
- Research Laboratory Safety/Services Available
- Centrifuge Safety Instructions
- Shared Laboratory Equipment
- Safe Handling of Liquid Nitrogen
- What to Do in an Emergency
- Emergency Contact Numbers
- Emergency Evacuation Procedures
- Appendix I: Shared Equipment Basic Operators’ Instructions
LABORATORY TRAINING REQUIREMENTS
The following training modules must be completed before access to the research laboratories can be obtained:

- Biosafety (includes Biosecurity and Bloodborne Pathogens) - available online through CITI;
- General Laboratory Chemical Safety – available online through Desire to Learn (D2L), https://d2l.arizona.edu/. This module is currently under revision by the Office of Radiation, Chemical, and Biological Safety (ORCBS), and the revised version will be available by February 28th, 2013 on D2L.

Note: Per OSHA regulations, Biosafety training must be completed once annually. CITI sends out reminder notifications to complete retraining 60 days, 30 days, 1 week prior to expiration, and 30 days following expiration.

Additional Training:

- Radioactive Materials Safety – required for individuals working with radiological isotopes;
- Imaging Laser Protection – required for individuals using the confocal microscope;
- Biosafety Protection Course – required by ORCBS;
- Institutional Animal Care and Use Committee (IACUC) – available online through CITI – required for individuals working with animals.

All laboratory safety compliance is monitored by the Chair of the Environmental, Health and Safety Committee, Kerr Whitfield, PhD, and the Manager of Laboratory Operations, Sepideh S. Hockley at the UA COM-P.

LABORATORY SAFETY ORIENTATION
All incoming laboratory members are required to attend a Laboratory Safety Orientation which must be completed during the first week of joining the laboratory. New research staff should contact the Manager of Laboratory Operations to schedule an orientation.

APPROPRIATE DRESS IN THE LABORATORY
Closed toe shoes
No sandals or flip-flops
Long pants or skirts preferred
No shorts or skirts above the knee
Long hair should be tied back
Safety goggles should be worn when working with hazardous materials
Laboratory coats
Laboratory coats must be removed before entering common areas e.g. administrative offices, break rooms, etc.
Gloves should be worn when performing experiments
Gloves must be removed before leaving the laboratory area

Additional information regarding appropriate dress is found in the APPENDIX 1

Note: Appropriate laboratory dress applies to research laboratories at ABC-1, Chandler Innovations, and 3rd floor of TGen.

FOOD OR DRINK IN LABORATORY AREAS
No food or drink is permitted in the laboratory areas at ABC-1, Chandler Innovations, or 3rd floor of TGen.

OSHA Regulations Governing the Safety of Minors in Hazardous Workplaces
Risk Management and ORCBS have stated that per the U.S. Department of Labor on employment of minors in Hazardous Workplaces OSHA regulation (29 CFR Part 570, Subpart E) restricts 14 and 15 year olds from “any occupation found and declared to be hazardous by the Secretary of Labor,” and for 16 and 17 year olds that restricts employment with “Exposure to radioactive substances.” ORCBS does allow those under 18 to be in laboratories of radioactive Approval Holders, but they cannot be “Radiation Workers,” and must be documented as having been trained as a “Non-Radiation Worker” as outlined at: [http://orcbs.arizona.edu/files/forms/Rules%20for%20Radioactive%20Material%20Use%20in%20Open%20Bay%20Laboratories.pdf](http://orcbs.arizona.edu/files/forms/Rules%20for%20Radioactive%20Material%20Use%20in%20Open%20Bay%20Laboratories.pdf).

ORCBS further allows 17 and 18-year-olds to work with Biosafety Level 1 agents after undergoing their Basic Biosafety Protection Course. No work with Biosafety Level 2 or 3 agents is allowed by minors. Risk Management and ORCBS have further stated that no minors under 16 years can work in laboratories because of the inherent hazardous nature of the materials and processes in these areas. This restriction applies to both volunteers and paid staff positions. On the issue of minors visiting research laboratories, Risk Management and ORCBS refer to the UA Human Resources policy 421.0 on Visitors in the Workplace: [http://www.hr.arizona.edu/policy/421](http://www.hr.arizona.edu/policy/421), which includes provisions for volunteers in laboratories and places restrictions on minors in Hazardous Workplaces (i.e. laboratories).

Hepatitis B Vaccine
It is recommended that individuals working with human tissue samples receive the Hepatitis B vaccine series or a titer. At UA Employee Health provides vaccinations to laboratory researchers per submitted protocols. At UA COM-P, these services are provided by University of Arizona – Tucson (UA-T) Employee Health and received from Concentra Health Clinics locations in Phoenix. Requests for Hepatitis B vaccination should be made through the Manager of Laboratory Operations. In the case where a researcher chooses not to receive the Hepatitis B vaccine, a Declination Form must be completed and submitted to the Manager of Laboratory Operations.
BIOSAFETY, BIOSECURITY AND BLOODBORNE PATHOGENS
http://risk.arizona.edu/healthandsafety/
The Occupational Safety and Health Administration (OSHA) regulates facilities where employees could be exposed to bloodborne pathogens by promoting safe work practices to minimize the incidence of disease caused by these pathogens. Relative to this goal, OSHA enacted the Bloodborne Pathogen Standard (29CFR1910.1030). The purpose of the standard is to reduce occupational exposure to human bloodborne pathogens (PDF format) that employees may come in contact with in the workplace and to establish a framework for training and medical response.

The University of Arizona's Exposure Control Plan
The Department of Risk Management and Safety, UA-T has developed an Exposure Control Plan (PDF format) (ECP) to comply with the standard. The ECP provides guidelines and procedures to prevent or minimize occupational exposure to bloodborne pathogens. The ECP is policy of the University of Arizona.

Biosafety training which includes modules on Biosecurity and Bloodborne Pathogens is available online through the CITI Program website www.citiprogram.org, and is mandatory for employees with a reasonably anticipated exposure to human blood, body fluids, and other potentially infectious materials. Due to the open bay nature of the UA COM-P laboratories, all research staff are considered potentially at risk of exposure whether or not they work directly with human samples. Thus, Biosafety, is mandatory for all research staff and faculty and must be completed before access to the research laboratories is obtained. New research staff should contact the Manager of Laboratory Operations to schedule training. Per OSHA regulations, Biosafety training must be completed once annually. CITI sends out reminder notifications to complete retraining 60 days, 30 days, 1 week prior to expiration, and 30 days following expiration.

RADIATION SAFETY
http://orcbs.arizona.edu
As a leading academic and research institution, the UA COM-P strives to maintain a safe and healthy working and learning environment for faculty, staff, students and visitors. The cooperation of the entire campus community is needed to realize this goal. This is particularly true of research that involves radiation sources, where the Office of Radiation, Chemical, and Biological Safety (ORCBS), Principal Investigators (PI) and Department Heads, and laboratory workers share the responsibility for creating and maintaining a safe workplace.

ORCBS is advisory to the Vice President of Research (VPR), in UA -T on matters related to the campus Radiation, Chemical and Biological Safety Program. The VPR delegates to the ORCBS the authority to oversee the use of radiation, chemical, and biological sources throughout the campus in Tucson and Phoenix. Thus, the ORCBS has the authority to permit, deny or revoke authorization for individuals to obtain and use radiation, chemical, biological sources. ORCBS staff perform regulatory required laboratory audits to identify and address safety and regulatory compliance issues while supporting the evolving research of our customers.

ORCBS provides radiation safety training for radiation users at UA COM-P once a month. Additional training dates are available at UA-T. Radiation safety training for non-radiation users
is also available through the RCO upon request. Radiation safety training is mandatory for all research faculty and staff whose research involves the use of radioactive materials, radiation generating machines, neutron probes/radioactive sealed sources, or lasers. To register for radiation safety training, contact the Manager of Laboratory Operations and submit a completed RC-088 form.

RC-088 forms can be printed from:  
http://orcbs.arizona.edu/training

Radiation Safety training dates can be viewed on:  
http://orcbs.arizona.edu/training/rgmpc/schedule

Radioisotopes are ordered through RCO, purchased through Perkin Elmer and delivered to COM-P/ABC-1. Incoming radiation packages are processed by ORCBS staff on Tuesdays and delivered to the radiation worker. Back-up service is provided by the office of the Manager of Laboratory Operations for deliveries that arrive on non-scheduled days.

Applications for laser use require the completion of an RC-050. Laser Radiation Protection training is provided by ORCBS as needed. A schedule of classes at UA-T can be found at:  
http://orcbs.arizona.edu/training/lrpc/schedule.Training is available at UA COM-P upon request.

The office of the Manager of Laboratory Operations provides monthly wipe surveys for the research laboratories. The results of the monthly wipe surveys are sent to the radiation approval holders and are available for inspection. PIs who are radiation approval holders are responsible for ensuring that their radiation workers conduct after-use surveys and maintain an accurate radiation user notebook for the laboratory. The ORCBS and Manager of Laboratory Operations reserves the right to conduct routine audits of the laboratories and inspect radiation user notebooks to ensure safety compliance.

Requests for radiation waste pick-up should be made online through the ORCBS website. Guidelines for proper packaging of radioactive waste are available on Form RC-040. A Radioactive Waste Summary (RC-090) must be completed and attached to the outside of the waste container clearly identifying the responsible PI (radiation license holder). ORCBS staff will pick-up radiation waste on Tuesdays per online requests.

All necessary ORCBS forms are available on:  
http://orcbs.arizona.edu/radioactive-materials
LABORATORY CHEMICAL SAFETY
The Department of Risk Management & Safety (RM&S) created a UA Chemical Hygiene Plan for the interim Chemical Safety Committee (iCSC). It has been approved by the iCSC, the Research Policy Committee of the Faculty Senate, the Faculty Senate and by the President's Cabinet. It is based on the recommendations of the National Research Council in their publication, "Prudent Practices in the Laboratory – Handling and Disposal of Chemicals" and constitutes the Chemical Hygiene Plan (CHP) required by the U.S. Occupational Safety & Health Act (OSHA) of 1970 and regulations of the U.S. Department of Labor including 29 CFR 1910.1450 "Occupational Exposure to Hazardous Chemicals in Laboratories."

The purpose of this manual is to describe the proper use and handling practices and procedures to be followed by people working with hazardous chemicals in University of Arizona laboratories to protect them from potential health and physical hazards presented by chemicals used in the workplace, and to keep chemical exposures below specified limits.

It is the policy of the University of Arizona to provide a safe and healthful workplace in compliance with OSHA regulations including the "Laboratory Standard" referenced above. This manual applies to all "laboratories" as defined below, and all people working in these labs, and their line management. These Lab Workers must become knowledgeable in the applicable details of this manual and fulfill their responsibilities as outlined. All operations performed in a laboratory must be planned and executed in accordance with the procedures outlined in the UA Chemical Hygiene Plan. In addition, each Lab Worker is expected to develop good personal chemical safety habits aimed at the reduction of chemical exposures to themselves, others, and the environment. The UA Chemical Hygiene Plan can be viewed at:
http://risk.arizona.edu/healthandsafety/labchemicalsafety/manual/index.shtml

The Arizona Occupational Safety and Health Administration (AZ/OSHA) requires that all laboratories have a written Chemical Hygiene Plan (CHP) that includes laboratory-specific hazard and safety information. This information should be available in the SOP of the Laboratory. PIs can obtain a template CHP for their laboratory by contacting the Manager of Laboratory Operations.

General Laboratory Chemical Safety training is available online through the Desire to Learn (D2L) System. Additionally, Laboratory Chemical Safety Self-Evaluations are available through the Office of the Manager of Laboratory Operations, and should be taken annually.

RESEARCH LABORATORY SAFETY/SERVICES AVAILABLE
Hazardous Materials Management
Storage: PIs are responsible for overseeing proper acquisition and storage of hazardous chemicals in their laboratories.

Disposal: The U.S. Environmental Protection Agency (EPA) regulates disposal of laboratory wastes. PIs are responsible for ensuring that employees and students working in their laboratory follow proper disposal procedures (please refer to No Discharge Policy for ABC-1 discussed below). These procedures should be clearly defined in the SOPs of each laboratory. EH&S
Chair or the Manager of Laboratory Operations will provide guidance in this area as needed. For additional information regarding procedures for the disposal of hazardous materials including biohazardous materials, batteries, light bulbs, etc. please refer to the Risk Management and Safety website link to Environmental Compliance: http://risk.arizona.edu/environmentalcompliance/index.shtml

At COM-P spent fluorescent light bulbs and batteries should be turned into the Facilities Management office.

**CHEMICAL WASTE**

Chemical waste pick-up is coordinated as needed by the Manager of Laboratory Operations and is a service provided by UA-T Department of Risk Management and Safety. Laboratories should provide complete chemical waste inventories to the Manager of Laboratory Operations and should ensure chemical waste containers are appropriately tagged and stored in time for pick-up. At COM-P, chemical waste is stored in designated fume hoods at ABC-1, TGen, 3rd fl., and Chandler Innovations. Like chemicals are consolidated by Risk Management personnel into barrels prior to pick-up, thus, it is important to accurately identify the contents of a waste container. Chemical waste tags are available in the office of the Manager of Laboratory Operations. PIs should contact EH&S Chair or Manager of Laboratory Operations if they have questions about proper labeling and storage of hazardous waste materials.

**No discharge policy for the ABC-1 Building**

The current University of Arizona (UA) policy prohibits any disposal of hazardous waste into the sewer system. In order to comply with the UA wastewater policy the following policy must be adhered to by all faculty and laboratory personnel.

To ensure items on the following list are disposed of properly they should be labeled as hazardous waste, and stored in appropriate containers for pick-up by the Risk Management personnel.

**No Sink Disposal list:**

- Any gasoline, benzene, naphtha, solvent, fuel oil or any other liquids, solids, or gases which create or tend to create a fire or explosion hazard in the publicly owned treatment works (POTW), or to be injurious in any other way to the POTW.

- Any solids or viscous substances of such size or in such quantities that they may cause obstruction to flow in the sewer or be detrimental to POTW operations. These objectionable substances include, but are not limited to, asphalt, dead animals, ashes, sand, mud, straw, industrial process shavings, metal, glass, rags, feathers, grass clippings, tar, plastic resins, wood, blood, paunch manure, grease, bones, hair, flashings, entrails, paper cups, paper dishes, milk cartons or other similar paper products, either whole or ground.

- Any amounts of petroleum oil, non-biodegradable cutting oil or products of mineral oil origin.
• Any biodegradable oils, fats and greases, such as lard, tallow or vegetable oil, in concentrations that may cause adverse effects on the POTW.

• Any waste having a **pH lower than 6.0 or greater than 9.0** standard units.

• Any waste having a temperature of 140 degrees F or higher.

• ABC-1 is a zero chemical discharge facility. No chemicals in any quantity can be poured into the drain system.

Please direct any questions regarding this policy to Sepideh S. Hockley, Manager of Laboratory Operations COM-PHX, at shockley@email.arizona.edu or (602) 827-8565. Additional clarification of any wastewater issues may be obtained by contacting Herb Wagner, Associate Director, Risk Management and Safety at hwagner@email.arizona.edu or (520) 621-7691.

**BIOHAZARDOUS WASTE**

Biohazardous waste is picked up every Friday from the cold rooms at COM-P ABC-1 building. Biohazard containers are located in the cold rooms on both the 3rd and 4th floors. A separate biohazard container is used for all animal carcasses and is located in cold room 351.

**Dry Ice**

Dry ice is delivered every Monday to UA COM-P and is deposited in the dry ice chest on the 4th floor of ABC-1. Special arrangements are made on State mandated holidays.

**Cryogenics**

Cryotanks are filled and maintained by the office of the Manager of Laboratory Operations. Liquid nitrogen is available in room 352 (ABC-1) for laboratory use. Training is provided on the proper protocol for safely dispensing liquid nitrogen through the office of the Manager of Laboratory Operations.

**Compressed Gases**

50-lb CO2 compressed gas cylinders are provided for all tissue culture rooms. Specialty gases should be ordered through the office of the Manager of Laboratory Operations.

**Laboratory Coat Laundry Service**

A weekly laundry service is provided for laboratory coats. Pick-up is from the 3rd and 4th floors of ABC-1 every Wednesday. Laboratory coats in various sizes are provided by the department of Basic Medical Sciences for research staff and faculty within Basic Medical Sciences and will be identified by the UA COM-P Basic Medical Sciences logo. Individual owned coats can be dropped off for laundry provided they are clearly identifiable and have a tracking label attached. For information regarding the laboratory coat laundry service, contact the Manager of Laboratory Operations.
LABORATORY SAFETY PROGRAM

EH&S Committee and the Laboratory Manager of Operations assist laboratories by providing hazard evaluations, work practice guidance, and training on:

- Carcinogens and other hazardous chemicals
- Shower/eyewash units and other safety equipment
- Chemical Hygiene Plans and other required safety documents
- Personal Protective Equipment (PPE) appropriate for laboratories
- Chemical exposure monitoring
- Required approval for use of radioactive materials, radiation generating machinery, lasers, biohazardous agents, and toxic gases
- Proper use of specific shared laboratory equipment such as centrifuges, scintillation counters, plate readers, etc.

Chemical Inventory: The Manager of Laboratory Operations maintains an inventory of hazardous materials for research laboratories on the UA COM-P campus including the laboratories at Chandler Innovations, and the 3rd floor of the TGen building. PIs are responsible for ensuring that all hazardous materials they control are listed in their inventory. Chemical inventories are required by environmental, occupational, and Fire Code regulations and are kept in a secure central database prepared and maintained by the Manager of Laboratory Operations.

MSDS Sheets
http://www.msds.com
The PI of each laboratory is responsible for maintaining a complete notebook containing all the MSDS sheets on chemicals used in their laboratory. In addition, the Manager of Laboratory Operations maintains a complete binder in which all the MSDS sheets for UA COM-P laboratories are compiled. PIs should provide to the Manager of Laboratory Operations copies of their MSDS sheets. The laboratory employees and students may need guidance on other research safety and compliance topics. The UA-T Department of Risk Management and Safety covers a variety of laboratory safety and compliance issues for easy reference at: http://risk.arizona.edu/healthandsafety/index.shtml

Centrifuge Safety Instructions
UA COM-P provides a number of centrifuges for shared use. Instructions for use are posted above each of these instruments and must be followed in order to avoid injury and damage to equipment. Users must sign in each time they use one of the shared centrifuges and indicate the rotor being used. Sign-in sheets are posted on the centrifuges.

The following centrifuges are available for shared use:
- Beckman Coulter Optima L-100 XP Ultracentrifuge – 3rd floor ABC-1
- Beckman Coulter Optima Max Ultracentrifuge (table-top) – 3rd floor ABC-1
- Beckman Coulter J-26XPI high speed centrifuge
Beckman Coulter – Centrifugation 101: Unravel the Mysteries of Centrifugation
A DVD is available, courtesy of Beckman Coulter, in the office of the Manager of Laboratory Operations which highlights basic safety concerns with regards to centrifugation. Laboratory staff should view the DVD prior to using departmental shared centrifuges. Viewing of the DVD should be scheduled through the office of the Manager of Laboratory Operations.

Shared Laboratory Equipment
UA COM-P provides a number of laboratory equipment for shared use. The location of the shared equipment and instructions for use are discussed during the laboratory safety orientation. Instructions for use for the shared instruments are posted next to each instrument along with sign-in sheets. Users are required to sign in each time they use one of the shared instruments. For a complete list of available shared equipment please refer to the BMS Shared Equipment Inventory posted on the Basic Medical Sciences intranet site, or contact the Manager of Laboratory Operations.

Any questions regarding the use and operation of shared equipment should be referred to the Manager of Laboratory Operations.

Operating instruction for all shared equipment is located in APPENDIX II

Safe Handling of Liquid Nitrogen
When handling liquid nitrogen:

Always protect exposed skin & eyes
- Wear appropriate personal protective equipment:
  - Face shield or goggles / laboratory coat / enclosed shoes / waterproof cryo-gloves
- At atmospheric pressure, liquid nitrogen boils at –320°F (-196°C). Users should ensure that unprotected body parts do not come in contact with anything cooled by liquid nitrogen; cooled objects can cause frostbite or stick and tear your flesh when the object is forcefully removed.
- Tongs should be used to handle objects immersed in liquid nitrogen.
- Liquid nitrogen can boil when inserting warm objects.
- Hollow rods or tubes should never be used as dipsticks.

Make sure you have adequate ventilation
- Work under the fume hood when dispensing liquid nitrogen
- Nitrogen gas is colorless and odorless. Liquid nitrogen has a large liquid to gas expansion ratio. One liter of liquid nitrogen can become 24.6 cu. ft. (0.7 m³) of gas, displacing oxygen. Breathing air with less than 18% oxygen can very quickly result in dizziness, unconsciousness, and asphyxiation.
- Never plug/close the vents on the liquid nitrogen storage tank.

If someone becomes dizzy or loses consciousness, move to well-ventilated area immediately.

Contact help immediately:
Manager of Laboratory Operations (Cell) 602-653-9519
Laboratory Coordinator (Cell) 602-653-6209
Emergency Phone Number 911
WHAT TO DO IN AN EMERGENCY

Chemical Spill
In the event of a chemical spill, refer to the MSDS sheets for toxicity warnings and recommended safety precautions. Spill pads are provided on the 3rd and 4th floor labs of ABC-1 and 3rd floor of TGen for clean-up of chemical spills. If additional assistance is required contact the office of the Manager of Laboratory Operations.

If the chemical spill causes exposure to skin, eyes or is ingested, refer to the guidelines provided in the MSDS sheets. If immediate medical attention is required, call 911, and inform the P.I. Notify the Manager of Laboratory Operations and complete an Injury Report.

Radiation Spill
In the event of a radiation spill, the following steps must be taken to avoid further contamination:

1. Inform Radiation Control and receive guidance on how to proceed with the clean-up, if attempts at decontamination have proven unsuccessful;
2. Inform the Manager of Laboratory Operations so the contaminated area can be covered and marked with radioactive caution tape as a warning to others;
3. Conduct a final wipe survey to ensure that the clean-up has been successful and counts per million are within normal ranges. Provide the Manager of Laboratory Operations a copy of the scintillation counter readings indicating the area has been successfully decontaminated.

Injury Reporting
In the event of an accident in the laboratories, resulting in injury notify the Manager of Laboratory Operations, Sepideh S. Hockley: 602-827-8565/602-653-9519, shockley@email.arizona.edu. Medical care for work related injuries is provided through a number of urgent care facilities within the Phoenix metropolitan area. The following are some of clinic options:

CONCENTRA MEDICAL CENTERS:

AIRPORT Phoenix - (Urgent Care Hours, Open 24 hours/7 days a week)
1818 E. Sky Harbor Circle
North Bldg. 2
Ste. 150
Phoenix, AZ 85034

WEST – 35th and Thomas - (Urgent Care Hours, Mon.-Fri., 8:00am to 6:00pm)
3532 W. Thomas road
Ste. 5
Phoenix, AZ 85019
Phone: 602-272-7662
FAX: 602-269-2417
After hours: 602-244-9500
SOUTHWEST – 51 Street and Buckeye  - (Urgent Care Hours, Mon. - Fri., 8:00am to 5:00pm)
5340 W. Buckeye Road
Ste. 3
Phoenix, AZ 85043
Phone: 602-233-2117
FAX: 602-484-7930
After hours: 602-244-9500

TEMPE – (Urgent Care Hours, Mon. – Fri., 8:00am to 5:00pm)
950 W Southern Avenue
Tempe, AZ 85282
Phone: 480-968-7200
FAX: 480-968-5100
After hours: 602-244-9500

CIGNA MEDICAL GROUP URGENT CARE:

WEST VALLEY          CENTRAL VALLEY          EAST VALLEY
Paseo Urgent Care Center Phoenix Central Stapley Urgent Care Center
5891 W. Eugie Ave. 3003 N. 3rd Street 1840 S. Stapley Dr. #101
Glendale, AZ 85304 Phoenix, AZ 85012 Mesa, AZ 85204
602-588-6725 602-282-9848 480-464-6969

Monday-Friday         Monday-Friday         Monday-Friday
7:00am - Midnight    8:00am - 8:00pm    7:00am – Midnight
Saturday-Sunday, Holidays Saturday-Sunday, Holidays Saturday-Sunday, Holidays
8:00am-Midnight     8:00am-6:00pm     8:00am-Midnight

In the event of a life-threatening injury, call 911, and contact the Manager of Laboratory Operations following medical treatment.

Laboratory related injuries must be reported to the Manager of Laboratory Operations and processed through UA-T Department of Risk Management within seven calendar days in order to qualify for workers’ compensation. A copy of the injury report is provided to Human Resources.
EMERGENCY CONTACT NUMBERS

SECURITY
(602) 478-8169

Campus Security hours are as follows:

Monday – Friday: 6:30 am – 12:00 am
Saturday & Sunday: 8:00 am – 8:00 pm

Please note students are only permitted on campus when Security is on site and must vacate at
11:30 pm on Monday – Friday, and 7:30 pm on Saturday and Sunday.

The Emergency call in line (602) 827-2222 provides 24/7 information regarding the campus
emergency status.

QUESTIONS ABOUT LABORATORY SAFETY? WHERE TO GET ANSWERS:
UA-T Office of Risk Management and Safety:
risk@email.arizona.edu
Telephone: 520-621-1790
Web site: http://risk.arizona.edu/index.shtml

UA-T Office of Radiation, Chemical, and Biological Safety (ORCBS):
http://orcbs.arizona.edu/
520-626-5577

UA COM-P Manager of Laboratory Operations:
Sepideh S. Hockley (shockley@email.arizona.edu)
602-827-8565 (office)
602-653-9519 (cell)

UA COM-P Laboratory Coordinator
Jennifer Jeung (jjeung@email.arizona.edu)
602-827-2238 (office)
602-653-6209 (cell)

Dept. of Basic Medical Sciences, Chair of EH&S Committee:
Dr. Kerr Whitfield (gkw@email.arizona.edu)
602-827-2142

UA COM-P Safety Compliance:
Dr. Joan Rankin Shapiro (jshapiro@email.arizona.edu)
602-827-2091 (office)
602-826-5839 (cell)
EMERGENCY EVACUATION PROCEDURES
Building Monitors will assist with evacuation of the buildings at UA COM-Phx in the event of an emergency evacuation.

The following individuals are Building Monitors for ABC-1:

Nancy Gwilliam – 3rd and 4th floors
Sepideh S. Hockley – 3rd and 4th floors
Linda Searcy - 1st and 2nd floors

Research staff should familiarize themselves with the location of emergency exits and assembly areas.

Formal Emergency Evacuation Policy is currently under revision by Facilities Management, and will be incorporated into this document when the policy is available.
APPENDIX I - RISK MANAGEMENT AND SAFETY GUIDELINES

The DOs & DON'Ts of Lab Coats ...

Lab coats cover your regular clothes to minimize non-obvious contamination, splash hazards and impede saturation of regular clothes or skin from exposures to harmful substances. They also provide some temporary protection against fire. Although, most lab coats are not designed to be impermeable to hazardous substances or flameproof, they provide additional safety because they can be quickly removed to isolate harmful exposures or flames.

To minimize exposures to harmful substances in the lab and provide some temporary protection against fire, adhere to the following DOs and DON'Ts.

**DO...**

* **DO** wear a lab coat when a Personal Protective Equipment (PPE) Hazard Assessment of the laboratory determines hazards to the body are present or likely to be present. A good rule of thumb is to wear a lab coat at all times when working in a lab.

* **DO** choose a lab coat based on the types of work hazards. Lab coats can be disposable or reusable. Consider a disposable lab coat when using high hazard materials or when appropriate decontamination/laundering services are not readily available. Lab coats made of cotton fabric are recommended for general lab use. Flame resistant fabric (e.g., Nomex) or flame resistant cotton fabrics (e.g., Indura, Excel) are a must if there is a significant fire potential.

* **DO** wear lab coats that cover the knees and have full length sleeves.

* **DO** keep lab coats completely "buttoned" up. Snap closures are preferred over buttons or zippers to keep the body covered and allow quick removal in an emergency.

* **DO** immediately remove a lab coat if on fire or there is obvious hazardous contamination.

* **DO** consider the addition of a rubber apron when there is a significant chance of exposure to corrosive materials.

* **DO** keep lab coats clean. If they become contaminated, they should be: decontaminated/cleaned on site (i.e., at the University); sent out for decontamination/cleaning by professionals who have been informed of the potential hazards, or disposed of as a hazardous material.

**DON'T...**

* **DON'T** wear lab coats made of synthetic fabrics if there is a potential for fire. Synthetic fabrics burn, melt, shrink and stick to the skin.

* **DON'T** wear lab coats unbuttoned. An open lab coat is an invitation for hazardous exposures. Avoid lab coats that have openings for access to pant pockets. This can compromise the wearer's safety.

* **DON'T** roll up the sleeves on lab coats for comfort or ventilation.

* **DON'T** wear lab coats outside the lab or take contaminated lab coats home for cleaning.

Risk Management & Safety
APPENDIX II - SHARED EQUIPMENT BASIC OPERATORS’ INSTRUCTIONS

The following are basic instructions for the use of departmental shared equipment. Manufacturer Operator Manuals are located next to the instruments. For additional information regarding the use of shared equipment, contact the Manager of Laboratory Operations.

OPTIMA L-100 XP Preparative Ultracentrifuge – Beckman Coulter (S/N LXPO7F11)

Rotors for L-100 XP: Type 45Ti (fixed angle), SW-32 Ti (swinging bucket), SW-55Ti (swinging bucket)

Departmental rotors are marked with a pink dot on the lid or the rotor body

1. Fill out the user log even for brief runs
2. Turn on the centrifuge – switch is located on right side panel
3. Key switch position should be in the normal position (arrow on key pointing left) for closed door centrifugation
4. Make sure the O-ring of the rotors do not dry out and have vacuum grease applied to them.
5. Make sure you have tubes approved for your rotor & high-speed spins (i.e. not just any 15 or 50 ml conical plastic tubes, such as Corning). Each tube must have an equally weighed balance positioned across from it in the rotor. Swinging bucket rotors must have all buckets hanging on the rotor to prevent an imbalance.
6. If you want to precool/heat the chamber without the rotor, make sure door is closed
   a. press PRECOOL/HEAT
   b. select desired temperature
   c. press Start Temp
   d. press STOP & VACUUM to vent the chamber when you are ready to load your rotor.
7. Check that the rotor is seated properly on the drive spindle assembly. Secure rotor or rotor lid by turning knob clockwise.
8. Close the door.
9. Use the touch screen to set the run parameters and select your settings from the drop-down menu or key in the numbers.
   a. SPEED (between 1000 rpm and rotor maximum speed)
   b. TIME (up to 999 hr and 59 min; or Hold for a continuous run)
   c. TEMP (between 0°C - 40°C)
10. Hit ENTER & START within 5 seconds to begin run (hitting STOP will end a run that has started). The vacuum will be activated. The rotor will not accelerate beyond 3000 rpm until the chamber pressure drops below 750 microns.
11. Check your high speed spins after a few minutes to make sure there are no error messages.
12. When run ends, press VACUUM to vent the chamber, open door, retrieve samples, close the door, and turn off centrifuge.
13. Check for spills / leaks / broken tubes. Decontaminate if necessary.
14. Wipe off old SPINKOTE around threads of rotor or buckets, reapply sparing amount of new SPINKOTE after you finish using the rotor.
15. Immediately notify the Laboratory Coordinator or Manager of Laboratory Operations if error messages or problems arise.
OPTIMA MAX Preparative Ultracentrifuge – Beckman Coulter (S/N CTM07F04)

Rotors for OPTIMA MAX: MLA-130 (fixed angle), MLA-55 (fixed angle)
Departmental rotors are marked with a burgundy dot on the rotor lid

1. Fill out the user log even for brief runs
2. Turn on the centrifuge 30 minutes prior to your run.
3. Press DOOR to stop the vacuum.
4. Make sure the O-ring of the rotors do not dry out and have vacuum grease applied to them.
5. Make sure you have tubes approved for your rotor & high-speed spins. Each tube must have an equally weighed balance positioned across from it in the rotor.
6. Check that the rotor is seated properly on the drive spindle assembly. Secure rotor or rotor lid by turning knob clockwise.
7. Close the door.
8. Select the parameter keys and set your run parameters.
   a. SPEED (between 5000 – 130,000 rpm)
   b. TIME (up to 99 hr and 59 min)
   c. TEMP (between 0°C - 40°C)
9. Hit ENTER/DISPLAY & START to begin run (hitting STOP will end a run that has started).
10. Check your high speed spins after a few minutes to make sure there are no error messages.
11. When run ends, press DOOR to vent the chamber, open door, retrieve samples, turn off centrifuge, and close the door.
12. Check for spills / leaks / broken tubes. Decontaminate if necessary.
13. Wipe off old SPINKOTE around threads of rotor, reapply sparing amount of new SPINKOTE after you finish using the rotor.
14. Immediately notify the Laboratory Coordinator or Manager of Laboratory Operations if error messages or problems arise.
Beckman Coulter Superspeed AVANTI J-26XPI (S/N JXT07E07)

Rotors for Avanti: JA-25.50 (fixed angle), JA-14 (fixed angle), JA-17 (fixed angle), JS-5.3 (swinging bucket)
Departmental rotors are marked with a red dot on the knob of the rotor lid

Before starting a run

1. Fill out the user log, even for brief runs.
2. Make sure the O-ring of the rotors do not dry out and have vacuum grease applied to them.
3. Turn on the centrifuge & step on the foot pedal to open the door.
4. Make sure you seat the rotor pins in the correct position! Failure to do so will result in a damaged rotor which may cost ~ $10,000.00 to replace!!!!
5. Make sure you have tubes approved for your rotor & high-speed spins (i.e. not just any 15 or 50 ml conical plastic tubes, such as Corning). Each tube must have an equally weighed balance positioned across from it in the rotor. If using a swinging bucket rotor, make sure all buckets are in place.
6. Check that the rotor is seated properly on the drive spindle assembly. Secure rotor lid or knob by turning knob clockwise. If knob turns loosely and threads do not engage, the pins may not be seated properly on the hub.
7. Close the door by pressing down on top of the hand sticker on the door.
8. Recommended key switch position operating mode:
   NORMAL = regular closed-door centrifugation

Rotors will have 2 or 4 pins which can be viewed by looking down into the rotor from the top, bottom, or turning rotor on its side and looking into the drive hole; if the pins are missing or damaged - STOP - do not use the rotor!

One of the pins must be placed in between the two metal projections from the drive spindle assembly in the centrifuge.

Place one pin in between these projections

STOP – this is incorrect pin placement

Drive spindle assembly
Starting a run

9. Press individual function keys & soft keys or the keypad to select your parameters. Blinking indicates parameter can be changed. Blinking will occur until ENTER or another function key is pressed. (To change an entry before pressing ENTER, press CE. Press the function key again if you already pressed ENTER). An invalid parameter will also blink and a valid range is displayed. Fix the parameter and press ENTER.

ROTOR, SPEED, TIME, TEMP, A/D (Default acceleration & deceleration rate is MAX)

10. Press ENTER & START within 5 seconds to begin run (hitting STOP will end a run that has started)
11. Check your high speed spins after a few minutes to make sure there are no error messages.
12. When run ends, open door with foot pedal, retrieve samples, close door, and turn off centrifuge.
13. Check for spills / leaks / broken tubes. Decontaminate if necessary.
14. Wipe off old SPINKOTE around threads of rotor or buckets, reapply sparing amount of new SPINKOTE after you finish using the rotor.
15. Immediately notify the Laboratory Coordinator or Manager of Laboratory Operations if error messages or problems arise.

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*Figures are adapted from Beckman Coulter Avanti J-26 XPI CD Manual

**Rotor Safety Tips**

- Inspect rotor before each use to verify that all O-rings are present and in good shape.
- Replace damaged O-rings and lubricate with thin film of Vacuum grease.
- **Make sure rotor drive pin is aligned properly on the centrifuge spindle, i.e. one pin is between the two metal projections. The JS5.3 rotor arms are labeled to indicate location of the two pins. (See diagram on operating instructions for spindle assembly).**
➢ Clean and lubricate the rotor lid threads with a thin coat of Spinkote (white tube).
➢ Swinging bucket rotors must always have all buckets attached to prevent an imbalance.
➢ Clean up any spills immediately and report any problems with rotor or instrument to Sepideh S. Hockley (602-827-8565/602-653-9519).

Centrifuge safety training is also provided by Beckman Coulter two times a year, or upon request. Users of the ultra or high speed centrifuges must attend the safety trainings. Please contact the Manager of Laboratory Operations for details.
Operating Instructions for Applied Biosystems 7500 FAST RT-PCR (S/N 275010449)

1. Contact Dr. Kerr Whitfield to join the users Google calendar email: gkw@email.arizona.edu

2. Only use a compatible 7500 FAST reaction plate (with a notch in the upper top left corner by the A1 well; see posted list for compatible consumables). Standard plates will not work in this unit.
   Avoid marking the top or bottom of the plates with a (sharpie) marker to prevent residue buildup on the block

3. When opening or closing the tray door, only push the dimple on the right hand side. Applying pressure on other areas of the tray door may result in a unit error.

4. Follow the instructions posted on the right of the instrument for saving or accessing your data.

5. If the plate is stuck or if problems arise, please notify Jennifer Jeung (Laboratory Coordinator 602-653-6209) or Sepideh S. Hockley (Manager of Laboratory Operations 602-827-8565) as a service call may be needed. Tampering with the unit will void the warranty.
Operating Instructions for the Beckman Coulter LS6500 (S/N S610041)

1. Sign in on user log
2. Turn the rack with the slots facing you. Place appropriate program card into the back of the rack in the left hand slot.
3. After placing vials in the blue sample rack, place the sample rack into the LS6500 on the right hand side. The sample numbers on the rack should be facing you.
4. Insert the red HALT rack (with the HALT card) after your last sample rack.
5. Press Main Menu
6. Use up/down arrows to select Auto Counting and press select
7. Press start
Operating Instructions for the Konica SRX101A (S/N 105232981)

Turning on:
1) Close both lids all the way
2) Turn left WASH knob to CLOSE
3) Turn power on (right side of processor)
4) Press RUN
5) After ~ 10-15 minutes when the ready light is lit, run practice film (preferably 11x14) by lifting the right hand lid & inserting film vertically to ensure contact with all wheels and chemicals. After processor beeps, run practice film a 2nd or 3rd time.

6) Turn off all lights, make sure no light is entering from the door cracks. Note: the light on the ceiling in the center of the room is not a true red light and will give background on your film.
7) Wait until processor beeps to insert your sample film emulsion side face down.
   a. Best to insert sample film horizontally to ensure longer contact with developer and fixer

8) Wait for processor to beep before turning on the lights
9) Record # of film developed on the sign in log

Turning off:
1) Press RUN to turn off light
2) Turn left WASH knob to OPEN
3) Lift both lids and prop them open to air dry when not in use (prop open the left lid with the right lid)
4) Turn power off
   • Please leave the Developer and Fixer knobs closed all the time
   • Contact Jennifer Jeung (Lab Coordinator, 602-827-2238) or Sepideh S. Hockley (Manager of Laboratory Operations, 602-827-8565) if any problems arise or if chemicals are low
Operating Instructions for the Licor Odyssey Imager 9120  (S/N ODY-1840)

Western Blot Analysis Protocol – Licor Odyssey

Scanning Membrane or Gel
1. For a new gel, first position your gel/membrane on the scanner
   - To transfer membrane, flip it over so that the top right corner (the clipped corner) is facing the bottom right of screen and the face of the gel membrane is now against the scanner glass
   - Align the bottom left corner so that it touches the arrow tip on the bottom left of the scanner
   - Put rubber cover over the gel. If gel is wet, use the roller to remove any air bubbles from the gel

2. Open the scanner program
   - Open the Odyssey program from the desktop
   - Select Rayna under “Available Application Settings” and click OK
   - Open the folder to which you will be saving the scan:
     - Open the Gonzales Lab folder located on the Left of the screen
     - Open the subfolder with your name on it
     - Right click to create a New folder
     - Name the new folder with the experiment name (as detailed as possible)
   - To start the scan, click the Blue Arrow button
     - Located on the 1st row, 5th icon from the left
   - Username: user   Password: user

3. Set the Gel parameters
   - Under “Scan Parameters” choose Quality: medium, or use high for publications
   - Under “Channels” select 700 for a 680CW secondary antibody, select 800 for a 800CW was used. If both were used, select both wavelengths.
   - Set the Intensity under “Channels” “Intensity”
     - Begin a new scan at 4.0
   - Set the scan area using the grid box in the lower right corner:
     - Count the number of lines on the scanner occupied by the gel
     - Click on and drag the red line to match the number of squares on the gel, go 1 square above each side to ensure a full scanning area
     - Click “Preview” at the bottom of the dialog box and allow a minute for the preview scan to complete. This will show whether the scan covers the whole gel and if the set intensity is appropriate.

4. Scan the Gel
   - Click “Start Scan” at the bottom of the dialog box. The timer on the bottom will indicate how long the scan will take to complete.
- When scan is complete, click “Save” to save the scan
- A dialog box saying “Save As Scan Analysis” will appear. Name the scan as follows:
  Scan Name: Cell type, treatment, antibodies used, date
  Analysis Name: intensity used of channels (ex: 4.0 green)

**Western Blot Band Analysis Protocol**
Standard Band Migration analysis:

1. Open membrane to be analyzed. If opening a saved scan, use the browser box to the left to navigate to the saved scan.

2. Look and Identify your lanes: They can be arranged as follows: Standard lane, Kaleidoscope (should appear blank), sample lanes

3. Click the “Add Lane” button located on the second row of symbols furthest to the left. Click once at the top middle of your Standard lane, double click on the bottom middle of your Standard lane. This should automatically draw a lane with bands over your Standard lane.

4. Ensure that the number of bands added to your Standard lane matches the number of standard weights (should be 9 bands for the BioRad Biotinylated Standard). To more easily envision the number of bands, click on the “Display Lane Profile” symbol located 7 buttons from the left on the second row of symbols. Each peak should correspond to a band number.
   - To remove bands, highlight the extra band and press the delete button.
   - To add bands, click on the “Add Band” button located 5 buttons from the left on the second row of symbols.

5. Apply the standard molecular weights to the standard lane. Highlight the first lane by clicking on the line in the middle of the lane. From the menu at the top of the screen, click “Lane” located 5th from the left. Choose “Edit Size Standards” towards the bottom of the menu. In the pop up dialog box, select “BioRad Broad Range Biotinylated Std” and click the “Apply Std Set” button to the right. Under Edit Mode of the box, click on “Select Lanes”. Select the standard lane again by clicking on the line in the middle of the lane. Press “Snap to Lane”, then click “Apply”.

**For band density measurements:**

6. Click the “Add Multiple Lanes” button located 2 buttons from the left on the second row of symbols. A dialog box will open prompting you to enter the number of lanes to add - put the number of sample lanes on your gel. To add the lanes, placing your cursor in the top center of the first sample lane, click once and drag the outline to the bottom center of the
last sample lane and release the mouse button. This should add a lane for each of the sample lanes.
- Make sure each lane contains the entire band of interest within. To expand a lane sideways, click on it to highlight it (will be red) and drag each side outwards. To expand a lane downwards, click on it to highlight it and drag down.
  - Once you expand a lane, a dialog box appears asking if you want to refine the bands. Click No.
  - Make sure lanes do not overlap.

- Make sure only the band(s) of interest is outlined by a band box. Delete extra bands by individually highlighting them and clicking delete.

7. From the top menu, click “Edit” \(\rightarrow\) “Select All” to select all of the lanes. Click “Report” from the top menu, then select “Report View”. This opens a new box reporting all of the values from your gel.

8. To export your data, click “Export” on the bottom of the data box. This will prompt you to Save your file. Browse to your folder and save your file as a .txt with the cell name, date, and experiment.

9. Open your newly saved .txt file of data. Select all and copy it. Open the Excel “Western Analysis Template”. Paste your date into an empty space on the lower left of the excel sheet. Delete the cells that contain your standard data- should be the bottom 9 values.

10. Copy and paste your Lane Names into the template on the right. Fill in the “OD Value” column with the I.I. value located next to your lane name on the data pasted from your .txt file. This is the density measurements of your bands.

11. Adjust the “Ratio to Vehicle” calculation. Click on the cell under the “Ratio to Vehicle” column that corresponds to your vehicle intensity measurement. Enter the intensity value in the formula under the division sign. Copy this cell and paste it on all the cells in the column. This should automatically adjust your formulas to divide by your vehicle measurement.

12. Highlight the newly calculated data under the “Ratio to Vehicle” column and copy the data. To paste data into ID lanes, right click on lane and select “Paste Special” \(\rightarrow\) “values”.

13. Calculations: the average value will automatically calculate. To calculate the Standard Error (under the Std column), double on the cell corresponding to each sample. Highlight only the cells that contain data. Under the formula, divide by the square root of the number of samples in that row.

14. To create a graph- Highlight the column of Averages. Select “Insert” from the top menu bar, select “Column”, then 2D column to create a graph. This inserts a graph onto the spreadsheet.
15. Right click on the “Series 1” to the right hand of the graph and choose “Select Data”. This opens a dialog box prompting you to enter data series.
   - Add labels on the graph’s X axis: Click “Edit” on the right hand of the dialog box labeled “Horizontal Axis Labels”. A new dialog box opens… click the button with a spreadsheet on it to outline your values. Outline the data labels under the Treatment column and click “OK”.
   
   - Add values to the graph’s Y axis: Click “Edit” on the left hand of the box labeled “Legend Entries”. Under “Series values” click the button with a spreadsheet on it to outline your values. Outline the data labels under the Average column, click again on the spreadsheet button, and click “OK”.
   
   - Click “OK” when X and Y axis values/titles have been entered.

16. Enter a Y axis title: Click Layout ➔ Axis Titles ➔ Primary Vertical Axis Title ➔ Vertical Title and enter Y-axis label.

17. Enter a chart title: Click Layout ➔ Chart Title ➔ Above Chart and enter title name.
Operating Instructions for the Thermo Electron Analyzer Multiskan Spectrophotometer (w/o cuvette) 5118750 (S/N 1500-484)
(Revised 9-17-12 – from SL 7-07)

Preparing computer and Multiskan Spectrum for use (must have machine on in order to start the program):

a) Log into computer and turn on Multiskan.

b) Double click on Multiskan icon (Skanit RE for MSS 2.2) on desktop.

c) Parameters tab- enter name of user and name of experiment

   Username: Admin

   Password: <Click enter>

For Standard Curve Template:

d) Click on Sessions and select NEW

   Type in Session name and Protocol name

e) Click NEXT to move to plate layout options

f) Click 96 Nunk Plate. A new window will pop up and in the “Definition Done” section click FINISH

g) Click on the PROTOCOL Icon located underneath the sessions structure (top left corner) Refer to the STEPS icon (bottom left). To add steps click on the STEPS MENU TAB

Parameters for standard analysis:

Measurement: Photometric

Wavelength: 562 nm (Protein only)

Bandwidth: 2

h) Click on the STEPS MENU TAB to select any other options

i) Click on PLATE LAYOUT underneath the sessions structure (top left) and click on BOX A1

j) Click on FILL WIZARD (bottom right) and in the “Sample section” click the DOWN BAR to CALIBRATOR. In “Concentration Section” click GENERATE SERIES.
Still in the “Concentration Section” pop up click on MULTIPLE VALUES. Click on the CONCENTRATION DOWN BAR and put in 2000 and click ADD. Put in all the concentrations until the last value of the standard is at zero.

k) In the same window, make sure that # of replicates is 2 and then click OK (brings you back to the Fill Wizard window)

l) Standard curve values should be visible in columns 1,2

**Creating Samples Template**

m) Click on the FIRST SAMPLE WELL (i.e. A3)

n) Click on FILL WIRZARD

o) Click on TYPE in the “Samples Section” and click the DOWN BAR to UNKNOWNs

p) Click the NAME section below (i.e. A) NOTE: program will not accept words and/or numbers. Identify samples but individual letters.

q) Still in the “Sample Section” put in the number of unknowns with the columns shaded in the blue on the main screen. NOTE: Maximum number of samples if 8. Make sure the number of unknowns/replicates arrow reflects the orientation of your samples on the plate.

r) Click ADD (FILL WIZARD window continues to say open while the main window is still applicable)

s) Repeat Steps m through r until all samples are accounted for.

t) If you need to DELETE samples in the column click on the sample box needed to be removed and click EDIT-DELETE with the icons in the toolbar on the top of the page.

u) Click on EXECUTE and select RUN PLATE LAYOUT. NOTE: the icon for this is in the toolbar to the right of the page.

**Analysis**

v) Place the plate in the reader and click EXECUTE RUN PLATE IN.

w) In the “Execute Run Session” the Execution Progress Window, you will have the option to name your RUN and click START.
x) Click RESULTS under “Sessions Structure”
   • Click on PHOTOMETER
   • Click on CALCULATION on the top of the page and select CUVRE FIT

There should be four tabs at the top of the open window:
   • Click on the PARAMETERS then Click FIT/TYP (For proteins it’s a linear regression)
   • Click on the GRAPH tab and see the standard curve on the top and the correlation R2 value is on the bottom; Make sure they are specific to your samples.
   • The TABLE tab shows the absorbance (concentrations list tab is the table format for “viewing purposes”)
   • Click CALCULATIONS at the top of the screen and click REPORT/EXPORT: Under Calculations/ data Click on CURVEFIT 1 and click ADD
   • In REPORT tab you can save and/or print
Operating Instructions for the NANODROP SPECTROPHOTOMETER
ND-1000UV (S/N B540)

General Operation:

1. Open sampling arm and pipette sample onto the lower pedestal
   a. The following volumes are recommended:
      i. Aqueous solutions of nucleic acids: 1 µl
      ii. Purified protein: 2 µl
      iii. Bradford, BCA or Lowry assay: 2 µl
      iv. Microbial cell suspensions: 1-2 µl
2. Close the sampling arm and obtain spectral measurement using the operating software
   on the PC.
3. When the measurement is complete, open sampling arm and wipe the sample from
   both the upper and lower pedestals using a soft laboratory wipe.
   a. Wiping sample from both upper and lower pedestals usually is sufficient to
      avoid residue buildup. After a particularly high concentration samples, 2 µl
      water aliquots may be used to clean the measurement surfaces to ensure no
      residual sample is retained on the pedestal.

Note: Proteins and solutions containing surfactants will interfere with formation of
the liquid column on the pedestal surfaces.
Operating Instructions for the Olympus Inverted Microscope CKX41SF5
(S/N 8D05569, 3rd floor; S/N 7C14239, 4th floor)

Basic instructions:

1. Sign in on user log
2. Turn on the power switch (bottom right)
3. Adjust light intensity with the control located on at the front center bottom of the microscope
4. Place specimen on the stage or in specimen holder
   a. x and y axis knobs of the stage can be used to move specimen in the holder
5. Select objective lens for viewing specimen by rotating the revolving nosepiece.
   a. Start with lower magnification before moving to higher magnification
6. Adjust eyepieces by sliding right and left eyepieces until left and right fields of view coincide
7. Focus on specimen using coarse and fine adjustment knobs
8. Adjust phase slider and aperture iris diaphragm as required
9. Turn off power switch when finished
Operating Instructions for the Tecan Microplate Reader Safire II (S/N 802001759)

Basic Instructions:

1. Turn on Computer and the Tecan Safire II plate reader
2. Enter the following:
   Username: TECAN
   Password: safire2
3. Select the following from the Start menu:
   Start Menu > All Programs > XFluorSafireII
4. From the Excel spreadsheet, select the following:
   Menu > XFluor4SafireII > Connect
5. In the Setup Port dialog box select the following:
   Instrument > SafireII > Port > Serial0 (COM1) and select OK
   Place your plate into the plate reader tray after it opens
6. From the Menu options select:
   XFluor4SafireII > Movements > In and select OK
7. Adjust your required parameters according to your experiment (see example below).
   a. Select Edit > Measurement Parameter > General > Absorbance
   b. Select your specific plate under Plate
      (i.e. choose NUN96ft for a NUNC 96 flat well transparent plate)
      Plate types will indicate the brand, # of wells, f= flat, b=black,
      t=transparent)
   b. Type your required measurement and reference wavelength (type zero if no
      reference wavelength is required)
   c. Under Measurement Parameters select 3 for the number of times the plate is read
      (3 is standard, maximum is 5-10). The time between move and read is generally
      zero (try 100-300 ms) if getting variable readings
   d. Save the measurement parameters
8. Start reading sample by selecting:
   XFluor4SafireII > Start Measurement
9. Data will be populated in an Excel spread sheet with each reading in a separate cell. Plot
   graph of the concentration (y axis) vs. absorbance (O.D. on x axis), left click on “data
   point” to select data set, right click to “add trend line” (on “type sheet” select “linear”, on
   “options” sheet check both boxes for “display equation on chart” and “display R squared
   value on chart”).
Operating Instructions for the Chemidoc XRS Imager Universal Hood II  
(SN 76S/07130)

1. **Switch on Universal Hood and the camera**  
   a. Open QUANTITY ONE program from the desktop  
   b. Click SELECT SCANNER from VOLUMES QUICK GUIDE  
   c. Select CHEMIDOC XRS

2. **Position Your Gel Using EPI WHITE**  
   a. Open the door of the Universal Hood  
   b. Press EPI WHITE button on hood to turn on the epi white lights  
   c. Center your gel on the plate and close the door  
   d. Select EPI WHITE from Step I of the program menu  
   e. Select LIFE/FOCUS  
   f. Adjust LENS, IRIS, ZOOM, and FOCUS on hood while looking at the computer screen  
   g. Open the door and reposition gel if necessary

3. **Selecting Light Source**  
   a. For protein & DNA, dial above hood should be in UV position  
   b. For chemiluminescence, dial should be in CHEMI position  
   c. Once gel is lined up using EPI WHITE, select appropriate light source for your sample:  
      i. TRANS UV – DNA  
      1. Note: If using COOMASSIE, use WHITE TRANS on software, and push TRANS UV on hood  
      ii. TRANS UV with pink filter - Protein  
      iii. PREP UV – DNA extraction

4. **Acquiring Image**  
   a. Once satisfied with image, select FREEZE  
   b. Select AUTO EXPOSE  
   c. Adjust exposure using up and down arrows followed by manual expose  
   d. Use TRANSFORM TOOLS in the VOLUMES QUICK GUIDE menu to edit contrast, etc.

5. **Printing image**  
   a. Select PRINT IMAGE from FILE MENU  
   b. Make sure MITSUBISHI P93D printer is selected  
   c. Select PRINT
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