Safety Update Newsletter

University of California, San Francisco
Office of Environmental Health and Safety

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"Ask OEH&S"

This month the Office of Environmental Health and Safety is starting a new series in our quarterly newsletter called, "Ask OEH&S". If you ever pondered the reason behind the rules, you are probably not alone. To submit a question, please email your Department Safety Advisor (DSA). If your question is used, OEH&S will reward you with a Starbuck's gift card. At the end of the year, all entries used in the newsletter will be entered into a drawing for a special prize.

Why can't's I chew gum in the lab if I put the gum in my mouth before entering the lab?

The purpose of the rule against eating and drinking in the lab is to prevent people from becoming exposed to pathogens or chemicals by placing their hands in or near their mouths. Even if you put your gum in your mouth before entering the lab, there is a high probability you may discard the gum while working in the lab.

Why cant's I wear open toed shoes in the lab?

Cal-OSHA, and the Centers for Disease Control recommend closed toed shoes when working in laboratories. Open toed shoes provide no protection from exposure to spilled chemicals, infectious agents, or radioactive materials. Even if you are not using hazardous materials in the laboratory and just working at a computer, it is wise to still wear closed toed shoes to protect yourself from potential accidents caused by a coworker.

Why shouldn't I wear my lab coat outside of the laboratory?

The purpose of wearing a laboratory coat is to protect you from being exposed to hazardous materials. Wearing your laboratory coat outside of the laboratory defeats the purpose. You can easily contaminate your laboratory coat with hazardous materials and then contaminate the lunch or conference rooms. By doffing your lab coat prior to entering public areas, you are leaving potential contamination where it belongs.

Why is it so important to wear Personal Protective Equipment (PPE) when dispensing liquid nitrogen?

Liquid nitrogen can cause severe burns when it contacts skin. For this reason, it is extremely important to wear the correct PPE when working with liquid nitrogen. Proper PPE includes cryogenic gloves, a laboratory coat, and a face shield. Be sure to tuck the cryogenic gloves under the cuffs of your lab coat to prevent liquid nitrogen from seeping into the gloves. If liquid nitrogen should spill inside your gloves, it can burn your hands.

Does reading a MSDS give me all the information I need to know to work safely with the chemical?

Not always. While an MSDS gives important information such as its physical and chemical properties, flammability, and incompatibilities with other chemicals, it does not always provide information on the appropriate gloves required. For this information, you need to consult chemical resistant glove charts on the manufacturer's websites. If you are having trouble finding information on a specific chemical,

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Regulation Update: Safe Shipping

The U.S. Department of Transportation (DOT) and the International Air Transport Association (IATA) have made significant changes to the regulations for shipping biological material. The classification system for Division 6.2 material has been revised from the current four-tiered risk group system to a two-tiered system (Category A and Category B). These changes are now effective.

Highlights:

Category A is defined as an infectious substance capable of causing permanent disability or life-threatening/fatal disease to otherwise healthy humans or animals. Refer to the newly published list of Category A pathogens and cultures (see URL that follows). Infectious substances meeting the above criteria causing disease in both humans and animals must be assigned UN 2814. Infectious substances which cause disease in animals only must be assigned UN 2990. Both Category A types require Infectious Substance packaging (IATA Packing Instruction 602).

Category B is defined as a biological material that does not meet the criteria for inclusion in Category A (does not cause permanent disability or life-threatening or fatal disease to humans or animals). The shipping name "Diagnostic Specimen" has been replaced with the shipping name "Biological Substance, Category B." These materials must be assigned UN 3373 and packaged according to IATA Packing Instruction 650.

Exemptions:

Shipments that are not regulated and

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When you have finished reading this newsletter, please pass it along to others in your laboratory or office.

In This Issue:

What's NEW on the OEH&S Website

1) UCSF ONLINE TRAINING - SAFE HANDLING OF LIQUID NITROGEN https://www.researchonline.ucsf.edu/

2) Other Useful Sites
Green Chemical Alternatives - MIT
Green Chemical Alternatives Purchasing Wizard - MIT http://www.ehs.ucsf.edu/Links/oehsLinks.asp#OURes

3) New Laboratory Employee Checklists
The UCSF Laboratory Managers' Steering Committee has created and provided the following New Laboratory Employee Checklists for your use:
• New Lab Employee Checklist
http://www.ehs.ucsf.edu/WhatsNew/oehsWhatsNew.asp

("Ask OEH&S" continued)
contact your DSA for assistance.

Why is it important to close the door, and limit access to a BSL-2 tissue culture room while working at a biological safety cabinet (BSC)?

An open door negates the effectiveness of engineered containment for a BSL-2 laboratory. Air turbulence in the room can disrupt the air flow of the BSC thus compromising the sterility of the BSC and the safety of the user. Closing the door will minimize air turbulence caused by people walking past the room. It will also reduce the chance of exposing coworkers or passersby while working with infectious materials.

Why is it important to keep the door to your laboratory closed?

Laboratory doors are critical safety devices; the proper function of laboratory ventilation systems relies upon closed doors. A closed door helps contain chemical vapors and odors within the laboratory and allows for the efficient removal by the ventilation system. When the door is open, the air balance between the laboratory and the corridor is compromised and chemical vapors can escape into the hallways. Laboratory doors that open into corridors have at least a 20-minute fire protection rating. If a fire should start in your laboratory, smoke and flame can spread if the door is open. Many of UCSF's older laboratories do not have automatic alarm door closures. For this reason, the doors must remain closed. Note that alarm activated fire doors are rendered useless if the door has been propped open.

Why is it important to remove your gloves before opening the door to the laboratory?

People open and close doors with their bare hands. If you open a door using gloves, you are exposing your co-workers to the materials you were handling. If you need to transport a hazardous item from one lab to another and don't want to touch it with your bare hands, use a cart to carry the item.

Why can't I use chemicals in a biological safety cabinet (BSC)?

Most BSCs are not designed for chemical use in that the air is recirculated through a HEPA filter. HEPA filters are designed to filter particulates and aerosols; the filter does not normally include a charcoal layer for vapor absorption. Only cabinets which are hard ducted to the building ventilation system are adequate for chemical use.

Does ultraviolet light sufficiently sterilize the environment inside a BSC?

No. Ultraviolet lights (UV) should only be used as a secondary means of decontamination, if at all. UV lights are only effective over a narrow wavelength and intensity range. Over time, the intensity of the lamp decreases and dust accumulates on the bulb. The bulbs intensity must be checked and the bulb cleaned regularly if UV light is to be relied upon as the primary means of decontamination. Even if the bulb is cleaned and calibrated regularly, other factors can limit the germicidal effectiveness of the UV light. UV light is not penetrating and will not kill microorganisms hiding beneath dust particles or laboratory supplies contained in the BSC. Frequent and thorough wipe-downs with alcohol are generally a more effective method of decontamination than UV light.

(Safe Shipping continued)
not classified as a Division 6.2 Dangerous Good (as defined in IATA Dangerous Goods Regulations) are considered exempt. Examples of exemptions follow:

"**Exempt Human/Animal Specimens**" is defined as a human or animal sample transported for routine testing unrelated to the diagnosis of an infectious disease. These include blood or urine samples to monitor cholesterol, hormones, organ function (heart, liver, kidney), or samples collected for insurance or employment purposes.
These substances may be shipped as unregulated. Shipment must be in leak-proof packaging and marked with the term "**exempt human specimen**."

- **Additional exempt** substances include:
  - non-infectious materials
  - materials unlikely to cause disease in humans or animals
  - materials consisting of non-pathogenic microorganisms
  - materials consisting of neutralized or inactivated pathogens
  - non-infectious biological materials from humans or animals (including cells, tissue cultures, blood, plasma, DNA, RNA or other non-infectious genetic elements).
  - dried blood, blood for transfusion, organs or tissues for transplantation

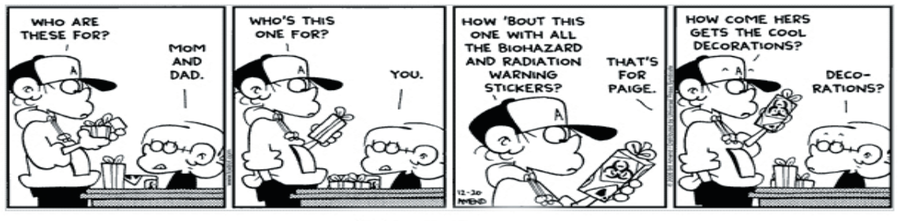
*Most laboratories at UCSF ship material in these categories.

If you have any question regarding the new shipping regulation, please contact your DSA or Peili Zhu at 514-2824. The Category A Pathogen table can be found at: http://www.oseh.umich.edu/Transportation_of_Biologics_Appendix%20A.pdf

Cryovial Hazards

Cryovials are commonly used at UCSF for the cryogenic storage of biological materials. Extreme care must be taken if you use these vials when storing materials in liquid nitrogen. Liquid nitrogen can leak into the vials. If this occurs, the liquid nitrogen will rapidly expand up to 700X its liquid volume as the vial warms. This could result in explosion of the vial, or result in spraying of the liquid from the lid.

Exposure to the liquid nitrogen can cause not only serious physical injury but may also expose you to infection from the vial contents. Recently, a researcher suffered an injury when a cryovial exploded due to the improper application of liquid nitrogen into the vial which resulted in injury to the researcher's forearm (see photos). A report from Lanet[1] in 1995 reports how five bone marrow transplant patients became infected as a result of bone marrow stored in the same contaminated tank used to store an HBV infected patient's bone marrow. The liquid nitrogen from the tank was not only found to contain identical HBV DNA sequences but also human DNA sequences of the five patients indicating the movement of both viruses and cells in and out of the containers[2].



Vial explosion may occur when uncertified or defective vials are used for storage in liquid nitrogen. Users of the cryovials must be aware of the explosion and contamination hazards in addition to implementing the appropriate control measures and donning of proper PPE to minimize the risks and exposure respectively.

The following actions are suggested:
1. Samples for freezing and storage should be placed in appropriate containers such as polypropylene cryovials and not in glass or polystyrene which may crack.

2. All biological samples in cryovials should be stored in the nitrogen vapor phase if possible.

3.When storing in the liquid phase, use internally threaded cryovials with a silicon gasket. Do not overtighten the caps prior to freezing as this will distort the gasket. In addition, wrap the vial using plastic tubing to prevent liquid from getting into the vial. Vials should be certified for use in liquid nitrogen.

4.Wear appropriate protective clothing including cryogenic gloves, lab coat or apron, and a face shield during transfer processes.

5. All laboratory personnel must be aware of the hazards of liquid nitrogen.

There are three important points to remember when handling liquid nitrogen:

1. Liquid nitrogen can cause cold burns

2. Vials can explode due to rapid expansion of the liquid to gas phase, particularly when a sample is removed from the liquid phase and warmed

3. Nitrogen can quickly replace oxygen in the air.

Exploded cryovial

Injury caused by exploded cryovial

For more details, see the Chemical Safety Update on Compressed Gas Cylinder Safety and Safety Precautions in Use of Cryogenic Liquids.

References:

1. Lanet, Tedder RS et al. Hepatitis transmission from contaminated cryopreservation tank. 1995, 346, pp 137-140

2. Hawkins A et al. Hepatitis B nucleotides sequences analysis: Linking an outbreak of acute Hepatitis contamination of a cryopreservation tank. 1996 J. Virol. Methods, 60, pp 81-91

Meet New OEH&S Employees

Nathalie Delsaer is the new OEH&S Campus Ergonomics Specialist. She will be responsible for developing a comprehensive ergonomics program for campus employees. Nathalie has a BS in Occupational Therapy from McGill University and an MS from San Jose State University in Human Factors and Ergonomics. As a Certified Hand/Occupational Therapist, she spent 12 years helping injured workers.

In 2004, Nathalie worked as an ergonomic consultant for Signore Ergonomics group. Her client was Yahoo, Inc. Nathalie enjoys running, yoga, good books and good wine.

Paula Tee has joined OEH&S as a new Department Safety Advisor. She graduated from UC Davis with a degree in Environmental Policy Analysis and Planning. You may recognize her as she has worked in the Office of Research in various units for close to five years. For the past 3 years, she worked in training and compliance with the Institutional Animal Care and Use Committee (IACUC). Paula is also in school part time. She enjoys playing soccer, exploring culinary delights, and finding new activities to experience.

Matthew James Carlson, MPH is the new Senior Industrial Hygienist with the OEH&S Clinical Program. He will be providing industrial hygiene support to both the Medical Center and the Campus.

After graduating from UC Davis with a degree in Environmental Toxicology, he worked as a consultant conducting risk assessments under the EPA's Superfund and Brownfields programs. He left consulting to pursue graduate studies at UC Berkeley where he graduated with a Master's in Public Health. Matt returned to consulting concentrating on industrial hygiene related assessments. Matt states of his career, "I have had a fulfilling journey that has ultimately landed me here at UCSF. I think it will be a great experience to work at such a prestigious research and medical institution."