



# Safety Guidelines for Demonstrations & Learning Activities in Research Labs

Research labs in academic institutions like Vanderbilt are diverse environments where multiple research hazards may be present. A hazard sign at each lab entrance identifies the hazards present and the point of contact for more information. All labs should be regarded as hazardous environments and not entered causally. The lab's point of contact should be aware of all who will enter the lab, even for a brief learning activity. This will allow them to remove or secure hazards ahead of time that are not related to the activity.

The lab point of contact should also provide a hazard and safety practice briefing for participants that is appropriate for the nature of the lab and planned activity. Basic lab safety rules that will likely apply include those listed below. More detailed information about hazard-specific safety programs can be found on Page 2.

## Top 10 Lab Safety Rules for Learners/Observers

1. **Don't enter the lab before (or without) your mentor/instructor.** These individuals will provide guidance to ensure that your time in the lab is safe and productive. If an accident happens, they will respond to the situation and ensure your safety. You are not expected to clean up spills, provide first aid, or use a fire extinguisher.
2. **Dress for the lab environment.** Your clothing will help prevent your skin from contact with items and surfaces in the lab that might be contaminated. Also, in the event of a spill, your legs and feet are the most likely to be impacted. Wear long pants and closed-toe/closed-heel shoes to ensure your safety.
3. **Tie back hair and remove loose jewelry.** These items that can get caught on equipment which could result in injury, could catch fire if working near open flames, or get contaminated with lab reagents.
4. **Don't take food or drink into the lab.** It's impossible to keep these items free of contamination in a lab setting. If the food/drink containers or your hands are contaminated and you put these items up to your mouth, you could accidentally ingest a hazard. Similarly, do not chew gum, consume mints, or apply lip balm when in the lab.
5. **Limit what you take in the lab and be mindful of where you place it.** As with food & drink items, any item you take into the lab could become accidentally contaminated. Take only what you need into the lab and place these items only on surfaces that your mentor/instructor has approved. Don't handle your phone while in the lab unless necessary and never handle it (or any other personal items) with gloved hands.
6. **Wear gloves when handling any lab hazard.** Your lab mentor/instructor will provide you with fluid-resistant disposable gloves for each activity where these are required. Make sure that you wear the size that fits snugly on your hand and that the gloves have no tears. If the gloves get wet or torn, remove them, wash and dry your hands, and put on a new pair. Do not reuse gloves once worn.
7. **Know where the eyewash is located and how to operate it.** If you will be working with (or around) liquids that can splash, you will be wearing splash goggles or safety glasses and a face shield (your mentor/instructor will provide instruction on use and maintenance of these devices). It is possible, even when using eye protection, that something could splash into your eyes. Therefore, it's important for you to know where the eyewash is located and how to operate it before the need arises. (Your mentor/instructor will review this with you.)
8. **Stay on task when in the lab.** Stay with your mentor/instructor and follow all instructions exactly as they are provided for the learning activity. Do not use/handle equipment or reagents that are not part of the activity and do not improvise or engage in horse play.
9. **Be aware of any hazardous conditions and report these to your mentor/instructor.** If you see a spill, here an equipment alarm, sustain an injury, etc., notify your instructor/mentor immediately so that they can initiate response actions.
10. **Wash your hands before leaving the lab.** Wash your hands thoroughly with soap and water at the lab sink before leaving. This is the most important thing you can do to ensure that you do not unknowingly take contamination out of the lab with you and contaminate your personal items.

## **Research Lab Hazards & Hazard-Specific Programs that Ensure Safety**

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Most basic science lab operations (sometimes referred to as “wet labs”) will include one or more of the following hazards:

### **RADIOACTIVE MATERIALS**

Radioactivity is the spontaneous emission of particles or electromagnetic waves from the nucleus of an unstable atom as it decays to a more stable form. Chronic exposure to low levels ionizing radiation can cause cancer or reproductive health effects. Exposure to high levels of ionizing radiation can cause burns or radiation poisoning (nausea, weakness, hair loss, skin burns, organ damage) resulting in premature aging or death.

Radioactive materials and areas where they are stored are identified with lab signage and labels and secured from unauthorized persons. Researchers must be trained and approved through the Office of Clinical & Research Safety’s (OCRS) Radiation Safety Section before handling radioactive materials. Special waste collection and area monitoring procedures are used to ensure that there is zero potential for individuals to be exposed to levels of radioactive materials that would cause an adverse health effect.

### **CHEMICAL REAGENTS**

Chemical reagents can present a physical hazard (such as a flammable or explosion hazard), or a health hazard, or both. Chemicals that can be a health hazard can cause short term effects such as dizziness, drowsiness, irritation of eyes, nose or throat, dermatitis, and nausea. Long term effects could include damage to eyes, skin, other body organs, birth defects, reproductive damage, cancer or death. In most cases, direct handling of the reagents or responding to a spill or damaged storage container would be the scenario where one could experience health effects from a chemical reagent.

All chemical reagent containers are marked with the contents and primary hazard identification. A compilation of hazards is also posted by the lab door (like shown on page 1). Researchers handling the chemicals must be trained regarding the hazards of the chemicals in use and adhere to the safety practices that apply to the chemical hazards. Special waste collection procedures apply to most chemical reagents. With these precautions in place, individuals entering labs should not be exposed to any chemical agent in a way that would cause an adverse health effect.

### **BIOLOGICAL AGENTS & SPECIMENS**

Biological materials (or “biohazards”) used in basic research labs include genetically-modified microbiological agents, infectious agents, human-derived cells, tissues and body fluids, nonhuman primate-derived (or monkey-derived) cells, tissues and body fluids. Some of these materials are potentially infectious to humans, while others are not an infection hazard, but could be hazardous in other ways if they were released outside the lab environment. The majority of Infectious agents used in Vanderbilt’s basic research settings are those that are commonly found in the community and cause infections through accidental ingestion or rubbing one’s eyes, nose or mouth after handling a contaminated item.

All lab equipment used to process or store biohazards is labeled with the biohazard symbol. Wastes contaminated with biohazards are collected in designated containers, and these wastes are heat killed before disposal. Researchers working with biohazards must complete biosafety training appropriate for the specific biohazards in use and follow safety practices prescribed by the Institutional Biosafety Committee (IBC). Labs that work with biohazards potentially infectious to humans will be designated as BSL-2 on the door sign. With these precautions in place, individuals should not be exposed to any biological agent in a laboratory that would cause an adverse health effect.

### **LAB ANIMALS**

Some research labs require the use of lab animals (mostly rodents) to support their studies, and this may require that the animals be brought to the lab for certain procedures. Rodents are a common source of allergens that can trigger allergy symptoms (runny nose, itchy or watery eyes, etc.) for sensitized individuals.

All lab spaces where live animal procedures are carried out are reviewed and approved by the Office of Animal Welfare Assurance (OAWA). As part of that approval process, an “allergen exposure” sign is posted in the designated procedures area to alert anyone in the lab space of this hazard and preventive actions to take.