

Ultraviolet light

1. Use of Ultraviolet Light

- Ultraviolet light (UV) is non-ionizing radiation in the 180 to 400-nanometer wavelength region of the electromagnetic spectrum (Figure 1). When the lights are working properly, they emit radiation at 254 nanometers, which can kill infectious agents on the interior surfaces of the cabinets. This wavelength also induces tumors in laboratory rodents and presents an occupational hazard to laboratory workers. Some equipment can generate concentrated UV radiation in all the spectral regions that, if used without the appropriate shielding and personal protective equipment, can cause injury with only a few seconds of exposure.

Figure 1. Ultraviolet light

Region Name Wavelength (nm)		
UVA	Black Light	315-400
UVB	Erythemat	280-314
UVC	Germicidal	180-280

- There are several sources of UV radiation in the laboratory including germicidal lamps in biological safety cabinets, nucleic acid transillumination boxes, nucleic acid crosslinkers and UV lasers.

2. Equipment Labeling

- Many overexposures to UV radiation have occurred as a result of individuals not knowing the hazards associated with UV-emitting equipment. To help prevent eye and skin injuries, any equipment that emits UV radiation must be conspicuously labeled with a caution label. The label should contain the following language:

**CAUTION
UV RADIATION HAZARD
USE ONLY WITH SHIELDING IN PLACE
PROTECT EYES AND SKIN FROM
EXPOSURE TO UV LIGHT**

3. Hazards Associated with Exposure to Ultraviolet Light

- An unfortunate property of UV radiation is that there are no immediate warning symptoms to indicate overexposure. Symptoms of overexposure including varying degrees of erythema (sunburn) or photokeratitis (welder's flash) typically appear hours after exposure has occurred.
 - **Skin Injury** - UV radiation can initiate a photochemical reaction called erythema within exposed skin. This "sunburn" can be quite

severe and can occur as a result of only a few seconds exposure. Effects are exaggerated for skin photosensitized by agents such as coal tar products, certain foods (e.g., celery root), certain medications and photoallergens. Chronic skin exposure to UV radiation has been linked to premature skin aging, wrinkles and skin cancer.

- **Eye Injury** – UV radiation exposure can injure the cornea, the outer protective coating of the eye. Photokeratitis is a painful inflammation of the eye caused by UV radiation-induced lesions on the cornea. Symptoms include a sensation of sand in the eye that may last up to two days. Chronic exposures to acute high-energy UV radiation can lead to the formation of cataracts.

4. Ultraviolet Light and Personal Protective Equipment (PPE)

At *minimum*, PPE that should be utilized when working with UV are:

- Laboratory Apparel: Wear standard laboratory apparel including a fully buttoned lab coat, long pants and closed toe shoes. While working with UV radiation sources, lab workers must be particularly vigilant to prevent gaps in protective clothing that commonly occur around the neck and wrist areas.
- Face / Eye Shield: If there is any potential for the eyes and face to be exposed to UV radiation, a polycarbonate face shield stamped with the ANSI Z87.1-1989 UV certification must be worn to protect the eyes and face. UV certified goggles and safety glasses will protect the eyes, but it is common for lab workers to suffer facial burns in the areas not covered by the goggles or glasses.
- Gloves: Wear disposable nitrile gloves to protect exposed skin on the hands. Ensure wrists and forearms are covered between the tops of gloves and the bottom of the lab coat sleeves.

5. Ultraviolet Light Overexposure

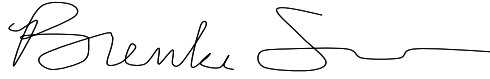
- In the event of overexposure to UV light, report any resulting skin/eye symptoms to a supervisor. Supervisor should refer employee to Employee Health Service and/or the Emergency Room. Additionally, Supervision is responsible for adhering to [UMHHC Policy 05-01-005 Accident Investigation and Reporting](#).

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