cont. OSHA Revises the Hazard Communication Standard

labels by June, 2016. This raises the question "do we need to go through our chemical inventory and re-label all of our existing chemicals?" There has been talk that OSHA will issue a letter of interpretation on this and it will hopefully only apply to newly purchased chemicals, which will be labeled this way by the manufacturer.

These new labeling requirements are another reason why buying chemicals in bulk and storing them for a potential future use is not a good practice. We recommend you just order what you need, and then use what you order. Try to maintain an up to date written inventory with fewer containers of chemicals and smaller amounts in each. "Less is Better" is the way to go for all reasons-safety, environmental and financial. Laboratory workers must also comply with OSHA's Laboratory Standard and the OSHA required Tufts University chemical hygiene plan which can be found on TEHS chemical safety webpage at http://publicsafety.tufts.edu/ehs/chemical-safety

Lab workers must take annual lab safety training, keep updated chemical inventories and submit them to TEHS annually. Also high hazard substances must be reported to TEHS on the High Toxic Chemical/Carcinogen Registration Form and have a written safety plan.

OSHA has stated that the Hazard Communication Standard in 1983 gave workers the "right to know," but the new Globally Harmonized System gives workers the "right to understand." Whether or not it really will give workers "the right to understand" remains to be seen. However, every year since 1983 violations of the Hazard Communication have been in OSHA's top 10 most frequently cited violations. To an OSHA inspector this standard is "low hanging fruit," so it's best to take all possible steps to be in compliance with this regulation.

The Effects of Laser Light on the Eye

By Geoffrey C. Sirr

Laser light of sufficient intensity and exposure time can cause irreversible damage to the eye. Laser effects are thermal or photochemical and dictated by the laser photon wavelength, exposure time and mode of operation (i.e. whether the laser is functioning in pulsed or continuous wave mode).

Lasers may interfere with vision either temporarily or permanently in one or both eyes. At low-power levels, lasers may produce a temporary reduction in visual performance. For high-power lasers, where outputs are greatly exceeding maximum permissible exposure limits, the effect can result in long term visual loss or permanent blindness.

The principal thermal and photochemical effects of laser exposure depend upon the following factors:

1. Absorption and scattering coefficients of the tissue or media of concern (e.g. cornea, lens, vitreous fluid, blood, retina)
2. Vascular flow
3. Irradiance (W/cm2) or radiant exposure (J/cm2) of the laser beam
4. Duration of the exposure
5. Area of exposure

Figure 1

Figure 1 shows a laser beam striking the corneal surface. What percentage of the laser beam intensity is absorbed, transmitter or scattered? This really depends on the impingent photon wavelength and the material or medium that is impacted.

The Eye and Wavelength Relationship

Figure 2 is a simple schematic of the eye. The following parts of the eye are important with regard to laser effects:

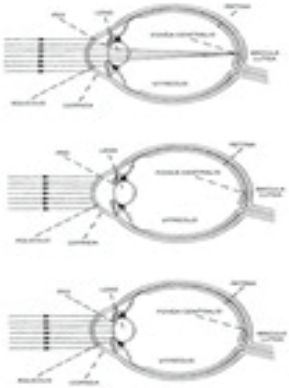

Figure 2

- The ***Cornea***, a transparent front part of the eye, and transmits most laser wavelengths except < 300nm, or > 3000nm.
- The ***Lens***, a transparent structure located behind the pupil, which focuses light on the retina, allows visible and near-infrared energy to pass through while absorbing near-ultraviolet radiation (absorbs 300-400nm, 1400-3000nm).
- The ***Retina***, the back of the inside of the eye where images are formed, has a high concentration of photoreceptor cells. Wavelengths not absorbed by the lens (400 – 1400 nm) are deposited on the retina and known as the retinal hazard region.

Laser Wavelength and the Eye's Response

- ***Ultraviolet***: Lasers operating in the ultraviolet spectrum (below 400 nm) are absorbed in the anterior segments of the eye, primarily by the cornea, as well as by the lens.
- ***Visible***: Laser radiation in the visible region of the spectrum (400-780 nm) is absorbed primarily within the retina. An ideal eye can focus a collimated visible beam by as much as 100,000 times.
- ***Near Infrared***: Laser radiation in the near-infrared region of the spectrum (700-1400 nm) is absorbed primarily within the retina. An ideal eye can focus a collimated near-infrared beam by as much as 100,000 times. This portion of the spectrum is a very dangerous area. The eye will focus the energy, but it is not visible and thus creates a very dangerous situation.
- ***Far Infrared***: Laser radiation in the far-infrared region of the spectrum (1400+ nm) primarily affects the cornea.

References: ANSI Z136.1 – 2000; American National Standard for Safe Use of Lasers