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Glove Related Contact Reactions

Gloves are important personal protective equipment to prevent contact with hazardous materials in the lab, however, sometimes gloves can cause reactions in wearers ranging from mild irritation to systemic allergic reactions. The following information details some common issues with different types of gloves and how these can be resolved to ensure both comfort and safety in the lab.

Latex gloves:

Latex comes directly from rubber trees, and as such, contains a protein from the plant that can produce allergies in some individuals. Latex gloves are also one of the most commonly used disposable gloves. Reactions after an exposure to latex gloves may range from mild irritation (which is not always a true allergy) to severe life-threatening allergic reactions for some individuals. More information about latex allergies can be found in the latex fact sheet (https://ehs.umass.edu/latex-fact-sheet). Note that latex is a sensitizer, meaning that individuals who are not allergic to latex can become allergic over time from repeated exposures. Given the incident rate of latex allergies and sensitization, latex gloves should not be used on campus to protect the health and safety of all individuals in our community.

Nitrile/neoprene/polyurethane gloves:

Nitrile rubber is a large synthetic rubber, a copolymer of acrylonitrile and butadiene, used in the production of latex-free gloves. Allergic contact dermatitis to nitrile, though somewhat rare, is usually due to an allergy to the accelerators used in the polymerization process to manufacture nitrile rubber gloves. Residual amounts of these accelerators, including thiurams, dithiocarbamates, and mercaptobenzothiazole, remain in the gloves, and can produce allergic reactions in sensitive individuals. Some individuals can also become sensitized to accelerators and develop allergies over time. In most cases, irritation that results from wearing nitrile gloves is not a true allergy. Contact uticaria is often caused by wearing gloves for extended periods of times and exposure to resulting moisture that develops from perspiration. Glove liners (see below) can help to prevent, and in most cases eliminate, this irritation.

Vinyl/plastic/PVC gloves:

Allergic reactions to vinyl gloves are very rare. Most of the time, the problem is contact urticaria, which is a simple skin irritation caused by perspiration and lack of ventilation inside the glove. Glove liners (see below) can help to prevent, and in most cases eliminate, this irritation. Leakage is another possible cause of skin reactions. Although thin vinyl gloves exhibit resistance to many chemicals when tested in the laboratory, reports indicate that when the gloves are donned (i.e., put on) and worn for about an hour, they will begin to leak. This leakage can result in chemical exposure which can produce irritation and potentially allergic reactions.

Powder-free gloves:

Power-free gloves should always be used. Powder free gloves do not contain traces of powder inside the glove. This powder, although it can make it easier to don and doff (i.e., remove) gloves, can cause contamination of materials and surfaces in the workplace and in some cases, irritation to wearers through inhalation of the powder. There have been reports of individuals with latex allergies experiencing anaphylactic shock when powdered latex gloves were used in the workplace due to inhalation of the powder, which also contained proteins from the latex. Many manufacturers have stopped producing powdered gloves due to the possible health effects.

Accelerator-free gloves:

Accelerator-free gloves are highly recommended. Many glove allergies can be attributed to chemical allergies or sensitivity caused by the chemical accelerators used in the manufacturing of some gloves, including some nitrile gloves. Accelerators are chemicals that glove manufacturers use as a catalyst to accelerate the process of polymerization. These additional chemicals, which are added in during the manufacturing of nitrile gloves, are added mainly for elasticity and durability. Three main kinds of accelerators cause contact dermatitis: carbamates, mercaptobenzothiazoles, and thiurams. When purchasing gloves, search for accelerator-free options, and contact EH&S if you need assistance in locating a source.

Glove liners:

Moisture-wicking fabric liners may reduce the risk for people who are highly sensitive and susceptible to contact urticaria and conditions such as eczema, with the liners either built into the gloves or worn as separate items under disposable gloves. Adding liners, however, makes the hand protection thicker and somewhat reduces the dexterity and tactility, which are the primary reasons for wearing thin disposable gloves. Please note that glove liners do not replace hand washing.

Double-gloving:

Double-gloving may provide more protection against chemicals by reducing permeation rate and lowering the risk of leakage, and as such, may help with reducing the risk of chemical related skin reactions.

Other General Tips for Gloves:

- Always wash your hands after glove removal with a mild soap and dry thoroughly.
- Do not use wet gloves and do not wear gloves on a wet hand.
- Change the gloves after one or two hours. Do not wear the same pair of gloves for a long time.

If you need further information regarding glove selection, please contact EH&S at (413)545-2682 or email askehs@umass.edu.

If you feel you have allergies or dermatitis, please see your doctor for further recommendations.

References:

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