

# Allergic *to the* Laboratory

**A**T THE BEGINNING OF EACH LAB CLASS, during my safety lecture, I tell students they must wear latex gloves during labs when the Material Safety Data Sheets recommend gloves. But last year a student informed me that she had an allergy to latex. In 13 years of teaching chemistry, I have encountered a variety of allergic reactions—HCl reactions with symptoms like those of a bee sting, rashes caused by NaOH, peanut allergies, and sensitivity to copper—but this was the first I had heard of a latex allergy. I did not know what it was nor was I familiar with its symptoms, so dealing with this student's condition challenged my tried-and-true safety procedures.

## LATEX LEGACY

Latex is used in the production of a wide variety of products including gloves, toys, clothing, adhesives, and condoms. Latex is made from the milky sap from the rubber tree, *Hevea brasiliensis*, and contains proteins, lipids, nucleotides, and cofactors. The sap is extracted and heated while chemical preservatives are added to enhance structural qualities (Reddy, 1998).

Allergic reactions to latex are becoming increasingly common. People who work in laboratory, health care, and food service settings are exposed to latex during work, and members of the general public have allergic reactions due to common everyday exposure. It is estimated that 8 to 17 percent of health care workers and 1 to 3 percent of the general population experience symptoms of a latex allergy. The increased use of latex gloves as a precaution to prevent HIV and viral hepatitis transmission is suspected as the cause for the increased sensitivity in medical, dental, paramedical, and emer-

*A creative setup allows students with latex allergies full participation in chemistry labs*

gency personnel. People who are repeatedly exposed to latex-containing products increase their risk of developing an allergy. Those with allergies to foods that have proteins similar to latex, such as bananas, avocados, nuts, celery, papayas, or kiwi, are also more likely to be allergic to latex than those who do not (Consumers Union, 1997; Frankland, 1999; Schwade and Walsh, 1995).

Having a history of asthma, allergic rhinitis, eczema, spina bifida, or any condition requiring frequent operations also increases a person's chances of developing a latex allergy (Frankland, 1999; Reddy, 1998; Schwade and Walsh, 1995).

The symptoms of latex allergies include hives on the hands from wearing gloves, hand dermatitis caused by wearing gloves, allergic conjunctivitis after rubbing eyes with recently degloved hands, swelling around the mouth after having a dental procedure or orally inflating a balloon, and vaginal burning after a pelvic exam or contact with a condom. Reactions can develop at the site of latex contact one to two days after exposure and rarely spread to other parts of the body. A rarer type of latex allergy causes a rash with red itchy bumps, which is sometimes surrounded by a lighter area. This type may also be associated with a runny nose, itchy red eyes, asthma, or life-threatening anaphylactic reactions. The reactions occur within a few minutes to an hour of exposure and usually go away within 24 hours. People who are allergic to latex may have either type of reaction or a combination of both.

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### SAFETY CHALLENGE

When my allergic student was around latex products such as gloves or party balloons, she grew physically uncomfortable. First, she became aware that the product was in the room because she could usually smell it from a good distance away. For a brief while the smell made her nauseated. After she was in a room with a latex item for a prolonged period of time, she began to get asthma, requiring her to use an inhaler. She never remained in the room after the onset of asthma to find out what would happen, although she believed her situation would get worse.

My first thought was that, in labs requiring gloves, the student could be a recorder, not an experimenter. Unfortunately, just being in the room with the other students wearing gloves triggered a reaction. This presented a problem.

Our first lab, however, was a simple chemical and physical change lab with sand, salt, wood shavings, and iron filings. Designed to be an easy lab to practice safety skills, the procedure did not require gloves, but did require lab aprons and goggles. I thought the student would at least be able to participate in this activity, but partway through the lab she started to sense that there was something in the room she should not be around. Although asthma did not start, her stomach became upset and her breathing became slightly more difficult than normal. She asked to step outside the room for a moment and noticed an improvement. We determined that the 35 rubberized cloth aprons hanging in the room triggered her reaction.

I learned that each exposure made her reaction worse, so I bought a garment rack with wheels on it. Lab aprons could be hung up and wheeled into a storage room when not in use. But I did not know what to do

when the aprons were rolled back in the room for lab and her 30 classmates were wearing them.

This presented a real dilemma and prompted more questions:

- Should I excuse the student from all labs? This would not be fair to the other students. Lab participation and reporting are a major part of my curriculum, so she would lose an integral part of class.
- Should I develop an alternative assignment for every lab (about 25 to 30 labs)? This would not be feasible because then the student would not have hands-on experience in chemistry.
- Should the student drop chemistry because of her allergy? No—this would be equal to admitting defeat and allow the allergy to interfere with her education. I was determined to find a solution that would allow her to study chemistry.
- Should I buy computer simulation software? This option was too expensive, and software was not available for everything we cover.

After considering the alternatives, the student and I came up with a solution: The student would “perform” labs via closed circuit television. This might sound expensive, but it was not.

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### WIRED FOR CHEMISTRY

At our school, we have an in-school television station (WBHS), so each classroom has a television on a cart with in-school cable. Fortunately, the allergic student was a member of WBHS, so we used her expertise. Initially we planned to videotape a group performing the lab so she could watch it at home. This was not a perfect substitute for the lab experience, but it had the advantage of being workable and inexpensive. Then the student talked to the station's advisor and the audio visual clerk about the possibility of setting up a video camera in my classroom, hooking it up to my television, rolling the television into the hallway, and watching the lab live.

A live broadcast would allow interaction on her part; she could ask questions and discuss the lab as it happened while it was fresh in her lab partners' minds. The student purchased an RCA interconnecting cable and learned how to hook everything up. One problem remained: how could the student talk to her lab partners without being in the room? We considered using a headset like the camera operators use in WBHS, but these are specially designed for the studio camera and therefore expensive. Instead, I found an inexpensive pair of headset walkie-talkies in the toy section of a department store; they worked well over the short distance between the laboratory and the hallway and allowed the student and her lab partners to converse in normal voices.

This setup required some adjustments. The group performing the lab had to be certain to explain what they were doing and be sure that the student could see and follow along. Because they had to talk a lot, she became the recorder, which ensured that she was actively involved in the lab.

Dealing with latex allergies does not always require such elaborate measures. This past year another student informed me that she was latex sensitive. She has not yet had an allergy test, but she has developed allergic-like reactions to milk and nut products. Her reaction to latex results from direct contact with the substance, so she participates in labs, wearing a suede apron and neoprene gloves. She selected a lab partner who is sensitive to her situation. Recently, she has noticed some of the same symptoms last year's student experienced.

### REACTING TO REACTIONS

When dealing with all allergies, teachers should report any severe reactions, such as shortness of breath and swelling of the tongue or throat, to a health care provider. People who experience itching, dryness, or rashes when using latex products should also contact a health care provider to determine if they have latex sensitivity. Students who are latex sensitive need to notify science teachers of their condition at the beginning of the semester, and teachers should include a discussion of latex sensitivity and allergies during safety lectures and ask if any students are allergic to latex. These students can use vinyl or neoprene gloves, but they should be aware that "hypoallergenic" gloves are still made of latex. Items that contain natural rubber will have the same effects as latex items. Therefore, vinyl or suede aprons should be worn. Other items that can trigger allergic reactions are clothing with latex elastic and carpets that have latex backing (Consumers Union, 1997).

### LEARNING EXPERIENCE

Instead of letting my students' conditions interfere with their education, we turned the situation into a learning experience. Through creative problem solving both of my students were able to participate in lab, I learned about latex allergies, and the students' classmates developed sensitivity toward and understanding of a disability. The effort we exerted to make the students active members of the lab stressed how important it is for all students to participate in labs and experience hands-on learning in science. ✧

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### AUTHOR'S NOTE

Another helpful source of information is the Food Allergy Network [www.foodallergy.org](http://www.foodallergy.org). This organization shares product information and suggestions on how to deal with food allergies.

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