

## Pregnancy and Reproductive Hazards in the Laboratory

Occasionally the Chemical Control Centre (CCC) is asked if it is safe for pregnant people to participate in laboratory courses that make use of chemicals, biological materials and particularly reproductive toxins. Another particularly common question is if pregnant students should participate in dissection activities using specimens preserved in formaldehyde. The challenges for pregnant students often come unannounced and need to be dealt with quickly. The intention of this bulletin is to provide some information on this topic and to specify guidelines to be followed by pregnant students.

### Reproductive Hazards

Pregnancy introduces an entirely new set of variables to consider when dealing with potential hazards in campus laboratories. There are many studies indicating that work during pregnancy in a chemical laboratory can represent a hazard to the fetus. Some chemicals that generate no adverse effects in adults can be highly teratogenic (harm to fetus or cause abnormalities in embryo or fetus)<sup>1,2</sup>. Campus laboratories in general contain several hazardous materials, some of which may harm the reproductive system or pose a hazard to a developing fetus if exposure is not effectively control. This is especially true for the first trimester of pregnancy, but later trimesters of pregnancy are susceptible as well.

The current state of knowledge of the effects of chemicals on pregnancies is such that we cannot clearly state that any given chemical is completely safe. Although protective equipment and lab procedures are designed to minimize contact with all chemicals in the lab, some exposure is possible. It is not known what level of exposure to many chemicals might affect your unborn child. You should assume that all chemicals represent a real threat to your unborn child.

*"...the WHMIS criteria for Teratogenicity and Embryotoxicity specify that injury to the embryo or fetus must be observed at a concentration that has no effect on the pregnant female. This is also the reason for the familiar medical advice that pregnant people should avoid all unnecessary chemical exposures."*<sup>3</sup>

### Pregnancy and the Lab

If this subject applies to you, we strongly suggest that you seek counsel from your personal physician. Although we cannot prevent any individual from taking laboratory courses, we recommend that people who are pregnant should drop the course and take it later. This situation should be one in which your Dean (?) would allow dropping the course and offer alternative means of studying or advise to alter your course load and academic program. The University treats each situation on a case-by-case basis, but

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<sup>1</sup> Schardein J. Industrial solvents. In: Schardein J. *Chemically induced birth defects*. New York, NY: Marcel Dekker; 1985. p. 645-58

<sup>2</sup> Windham GC, Shusterman D, Swan SH, Fenster L, Eskenazi B. Exposure to organic solvents and adverse pregnancy outcome. *Am J Ind Med* 1991; 20:241-59.

<sup>3</sup> <http://www.oshanswers.ca/headlines/text77.html>

typically does not pressure the students to stay in the lab. It is a student's choice which should be made upon consultation with your personal physician.

If you are pregnant, suspect you are pregnant or become pregnant during the semester and considering your decision about your participation in a laboratory begin with the following:

- Inform your Laboratory Coordinator of your pregnancy as soon as possible. The Laboratory Safety Coordinator should conduct a risk assessment of potential hazards by reviewing the list of chemicals used in the experiments.
- Review the SDSs for any hazardous material used in the experiments in particular for potential reproductive hazard that may be present.
- Contact your personal doctor or health care provider to seek advice in relation to specific laboratory hazards such as the use of a particular chemical. A list of chemicals will be furnished to you physician upon request. Your laboratory instructor cannot give you medical advice but should be informed of concerns and potential problems.

#### **Standard Exposure-Control Practices<sup>4</sup>**

People who are pregnant or planning pregnancy and wish to continue laboratory activities should strictly employ the following standard exposure-control practices each time they are working in a campus laboratory.

- Observe basic hygiene in the laboratory to prevent accidental chemical ingestion or contamination. Never eat, drink, apply cosmetics, or make other hand-to-mouth contact in the laboratory. Always wash your hands with soap and water after handling chemicals and when leaving the laboratory.
- Always work with volatile chemicals at least six inches inside a properly operating chemical fume hood with the sash placed between you and the material.
- Wear appropriate personal protective equipment including a laboratory coat, closed-toe shoes, disposable impermeable gloves (wear 2 pairs of gloves if needed), and safety glasses (or goggles when using liquids). The specific protective equipment worn should be tailored to the task that is being performed. For example, face shields, rubber aprons, and heavy-duty gloves should be used for strong corrosives. For assistance in selecting the proper personal protective equipment, refer to the appropriate Material Safety Data Sheet.
- Avoid bringing contaminated clothing or other objects home.
- Take a fresh look at the safety precautions describe in your Laboratory Manual.
- Discuss any concerns you may have about potentially hazardous laboratory operations or conditions with your Lab Coordinator. If your concerns are not adequately addressed, contact the Laboratory Safety Coordinator at the CCC.

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<sup>4</sup> <http://www.ehs.berkeley.edu/pubs/factsheets/45reprodhaz.html>

## Special Precautions

- Review all SDSs to become familiar with any reproductive hazards that may be present in your experiments.
- Consult your doctor to determine what, if any, work restrictions are required. In some cases, certain chemicals may need to be substituted for other reagents-or- certain activities curtailed - for the duration of the pregnancy. Any restrictions placed by the physician should be discussed with the Laboratory Coordinator immediately.
- There are several campus resources available to assist your physician in making these evaluations, including occupational physicians at University Health Services.
- Specialized regulations apply to pregnant people exposure to radiation. If you work with radiation-producing machines or radioactive materials, contact Radiation Officer at the CCC ext 3523 for information.
- Remember, it is **always** important to adhere to proper laboratory safety practices to prevent unsafe chemical exposures. Many toxic and radioactive materials can be used safely before and during pregnancy if handled properly. For people of childbearing age, it is particularly important because fetal damage from chemical exposure may occur prior to a person realizing they is pregnant.
- If you would like assistance in verifying safe chemical handling practices in your laboratory, contact Laboratory Safety Coordinator at the CCC ext. 3523.

## Chemical Teratogens and Embryotoxins

Certain chemicals are known or suspected to harm fetuses or reproductive health of adults. Some examples of reproductive toxins are:<sup>5</sup>

- anesthetic gases,
- arsenic and certain arsenic compounds,
- benzene
- cadmium and certain cadmium compounds,
- carbon disulfide,
- ethylene glycol monomethyl and ethyl ethers,
- ethylene oxide,
- lead compounds,
- mercury compounds,
- toluene
- vinyl chloride,
- xylene, and
- formamide

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<sup>5</sup> <http://ehs.uky.edu/ohs/pregnant.html>

## **Pregnant students and dissection lab**

Looking strictly at reproductive effects, research evidence suggests that formaldehyde exposure in the ranges permitted under Occupational Health and Safety Act in Ontario (1986) regulations, and certainly at the levels encountered when dissecting specimens, would not be expected to cause adverse reproductive or developmental effects. Formaldehyde has been suspected to be a human carcinogen since the discovery, many years ago. Large quantities of formaldehyde breathed over a long period of time by rats can cause nasopharyngeal carcinomas. *Many animal studies have not found a connection between formaldehyde exposure and reproductive harm.*<sup>6</sup> The students should familiarize themselves with the risks, do a literature search, consult with their physician and make an informed decision.

## **Conclusions**

A pregnant person should be aware of the risks if they wishes to participate in the laboratory during pregnancy or breastfeeding. Further, the student should think seriously about whether they wants to expose themself unnecessary to any chemical, regardless of its apparent safety. It is a student's choice which is to be made after consultation with a personal physician. The University will accommodate the pregnant student's decision.

## **Resources**

Pregnant people and people intending to become pregnant should seek advice from knowledgeable sources before working with substances that are suspected to be reproductive toxins. These sources include but are not limited to the respective Laboratory Coordinator, Laboratory Safety Coordinator, Safety Data Sheets, and the University Health Unit and Safety office.

For more information see also sources such as:

- *Motherisk*<sup>7</sup> is a program, run by the Hospital for Sick Children in Toronto since 1985, which provide information and guidance for pregnant and lactating people, concerning "...the potential risks to the developing fetus or infant, from exposure to drugs, chemicals, diseases, radiation and environmental agents"<sup>7</sup>. Their web site was built in collaboration with the Society of Obstetricians and Gynaecologists of Canada. To contact Motherisk by telephone, call (416) 813-6780.
- For more information about pregnancy and chemical safety contact the CCOHS Inquiries Service for answers to your health and safety questions: <http://ccinfoweb.ccohs.ca/>
- There are several campus resources available for students at the University:  
(List needed)

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<http://www.carolina.com/category/teacher+resources/lab+safety+and+chemical+safety+information/general+safety+information/pregnancy+and+dissection+of+carolina+perfect+solution+specimens.do>

<sup>7</sup> <http://www.motherisk.org/welcome/index.htm>