

GUIDELINES FOR SAFETY & USE

HUMAN GROSS ANATOMY LABORATORIES

DEPARTMENT OF RADIOLOGY- DIVISION OF HUMAN ANATOMY
MICHIGAN STATE UNIVERSITY COLLEGES OF HUMAN AND OSTEOPATHIC MEDICINE

HAZARDOUS CHEMICAL EXPOSURE

INTRODUCTION

In 1986, the State of Michigan enacted Right to Know Laws. Simply stated, employees have the right to know what hazardous chemicals they will be exposed to in the work place through programs of labeling, awareness training and written communication. The Department of Radiology extends this process to the learning environment of the Human Gross Anatomy Laboratory at Michigan State University. These guidelines were prepared to inform you of the hazardous chemicals you will be exposed to in the Human Gross Anatomy Laboratory, and to alert you to conditions that require specific attention.

EXPOSURE

Exposure is defined as personal contact with the hazardous materials at levels generally regarded as safe, and in a manner consistent with usual gross anatomical laboratory use. Exposure includes inhalation of the ambient laboratory air, eye and skin contact, and accidental ingestion.

HAZARDOUS CHEMICALS

The hazardous chemicals which you are exposed to in the Human Gross Anatomy Laboratory are the components of the embalming fluid and the wetting solution. A list of these components follows along with a brief description of their health hazard. As required by the law, copies of the Material Safety Data Sheets (MSDS) are available for review in the "MSDS" binders located in the Human Gross Anatomy Laboratories.

- **Embalming Fluid** - The components of the embalming fluid are formaldehyde, glutaraldehyde, glycerin, phenol, alcohol and water.

Health Hazard:

Following prolonged contact and depending on the route of entry into the body, all of the embalming fluid components may cause toxicity, respiratory distress, eye irritation/damage, and skin irritation.

- **Wetting Solution (Rehydrating Fluid)** - The components of this solution are methanol, propylene glycol, surfactants.

Health Hazards:

Following prolonged contact and depending on the route of entry into the body, all of the Rehydrating Fluid components may cause toxicity, respiratory distress, eye irritation/damage, skin irritation.

Components of major concern are:

Formaldehyde - a suspected carcinogen and respiratory irritant (see the Formaldehyde MSDS).

Phenol - used for fungicidal purposes; a respiratory toxin and skin irritant (see the Phenol MSDS).

MONITORING OF AMBIENT AIR FOR HAZARDOUS CHEMICALS

The Environmental Health & Safety (EHS) Department monitors the ambient air in the laboratory for formaldehyde levels. EHS-accepted air quality levels are stricter than industry standards that would be considered unsafe. The monitoring reports are posted in the laboratory annually.

HIGH RISK AREAS FOR HAZARDOUS CHEMICALS

The air in the specimen coolers and other areas/spaces in the laboratories hold high concentration of the hazardous chemicals found in the Embalming and Rehydration Fluids. Hence, these areas/spaces are not to be entered without approval of laboratory staff or faculty member. When authorized to enter these spaces please keep visits brief.

Note: Avoid generating aerosols in your work environment; minimize use of spray bottles.

Presence of a Developmental Toxicity (Teratogenic) Hazard Within the Standard Dissecting Laboratory: Truth or Fiction.

NEWMAN, Lois M., and Nick PINIZZOTTO

Departments of Pathology, Anatomy & Cell Biology and Environmental Health and Safety
Thomas Jefferson University, Philadelphia, PA

There is an ongoing concern with regard to the magnitude of risk for developmental toxicity (DT) from the inhalation/absorption formaldehyde exposures received within the medical school gross anatomy dissection laboratory, often leading to unnecessary anxieties and fears. While a large amount of data has been compiled and circulated addressing carcinogenicity and allergenic sensitization potential, information related to formaldehyde-induced DT potential has not been widely disseminated.

Key questions are:

- 1) What is known about DT, in general, and specifically, in relationship to formaldehyde exposures?
- 2) Are our current safety guidelines sufficient to protect an unborn conceptus?

What is known is:

- (a) That 95% of all chemicals produce DT only at exposures that are near or equal to those producing some signs of maternal toxicity (adult/developmental toxicity ratio = 1). Thus, since regulatory guidelines are set to protect the adult, the conceptus is protected by default for most chemicals.
- (b) Formaldehyde is an epigenetic toxin, not a systemic toxin; therefore, toxic actions are limited to the site of local contact.
- (c) All animal and human evidence clearly indicate that the embryo is not at special risk as formaldehyde has an A/D ratio ≤ 1 .

While the current federal (NIOSH & OSHA) permissible exposure level (PEL) is 0.75ppm time weighted-average (TWA) for an 8-hr exposure in a 40-hour work-week, we find typical exposures (from air sampling) within our teaching laboratories during session at TJU to be well below 25% of the current PEL, or 0.170ppm over a 5.7 hr period (adjusted to 0.120ppm TWA for an 8-hr day).

Conclusion: Formaldehyde exposures within the standard dissection laboratories, with proper ventilation and clothing, do not present an unusual risk of DT for the unborn conceptus.

This information was presented at the second joint meeting of the American and British Associations of Clinical Anatomists held at the Mayo Clinic, Rochester, MN on July 18–22, 1995.

LAB ATTIRE and PERSONAL PROTECTIVE EQUIPMENT

Professional lab attire and Personal Protective Equipment (PPE) are required for all individuals who enter the anatomy laboratory. At a minimum, the following professional lab attire is expected for all users of the Human Gross Anatomy Laboratories:

- Shirt that covers the shoulders;
- Pants or a skirt covering the legs to the knees when seated;
- Closed-toe shoes.

In addition to the above professional lab attire, for those individuals handling anatomical material or in contact with the solutions used in the care of anatomical material the following PPE is required:

- Lab coat or disposable gown over street clothes, or surgical scrubs;
- Safety glasses certified to ANSI Z87 (**NOTE:** Prescription eyeglasses are not considered safety glasses unless they have both side shields and shatter resistant lenses);
 - Students enrolled in an a course or program of study that requires the handling of anatomical material need to supply their own acceptable protective eyewear (safety glasses are available at MSU Stores or can be obtained from an online vendor);
 - Approved visitors (including faculty) to the Human Gross Anatomy Laboratories will be provided with protective eyewear;
- Disposable nitrile* gloves (**NOTE:** As some individuals are allergic to latex, latex gloves are NOT allowed in the lab).

Individuals who enter the lab without the appropriate PPE, including protective eyewear, will be asked to leave and may return only when they have the necessary PPE.

MINIMIZING YOUR EXPOSURE IN THE LABORATORY

As noted above, the exposure levels to hazardous materials in the Human Gross Anatomy Laboratories are generally regarded as safe. However, pre-existing or newly acquired conditions may alter an individual's margin of safety. Below are listed some conditions an individual may have to devote special attention to if handling anatomical material or working with anatomical specimens.

SKIN

An individual present in the anatomy laboratory that has or develops skin sensitivity should use gloves and a long sleeved garment at all times. Individuals exhibiting contact sensitivity should consult a dermatologic physician regarding type of gloves, garment and other precautions. Minor cuts and abrasions from cutting instruments or bone edges should be washed thoroughly with disinfectant soap and water. Contact a member of the laboratory staff or faculty for antiseptic and dressing materials. Any serious wound should be treated by a physician immediately. Individuals with long hair are advised to tie hair behind the head.

EYES

Accidental fluid splashes to the eyes are an infrequent occurrence, but the potential risk exists. Should any splashes occur the eyes should be flushed immediately using the eye wash stations located in the laboratory and a physician should be consulted. The Environmental Health & Safety Department (EHS) recommends that contact lenses not be worn in the laboratory. If an individual's vision cannot be corrected by means other than contact lenses, EHS, an ophthalmologist and/or optometrists should be consulted for recommendations for additional eye protection. Questions concerning the effects of any of the above noted chemicals on eye tissues should be directed to your ophthalmologist and/or optometrist.

RESPIRATORY

Individuals may have or develop sensitivity to any of the chemicals used in the laboratory, most notably formaldehyde or phenol (if present). If a respiratory protective device (respirator) is necessary due to a chemical sensitivity, the individual will be referred to EHS for a respiratory evaluation and may be fitted and trained in its proper care and use by the EHS. A simple particulate filter mask (such as those commonly found at hardware stores) **does not** provide protection for formaldehyde or phenol sensitivity.

PREGNANCY

Women who are or who learn they are pregnant or who are nursing newborn infants while using the Human Gross Anatomy Laboratory should consult their obstetrician or pediatrician immediately regarding recommended precautions.

SPECIMEN RESPECT, CARE & USE POLICY

The donors to the Department of Radiology's Willed Body Program have made a unique and unselfish gift for your education. The anatomical specimens must be treated with respect and dignity at all times. In short, students and faculty are expected to display PROFESSIONAL AND ETHICAL BEHAVIOR towards donors. This is expected at all times during your course or your program of study, and the list includes:

1. Respect for donors in the lab and outside of lab (no disrespectful language about donors or body parts).
2. Personal devices that are allowed in the Human Gross Anatomy Laboratories are to be used strictly for educational purposes (no computer games, texting, phone calls, emailing, etc.).
3. **ABSOLUTELY NO PHOTOGRAPHY/VIDEO** of donors or specimens (including bones, skulls and skeletons).
4. All anatomical specimens, including anatomical models, should be treated professionally at all times.
5. Anatomical specimens, tissues, and skeletal material are not to be taken from the laboratory.
6. Ensure that all donors and bucket specimens are wetted down and covered when not in use.
7. **NO VISITORS ALLOWED IN LAB:** Only students or faculty enrolled in or participating in a MSU course or approved program of study which requires a gross anatomical laboratory experience are authorized to enter the Human Gross Anatomy Laboratory. The no visitor rule is designed to prevent exposure of visitors to hazardous materials, as well as ensure donor respect and positive community relations. Pets are not permitted in the laboratory at any time.
8. Any student believing a deceased relative or acquaintance may be a donor to our Willed Body Program should contact the Director of Anatomical Resources, Ms. Jacque Liles at lilesj@msu.edu or (517) 353-5398 immediately. If this suspicion is confirmed, the specimen will be withdrawn from use.
9. The anatomical specimens are identified only by number on an orange plastic wrist band. **THE ORANGE WRIST BAND MUST NOT BE REMOVED UNDER ANY CIRCUMSTANCES.**
10. Instruments dropped on the floor must be washed immediately with soap and water. Plastic tray covers which fall to the floor must be placed in a sink and a lab technician or faculty member notified for a replacement. Anatomical tissue is susceptible to mold growth, and if the above sanitary procedures are not followed, bodies and other tissues overwhelmed with mold may be withdrawn as a resource. Students and visiting faculty are required to bring to the attention of the lab technician or anatomy faculty member, any unusual or suspicious conditions on a specimen that may be mold.
11. Paper toweling and used gloves are to be disposed of in the appropriate trash containers. Keep the lab and classroom clean. Check the floor, tables and donors for trash and dispose of it in the appropriate trash containers.
12. Food and beverages are NOT permitted in the Human Gross Anatomy Laboratory, adjacent rooms, and classroom. These areas are also designated as no smoking areas.

If images and/or videos of the anatomical donors have been made available to you as a faculty member or student enrolled in a course in the Human Gross Anatomy Laboratories, the following additional policies apply:

13. All anatomical media and images must be viewed within the designated locations. These include all gross anatomy lab spaces, Secchia Center, MUC & DMC common areas, Fee Hall, Radiology and the Clinical Center in East Lansing.
14. Anatomical media and images are to be viewed either alone or in the exclusive company of course faculty or students enrolled in the course.
15. Anatomical media and images are not to be copied, downloaded or in any way reproduced or disseminated.

Please direct any questions or concerns regarding this policy to the Director of Anatomical Resources (see info below):

Director, Anatomical Resources

Ms. Jacque Liles
E206 Fee Hall
lilesj@msu.edu
517-353-5398.

SIGN THE

**HUMAN GROSS ANATOMY LABORATORIES
USER AGREEMENT**

*on the NEXT PAGE AND RETURN THE SIGNED AGREEMENT TO THE ANATOMY FACULTY OR
COURSE DIRECTOR*

USER AGREEMENT

HUMAN GROSS ANATOMY LABORATORIES

DEPARTMENT OF RADIOLOGY- DIVISION OF HUMAN ANATOMY
MICHIGAN STATE UNIVERSITY COLLEGES OF HUMAN AND OSTEOPATHIC MEDICINE

Each individual using the Human Gross Anatomy Laboratories assumes the following responsibilities:

1. To adhere to all policies and procedures relating to the respectful and dignified treatment of human remains, including those donors recorded in media and images.
2. To familiarize themselves with all rules and regulations concerning laboratory safety and use; noting especially the information provided regarding hazardous materials used for embalming. Should any hazardous condition come to his/her attention, these should be communicated immediately to Anatomy faculty or the laboratory staff members.
3. To comply fully with all established rules and regulations and updates, and to consult with faculty and/or laboratory personnel for advice in circumstances where safe practice is in doubt.
4. To limit laboratory use to study only in approved courses and programs of study.
5. To refrain from bringing visitors to the laboratory and thus exposing them to the hazardous materials.

I have read and understand my responsibilities as a user of the Human Gross Anatomy Laboratory, Prosection Laboratory, adjacent rooms/Labs, and walk-in refrigerators. I agree to observe the rules/policies as outlined above and as posted from time to time during my use of those Labs/rooms. I understand that any violation of these rules/policies is considered both a breach of this agreement and unprofessional behavior and for students may result in disciplinary action by the appropriate college or university personnel as outlined in the Michigan State University Medical Student Rights and Responsibilities Policy, by the Graduate School, or by the College of Education up to and including dismissal. I further recognize that I will be studying in an environment containing the mentioned hazardous materials. The risks have been explained to my satisfaction, and I have had an opportunity to ask questions about them; hence, I am aware of and consent to the potential risks associated with exposure to these materials. Here "exposure" means personal contact with hazardous materials at levels that are generally regarded as safe.

Signature

Date

Print Full Name