Cytotoxins and Antineoplastic Drugs

Standard Operating Procedure

Revision Date: 03/04/19

Laboratory Director (LD) Approval is Required Prior to Performing this Procedure

This standard operating procedure (SOP) outlines the handling and use of cytotoxic chemicals and antineoplastic drugs. Review this document and supply the information required in order to make it specific to your facility. In accordance with this document, laboratories should use appropriate controls, protective equipment, and disposal techniques when handling cytotoxic chemicals and antineoplastic drugs.

# Description [Provide additional information as it pertains to your research protocol]

Cytotoxins and antineoplastic drugs inhibit the function of cells and are primarily used to treat cancer through chemotherapy. Antineoplastic drugs are substances used as a cancer chemotherapeutic agent, which affect the reproductive capabilities including chromosomal damage (mutagens), effects on the fetus (teratogens), and are carcinogenic in animal models.

Although little research has been done on the long-term risk of occupational exposure to cytotoxic drugs, these drugs have been associated with human cancers at high (therapeutic) levels of exposure.

## Process [Write the steps for using the chemical in your research protocol]

# Potential Hazards [Provide additional information as it pertains to your research protocol]

Cytotoxic drugs have been shown to be carcinogens, mutagens and teratogens in many animal species. There is evidence that hazardous drugs may cause spontaneous abortions and increase the risk of congenital malformations. In addition, some of these drugs have been shown to cause acute effects in humans, such as localized skin necrosis (death of tissue), damage to normal skin after surface contact, dizziness, lightheadedness.

Most hazardous drugs either bind directly to genetic material in the cell nucleus or affect cellular protein synthesis. Cytotoxic drugs may not distinguish between normal and cancerous cells. The growth and reproduction of the normal cells are often affected during treatment of cancerous cells.

# Engineering Controls [Provide additional information as it pertains to your research protocol]

All hazardous drug work will be conducted in a chemical fume hood or Class II Biological Safety Cabinet.

# Work Practice Controls [Provide additional information as it pertains to your research protocol]

Decontamination should consist of surface cleaning with water and detergent followed by thorough rinsing. The use of detergent is recommended because there is no single accepted method of chemical deactivation for all agents involved. A plastic backed absorbent pad should be placed under the work area during the process. This should be changed at the end of each process or when a spill occurs.

All locations within the laboratory where cytotoxic or antineoplastic chemicals are handled should be demarcated with **designated area** caution tape and/or posted with designated area caution signs. This includes all fume hoods and bench tops where the antineoplastic drugs are handled.

# Personal Protective Equipment [Provide additional information as it pertains to your research protocol]

Use doubled gloves with nitrile or neoprene gloves. Gloves should be changed frequently. Laboratory coat and safety glasses are required for preparation of material.

# Transportation and Storage [Provide additional information as it pertains to your research protocol]

Please review the SDS and determine appropriate transportation and storage requirements for the specific chemicals you are working with.

# Waste Disposal [Provide additional information as it pertains to your research protocol]

All hazardous drug contaminated waste should be placed in a 5-gallon white pail. The container must be closed except when actively adding waste. The container must be located in the area where hazardous drugs are being used. All items contaminated by hazardous drugs, including gloves, syringes, vials, needles, and solution containers should be disposed according to Environment, Health & Safety (EHS) guidelines. Contact EHS Hazardous Material Management (HMM) at (743) 763-4568 for waste pick-up. Also, refer to the EHS [Hazardous Waste](http://ehs.umich.edu/haz-waste/) Web page for more information.

* **Sharps** – place needles, syringes with needles attached and other breakable items into appropriately labeled sharps containers.
* **Empty stock vials, reagent bottles, etc**. – triple rinse with copious amounts of water. Deface label with black magic marker or scraper. Place in a cardboard box for disposal. Label the box as uncontaminated glass.

# Exposures/Unintended Contact [Provide additional information as it pertains to your research protocol]

If the employee is in need of emergency medical attention, call 911 immediately.

For a chemical exposure/injury:

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| --- | --- | --- |
| injury type | action | notes |
| Exposure-Eyes | 1. Flush exposed eyes with water for at least 15 minutes. 2. Seek medical attention. |  |
| Exposure-Skin | 1. Flush exposed skin with water for at least 15 minutes. 2. Seek medical attention |  |
| Inhalation (including spills of powder outside of a chemical fume hood) | 1. Seek medical attention. | symptoms may be delayed up to 24 hours. |
| Ingestion | **Otain urgent medical attention.** |  |
| **NOTE**: If an ambulance is needed, call the University of Michigan Division of Public Safety and Security (DPSS) at 911 to request assistance. | | |

Contact EHS for advice on symptoms of chemical exposure, or assistance in performing an exposure assessment.

Report all work related accidents, injuries, illnesses or exposures to Work Connections within 24 hours by completing and submitting the [Illness and Injury Report Form](http://www.workconnections.umich.edu/employees/work-related-illness-injury/step-one/). Follow the directions on the Work Connections website [Where to go for treatment](http://www.workconnections.umich.edu/treatment.html) to obtain proper medical treatment and follow-up.

Complete the [Incident and Near-Miss Report](https://ehsa.oseh.umich.edu/EHSA/public/injuryillnesssubmit/injuryillnessinitialedit) form.

## Treatment Facilities

**U-M Occupational Health Services -- Campus Employees**Mon-Fri 7:30 am - 4:30 pm  
After hours - go to U-M Hospital Emergency Dept. -- Urgent Care Clinic  
380 Med Inn building  
1500 East Medical Center Drive, Ann Arbor (734) 764-8021

**University Health Services -- University students (non-life threatening conditions)**  
Mon-Fri 8 am - 4:30 pm, Sat 9 am - 12 pm  
Contact for current hours, as they may vary  
207 Fletcher Street, Ann Arbor (734) 764 - 8320

**UMHS Emergency Department -- after clinic hours or on weekends**  
1500 East Medical Center Drive, Ann Arbor (734) 936-6666

# Spill Procedure [Provide additional information as it pertains to your research protocol]

A **minor (small) chemical spill** is one that the laboratory staff is capable of handling safely without the assistance of safety and emergency personnel, i.e., less than 1 gallon or 3.5 liters. A **major (large) chemical spill** requires active assistance from emergency personnel.

**Minor Chemical Spill**

* Alert people in immediate area of spill.
* If spilled material is flammable, turn off ignition and heat sources. Don’t light Bunsen burners or turn on other switches.
* Open outside windows, if possible.
* Wear protective equipment, including safety goggles, gloves and long-sleeve lab coat.
* Avoid breathing vapors from spill.
* Confine spill to as small an area as possible.
* **Do not wash spill down the drain**.
* Use appropriate spill kits/sorbents to neutralize corrosives and/or absorb spill. Collect contaminated materials and residues and place in container. For powdered chemicals sweep carefully to avoid generation of dust or, if appropriate, use moist sorbent pads or wet the powder with a suitable solvent and then wipe with a dry cloth. Label and manifest waste and contact OSEH-HMM (734) 763-4568 for proper disposal.
* Clean spill area with water.

**Major Chemical Spill**

* Attend to injured or contaminated persons and remove them from exposure.
* Alert people in the laboratory to evacuate.
* If spilled material is flammable, turn off ignition and heat sources. Don’t light Bunsen burners or turn on other switches.
* **Call University of Michigan Division of Public Safety and Security (DPSS) at 911 immediately for assistance.**
* Close doors to affected area.
* Post warnings to keep people from entering the area.
* Have person available that has knowledge of incident and laboratory to assist emergency personnel.

For additional information regarding spill response procedures, refer to the EHS [Hazardous Waste Spill Response](http://ehs.umich.edu/hazardous-waste/spill-response/) Web page.

# Emergency Reporting

Report all emergencies, suspicious activity, injuries, spills, and fires to the University of Michigan Police (DPSS) by calling 911 or texting 377911. Register with the [University of Michigan Emergency Alert System](http://dpss.umich.edu/emergency-management/alert/) via Wolverine Access.

# Training of Personnel

All personnel are required to complete the ***General Laboratory Safety Training*** session (**BLS025w** *or equivalent*) via [the [EHS My LINC](http://ehs.umich.edu/education/) Web page](http://oseh.umich.edu/education/). Furthermore, all personnel shall read and fully adhere to this SOP when handling cytotoxins and antineoplastic drugs.

# Certification

I have read and understand the above SOP. I have received approval from my Lab Director to perform this procedure. I agree to contact my Lab Director if I plan to modify this procedure.

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| Laboratory Director | Revision Date |

### Major Revisions (Tracking purposes only -- Do not print as part of SOP)

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| --- | --- |
| Date | Revision |
| 09-14-18 | EHS name and logo were added, updated the formatting, and revised the content under Exposure/Unintended Content (AKJ). |
| 03-04-18 | Reviewed and updated. |
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