

UNIVERSITY OF VICTORIA
Occupational Health, Safety and Environment

Chemical Safety – Special Hazards

Safe Work Procedure (SWP – 011)

Cytotoxic Drugs

Last revised: 25-May-2023

REVISION HISTORY

| | <i>Revision Date</i> | <i>Author</i> | <i>Position</i> |
|----|----------------------|---------------------|-----------------|
| 1. | 25-May-2023 | Paraskevi Lagaditis | OHSE consultant |

DOCUMENT APPROVAL

Approved by: Laboratory Safety Committee

Jody Spence
Chair, Laboratory Safety Committee

25-May-2023
Date Approved

**This revision replaces all previous versions of this document. If a copy is printed, it is the users' responsibility to verify the copy is the most current version of the document.*



PURPOSE

To provide guidance and instruction of the safe use in laboratories of cytotoxic drugs. In addition to this general Safe Work Procedure (SWP), each lab must develop both an exposure control plan (ECP) and a lab-specific SWP unique to the experiments and activities being performed. The Lab ECP and SWP must be reviewed by OHSE (see Procedures, #7)

SCOPE

The SWP applies toward the storage, handling and disposal of cytotoxic drugs.

TRAINING

The following training is required to be completed prior to being permitted to perform these procedures:

- [WHMIS](#)
- [Lab Safety for Lab Workers](#)
- [Cytotoxic Drug Awareness](#)
- Lab SWP with documented signoff by the individual and their supervisor.

Refresher training in the General & Lab SWP and Lab ECP must be provided when:

- There has been an extended time frame of inactivity, or
- There has been an incident or injury, or
- 1 year has elapsed since the original training.

REGULATION AND POLICY

The University of Victoria will follow WorkSafeBC Occupational Health and Safety Regulation Part [6.42 – 6.58](#) and the University of Victoria Occupational Health, Safety & Environment Department.

RESPONSIBILITY

It is the responsibility of personnel undertaking activities with special hazards to complete all required training and adhere to these safe work procedures, including any additional lab or job-specific procedures.

It is the PI's or supervisor's responsibility to:

- Ensure that individuals working with special hazards have been trained prior to commencing work and have demonstrated competency in safely performing all duties associated with the special hazard in accordance with these procedures. Training records are to be maintained for 3 years from the date of training.
- Maintain records of all workers who prepare or administer cytotoxic drugs, including the names of the drugs handled, and when practicable, the number of preparations administered per week. These records must be maintained for the duration of employment plus 10 years.
- Develop and implement an ECP if a worker has the potential to be occupationally exposed to a cytotoxic drug.

DEFINITIONS

BSC – biosafety cabinet

PPE – personal protective equipment

ECP – exposure control plan

MATERIALS

Administration sets used with cytotoxic drugs include syringes, IV set, or other common devices used for delivery of cytotoxic drug via injection. Only use luer-lock connections in the preparation and administration of cytotoxic drugs.

HAZARD

Cytotoxic drugs are defined as agents that possesses a specific destructive action on certain cells or hazardous to cells in any way. Cytotoxic drugs includes most anti-cancer drugs and are also referred to as antineoplastics and chemotherapy. Cytotoxic drugs may pose a risk to researchers through acute or chronic exposure.

Cytotoxic drugs may be:

- Genotoxic, damage to DNA
- Oncogenic, cause development of a tumor
- Mutagenic, cause a change in the DNA of a cell
- Teratogenic, cause fetal abnormalities

Some common drugs that meet criteria as cytotoxic drugs are listed [below](#). This is not an exhaustive list, contact OHSE to assess if a chemical may be a cytotoxic drug.

| | | | |
|-------------------|---------------------|----------------------|----------------|
| Altretamine | Dacarbazine | Idarubicin | Nafarelin |
| Aminoglutethimid | Dactinomycin | Ifosfamide | Paclitaxel |
| Azathioprine | Daunorubicin | Interferon-A | Pipobroman |
| L-Asparaginase | Diethyl-stilbestrol | Isotretinoin | Plicamycin |
| Bleomycin | Docetaxel | Leuprolide | Procarbazine |
| Busulfan | Doxorubicin | Levamisole | Ribavirin |
| Carboplatin | Estradiol | Lomustine | Streptozocin |
| Carmustine | Estramustine | Mechlorethamine | Tamoxifen |
| Chlorambucil | Ethinyl | Medroxy-progesterone | Testolactone |
| Chloramphenicol | Estradiol | Megastrol | Thioguanine |
| Chlorotianisene | Etoposide | Melphalan | Thiotepa |
| Chlorozotocin | Floxuridine | Mercaptopurine | Uracil Mustard |
| Cyclosporin | Fluorouracil | Methotrexate | Vidarabine |
| Cisplatin | Flutamide | Mitomycin | Vinblastine |
| Cyclo-phosphamide | Ganciclovir | Mitotane | Vincristine |
| Cytarrabine | Hydroxyurea | Mitoxantrone | Zidovudine |

PROCEDURE

1. Handling

- a. Always consult the Safety Data Sheet (SDS) before handling
- b. Ensure a clearly labeled spill kit is within reach of preparation area
- c. Ensure adequate PPE, as outlined in the SDS, is worn when directly handling cytotoxic drugs or contaminated equipment, animals and/or bedding
 - i. Wear cytotoxic drug resistant gloves (such as nitrile gloves)
 - ii. Wear a moisture resistant gown with cuffs
 - iii. Wear an approved respirator with P100 cartridges if there is a risk of contact with aerosols and ensure respirators are [fit tested](#) annually by OHSE.
 - iv. Wear eye protection
- d. Ensure PPE not be worn outside the preparation area
- e. Cover or line the work surface with a disposable bench protector
- f. Assemble all materials, equipment and waste containers around the immediate work area before handling cytotoxic drugs
- g. Perform the following activities in one centralized area within a Class II Type B BSC
 - i. Mix, prepare and prime administration sets
 - ii. Dilute cytotoxic drugs for further experimentation
- h. Handle diluted cytotoxic drugs within a fume hood or a Class II Type B BSC
- i. Open packages of received cytotoxic drugs in a fume hood in case of spill
- j. [Post a sign](#) on the biosafety cabinet or fume hood where cytotoxic drugs are handled
 - i. Keep sign posted until unit and area is decontaminated

2. Storage

- a. Post a list of all cytotoxic drugs present at storage and preparation areas
- b. Ensure a spill kit is within or adjacent to storage area
- c. Separate cytotoxic drugs from other chemicals by using a labeled secondary containment bin
- d. Ensure all containers, shelves or secondary containment bins are labeled with the wording "Cytotoxic Agent", or similar wording

3. Spills

- a. Follow OHSE's [general spill response](#) instructions.
- b. Do not attempt to clean up any spill if not trained or comfortable. Seek assistance or call Campus Security (250-721-7599)
- c. Refer to SDS before attempting spill clean up even if trained
- d. For powder spills within the BSC or fume hood work area:
 - i. Use wet or moist towels or pads to cover spill to avoid aerosols (refer to SDS for compatible solvent)
 - ii. Cover and wipe the spill with the wet/moisten towels
 - iii. Collect and double bag contaminated towels or pads
 - iv. Clean surface with a dilute (~10%) bleach solution
 - v. Clean surface with detergent and water

- vi. Collect all materials used in the clean and place in designated cytotoxic waste bin for disposal through the hazardous waste system
- e. For liquid spills within the BSC or fume hood work area:
 - i. Gently cover the spill with absorbent pads
 - ii. Collect and double bag contaminated absorbent pads.
 - iii. If biological material was also used, clean surface with a dilute (~10%) bleach solution
 - iv. Clean surface with detergent and water
- f. For a cytotoxic drug spill of any size outside of the BSC or fume hood area:
 - i. Secure the area and warn others
 - ii. Immediately evacuate the area
 - iii. Post "do not enter" signs on the doors of the lab
 - iv. Contact Campus Security at 250-721-7599
- g. Complete a [Department Incident & Investigation Report](#) to document and review the spill incident.

4. Decontamination

- a. Ensure laboratory work surfaces are cleaned at the conclusion of each procedure and at the end of each work day.
- b. Ensure proper PPE is worn as outlined under (1) Handling
- c. Refer to SDS of specific cytotoxic drug for proper decontamination protocol
- d. Complete decontamination with detergent and water

5. First Aid and Emergencies

- a. Call 911 to summon an ambulance if there is a medical emergency
- b. Call Campus Security at 250-721-7599 for first aid
- c. Refer to SDS for specific first aid response measures
 - i. In general for eye exposure, use emergency eyewash and flush for at least 15-20 minutes.
 - ii. In general for skin contact, flush affected area with running water for at least 15-20 minutes.

6. Waste Disposal

- a. Separate all cytotoxic waste from other waste streams.
- b. Label all waste containers and buckets/bins with distinctive warning signs/labels
- c. Dispose all solid waste materials contaminated with cytotoxic drugs, such as absorbent pads, PPE, animal waste, animal bedding, into cytotoxic waste pails provided by OHSE
- d. Dispose all liquid waste containing cytotoxic drugs into an approved container provided by OHSE
- e. Pour liquid waste into approved containers only in a fume hood

7. Lab SWP and ECP

Each lab that is using a cytotoxic drug requires a Lab SWP that includes specific procedures for

- a. Amount of cytotoxic drug and dilution concentrations permitted to handle
- b. Personal protective equipment to wear
- c. How to decontaminate any surface or reusable lab ware
- d. Spill containment and response
- e. Disposal procedure
- f. Emergency first aid

Each lab is also required to complete a Lab ECP with the following elements:

- a. A statement of purpose and responsibilities
- b. Risk identification, assessment and control
- c. Education and training
- d. Written work procedures, when required
- e. Hygiene facilities and decontamination procedures, when required
- f. Health monitoring, when required
- g. Documentation, when required

REFERENCES

1. WorkSafe BC *OHS Regulations Part 6.42-6.58 Cytotoxic Drugs*. Retrieved from <https://www.worksafebc.com/en/law-policy/occupational-health-safety/searchable-ohs-regulation/ohs-regulation/part-06-substance-specific-requirements#SectionNumber:6.42>
2. WorkSafe BC *OHS Regulations Part 5.48-5.59 Controlling Exposure*. Retrieved from <https://www.worksafebc.com/en/law-policy/occupational-health-safety/searchable-ohs-regulation/ohs-regulation/part-05-chemical-and-biological-substances#SectionNumber:5.48>
3. WorkSafe BC *OHS Guidelines G6.42-G6.58 Cytotoxic Drugs* <https://www.worksafebc.com/en/law-policy/occupational-health-safety/searchable-ohs-regulation/ohs-guidelines/guidelines-part-06#SectionNumber:G6.42>