

Engineering Physics / C.E.D.T. Research Hazards Safety Report

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1. Elaborate on potential hazards

Class A: High pressure – CO₂ cylinder, liquid nitrogen tank
Class B: Flammable materials – 70% and 99% ethanol
Class D1: Immediately toxic materials – Adenine
Class D2: Long-term toxic effects – Cholera toxin, hydrocortisone
Class E: Corrosive materials – Acetic acid
Radiation: Laser – Microscopes
Electrical: High voltage enclosed – Laser sources
Extreme low temperature – Liquid nitrogen
Potential falling objects – Items on shelves
Biohazards – CP-A and CP-B cells (Barrett's esophagus)
Very bright light – UV light, microscope light
Loud noise

2. Routine Operating Procedures

a) Laboratory Protective Devices:

CP-A and CP-B cells – Biological safety cabinet

b) Personal Protective Devices:

Lasers – Safety glasses specific to wavelength of laser
Cell/Chemical handling – Gloves, lab coat, safety glasses, respirator specified on MSDS

3. Emergency Preparation

Flammable materials – Ethanol is spilled and starts a fire.
Chemicals – A toxic chemical is spilled and comes in contact with skin and/or eyes.
Lasers – An object falls into the beam's path and redirects the beam into eyes or onto skin.

a) Emergency procedures:

For immediate assistance, dial 5555 (the Biophotonics Facility is located in the hospital).

Flammable materials – If the fire is small, acquire a fire extinguisher from beside the nearest entrance door and extinguish the flames. If the fire is large, alert surrounding staff, pull the fire alarm, and evacuate the building.

Chemicals – If the spill is small and does not come in contact with skin or eyes, acquire a spill kit and cover any nearby drains. Cover the spill with the appropriate absorbent material along with disinfectant and let sit for 30 minutes. Discard the waste and wipe down the area with

disinfectant. If aerosol generation is suspected, alert surrounding staff, exit the room, and call extension 5555. Report all spills to the supervisor and the Safety Office. If a chemical comes in contact with skin, immediately wash the affected area with disinfectant soap and water. If a chemical enters the eyes, use eyewash station and rinse eyes for at least 15 minutes.

Lasers – Immediately seek medical attention.

b) Emergency Devices/Material Available:

Fire extinguisher – Beside the entrance doors

Chemical spill kits – Across from the tissue culture room

Eyewash station – In the tissue culture room

First aid station – Across from the tissue culture room

Emergency shower – Across from the tissue culture room

4. Chemicals, biohazards, and lasers – additional information

ACETIC ACID

Flash point: 43°C

Auto-ignition temperature: 463°C

Explosive range: 4% to 19.9%

Vapour pressure: 1.5 kPa

WHMIS classification: B3 and E

Hazard: Combustible liquid, corrosive material

- eye and skin irritant

- ingestion and inhalation may lead to coughing and shortness of breath

SOP: Wear a lab coat, gloves, and safety glasses. Handle in fume hood.

70% ETHANOL

Flash point: 16.6°C

Auto-ignition temperature: 363°C

Explosive range: 3.3% to 19%

Vapour pressure: 59.3 mm Hg

PEL: 1900 mg/m³

WHMIS classification: B2 and D2A

Hazard: Flammable liquid and vapour, teratogen

- may cause birth defects

- causes eye and skin irritation

- ingestion and inhalation may cause nausea and dizziness

SOP: Wear a lab coat and gloves.

ADENINE

WHMIS classification: D1B

Hazard: Toxic material causing immediate and serious toxic effects

- toxic by ingestion

- may cause eye, skin, and respiratory tract irritation

SOP: Wear a lab coat, gloves, and safety glasses. Handle in fume hood.

CHOLERA TOXIN

WHMIS classification: D2B

Hazard: Toxic material causing other toxic effects

- moderate skin and eye irritant
- may cause respiratory tract irritation

SOP: Wear a lab coat, gloves, and safety glasses. Handle in fume hood.

HYDROCORTISONE

WHMIS classification: D2A

Hazard: Very toxic material causing other toxic effects, teratogen

- may cause birth defects
- may cause skin, eye, and respiratory tract irritation

SOP: Wear a lab coat, gloves, and safety glasses. Handle in fume hood.

EMERGENCY PROCEDURES FOR THE ABOVE CHEMICALS

Inhalation – Move into fresh air.

Eyes – Rinse eyes for at least 15 minutes using the eyewash station.

Skin contact – Wash with soap and water.

Ingestion – Rinse mouth with water and call Poison Control Centre.

Seek medical attention.

CP-A AND CP-B CELLS (BARRETT'S ESOPHAGUS)

Hazard: Biosafety level 2

SOP: All staff must have biosafety level 2 training. Wear a lab coat and gloves. Handle in a biological safety cabinet.

Disposal: Into a biohazardous waste container.

Cleaning: Decontaminate all surfaces with 70% ethanol.

SPINNING DISK CONFOCAL MICROSCOPE

Lasers: 440/491/561/650 nm

SOP: Wear appropriate safety glasses.

MP LEICA TCS-SP5 CONFOCAL MICROSCOPE

Lasers: 100 mW 488 nm Argon ion, 10 mW 561 nm DPSS, 633 nm HeNe, Chameleon Ultra 690-1040 nm

SOP: Wear appropriate safety glasses.