Safe Work Practice

Animal Projects with Highly Toxic Substances

1.0 Hazard Description

Highly toxic chemicals utilized in projects with animals can have the potential to cause injury or illness in humans and animals or harm to the environment. Federal and provincial safety regulations required that Principal Investigators (PIs) conduct a hazard assessment for their project, which includes chemical hazards.

In general, highly toxic chemical hazards can be broken down into categories. These include:

- **Carcinogens**
- **Teratogens**
- **Mutagens**
- **Chemicals with a low LD50**
- **Chemicals with a low occupational exposure limit (OEL)**
- **Chemicals that may be fatal if inhaled, ingested, absorbed, or injected.**

If the PI identifies the use of highly toxic chemicals in their Animal Use Protocol (AUP), they must review this Safe Work Practice (SWP). PIs must incorporate the required controls identified in these documents into their hazard assessment and subsequent project-specific Standard Operating Procedures (SOPs) as detailed in the Animal Research, Teaching and Testing Projects SWP (EHS-SWP-101).

1.1 Hazard Assessment Considerations

1. When conducting a hazard assessment of chemical substances, the PI must consider whether project plans or experimental activities will pose a risk to the employees, animals, or environment. Considerations include:

   - **Carcinogens and mutagens** – In most cases, there is no level deemed “safe” for carcinogen or mutagen exposure. Controls for carcinogens and mutagens must keep exposure as low as reasonably achievable (ALARA).
   - **Teratogens** – Teratogens may cause reproductive problems, or may harm an unborn fetus. Special considerations must be taken for pregnant employees.
- **Low LD50 or OEL** – In general chemicals with a low LD50 or OEL are considered higher-risk hazards and additional precautionary measures must be taken.
- **Fatal designation on SDS** – for any chemical that includes precautionary statements with the word fatal must be handled with additional precautions.

### 2.0 Minimum Hazard Controls

In addition to the Minimum Requirements listed in the Animal Research, Teaching and Testing Projects, and Animal Projects with Chemicals (EHS-SWP-140) SWPs, PIs working with highly toxic substances must abide by the following:

#### 2.1 Elimination/Substitution

1. Appropriate substitutions or eliminations of a chemical substance must be used wherever possible to reduce the risk of exposure to highly toxic chemicals.

#### 2.2 Engineering Controls

1. When handling the chemical, such as preparing a solution, or prepping for injection, fume hoods should be used wherever possible, as they provide both isolation and ventilation. Where fume hoods are not practical, local exhaust ventilation such as a downdraft table, or portable/wall-mounted capture hood can be used.

2. Engineered safety needles must be used to protect against accidental needle sticks with highly toxic chemicals.

#### 2.3 Administrative Controls

1. Additional site-specific training must be completed for users of highly toxic chemicals. This training must include information on the health hazards and how to protect themselves and others who may be affected by their work.

2. Safe work practices must be followed for handling highly toxic chemicals. Examples include: wetting a material to prevent the particles from becoming airborne so they cannot be inhaled, or using techniques which minimize the aerosolization of a solution containing a highly toxic substances.

#### 2.4 Personal Protective Equipment (PPE)

1. Respirators, skin protection, and eye protection must be worn in addition to the indicated engineering controls for highly toxic chemicals. This PPE will act as a last line of defense to protect the employee should the engineering or administrative controls fail.
2. Respirators should include a minimum of an N95 respirator for particulates, or a half-face respirator equipped with the appropriate cartridge (i.e., organic vapour) for other hazards.

3. Many highly toxic chemicals can be absorbed into the skin. Those that will not be absorbed could enter the body when you touch your face, or go to eat or drink on break. Be sure to choose gloves that are rated for the chemical being used, as nitrile gloves are not appropriate for all chemicals.

3.0 Emergency Preparedness/Response

1. Considerations should be taken to prevent exposure to other personnel who may be affected by a spill, leak, or other incident.

4.0 Applicable Legislation and Regulations

3. Occupational Health and Safety Regulations, Government of Alberta

5.0 Related Resources

1. Hazard Identification, Assessment, and Control Procedure, UAPPOL, University of Alberta
2. Chemical Safety Program, Environment, Health & Safety, University of Alberta
3. Safe Work Practice: How to Use Animal Safe Work Practices (EHS-SWP-100), Environment, Health & Safety, University of Alberta
5. Safe Work Practice: Allergen Protection (EHS-SWP-110), Environment, Health & Safety, University of Alberta
6. Safe Work Practice: Needle Safety (EHS-SWP-120), Environment, Health & Safety, University of Alberta
7. Safe Work Practice: Animal Projects with Chemicals (EHS-SWP-140), Environment, Health & Safety, University of Alberta
8. Safe Work Practice: Animal Projects with Flammable Substances (EHS-SWP-141), Environment, Health & Safety, University of Alberta
9. Safe Work Practice: Animal Projects with Gases Under Pressure (EHS-SWP-143), Environment, Health & Safety, University of Alberta
10. Safe Work Practice: Animal Projects with Nanomaterials (EHS-SWP-145), Environment, Health & Safety, University of Alberta
11. Safe Work Practice: Animal Perfusions (EHS-SWP-150), Environment, Health & Safety, University of Alberta
6.0 Document Management

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