Safe Work Practice

Animal Projects with Toxins and Venoms

1.0 Hazard Description

Many species of microbes, plant, insects and animals produce toxins and venoms that can have an adverse effect on humans in the event of accidental exposure. Depending on the toxin or venom involved and the exposure dose, accidental exposure could even result in mortality. Therefore, for any animal research, teaching or testing activities involving toxins and venoms, including bacterial lipopolysaccharides (LPS), the preparation and administration of the toxin or venom must be conducted in Containment Level 2 (CL-2) facilities while following appropriate containment standard operating procedures (SOPs).

1.1 Hazard Assessment Considerations

1. The risk of all toxins and venoms utilized with animal models at the University of Alberta (U of A) must be determined by the Principal Investigator (PI).
   - If using a commercial toxin or venom product, the supplying company typically provides safety information through their website.
   - If Investigators cannot locate information on the toxin or venom they are employing, they should contact the Biosafety Officers at biosafety@ualberta.ca for assistance.

2.0 Minimum Hazard Controls

2.1 Elimination/Substitution

1. The PI should assess whether bioactive preparations of the toxin or venom are required, or whether inactivated preparations or subunits of the toxin or venom could effectively be utilized with the animals.

2.2 Engineering Controls

1. Weighing out and reconstitution of lyophilized toxins and venoms must be conducted in a biological safety cabinet (BSC) certified with Environment, Health and Safety (EHS).
   - The BSC must have a sticker on its front indicating it has been successfully tested and the future date of its next testing.
2. Animals inoculated with toxins and venoms must be housed in CL-2 animal facilities for at least 72 hours following inoculation.
3. After 72 hours, the inoculated animals may be moved to a clean cage and transferred to conventional animal housing facilities.
   ➢ After the initial 72 hours, the inoculated toxin or venom is unlikely to leak out of the incision site which has begun to heal and the toxin or venom will not be excreted in the animal’s urine, feces or saliva.

2.3 **Administrative Controls**

1. If during the Hazard Assessment process, a commercially available antidote is identified against the toxin or venom in use, the PI must contact EHS via ehs.info@ualberta.ca to determine the availability of the antidote in Alberta and the steps necessary for rapid access in the event of an accidental exposure.
   ➢ Antidotes for microbial toxins and indigenous insect venoms are available across Canada. However, availability of antidotes against animal venoms, in particular snake anti-venoms, and the venoms from insect species not indigenous to Alberta is very limited.

2. When working with a toxin or venom, or handling animals during the 72-hour post-administration period, work surfaces will be wiped downed at the completion of work with a solution containing 2.5% sodium hypochlorite and 0.25 N sodium hydroxide.

3. Following transfer of the animals to a clean cage, the cage that housed the animals for the first 72 hours after inoculation of the toxin or venom must be processed as biohazard waste as per Item 2.4.7 of the Animal Projects with Biological Materials Safe Work Practice (EHS-SWP-130).

4. Waste containing toxins and venoms must be processed as follows:
   ➢ Solid and liquid waste must be autoclaved at 121°C for a minimum of 60 minutes prior to disposal.
   ➢ Soiled cages must be autoclaved with bedding and food pellets in place at 121°C for a minimum of 60 minutes before processing.
   ➢ Used water bottles must be either treated chemically with a solution containing 2.5% sodium hypochlorite and 0.25 N sodium hydroxide for a minimum of 30 minutes, or autoclaved at 121°C for a minimum of 60 minutes.

2.4 **Personal Protective Equipment (PPE)**

1. No additional minimal PPE controls beyond those outlined in the Animal Research, Teaching and Testing (EHS-SWP-101), and Animal Projects with Biological Hazards SWPs are required.

3.0 **Emergency Preparedness/Response**

1. Laboratories and animal facilities where toxins and venoms are utilized must have ready access to a spill remediation kit containing containers of sodium hypochlorite and sodium hydroxide.
2. In the event of a spill of a toxin or venom, personnel must make a solution containing 2.5% sodium hypochlorite and 0.25 N sodium hydroxide and use it to treat the spill site for a minimum of 30 minutes as per Section 9.6 of the Biosafety Guidelines.

3. If reusable safety glasses or goggles or face shields come into contact with a preparation of a toxin or venom, they must be soaked in a solution containing 2.5% sodium hypochlorite and 0.25 N sodium hydroxide for a minimum of 30 minutes then rinsed thoroughly with tap water.

4. If reusable PPE or clothing comes into contact with a preparation of a toxin or venom, the item must be autoclaved at 121°C for a minimum of 60 minutes prior to being laundered.

4.0 Applicable Legislation and Regulations

1. Canadian Biosafety Standard, Public Health Agency of Canada
2. Human Pathogens and Toxins Act, Public Health Agency of Canada
3. Human Pathogens and Regulations, Public Health Agency of Canada

5.0 Related Resources

1. Biosafety Guidelines, Environment, Health & Safety, University of Alberta
2. Safe Work Practice: How to Use Animal Safe Work Practices (EHS-SWP-100), Environment, Health & Safety, University of Alberta
4. Safe Work Practice: Animal Projects with Biological Materials (EHS-SWP-130), Environment, Health & Safety, University of Alberta

6.0 Document Management

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