

**BIOHAZARDOUS AGENT REFERENCE DOCUMENT**

## Alpha Toxin

The Biohazardous Agent Reference Document (BARD) is a general guidance resource that reviews and summarizes the nature of a pathogen or biotoxin, and offers safety requirements for work with the agent in the laboratory. The BARD may replace the formal SOPs used in conjunction with some IBC registrations.

The BARD is provided as an additional guidance tool, and is not a substitute for a risk assessment, biosafety training, lab-specific training, or a formal [IBC master protocol registration](#). This document should be readily available in the laboratory, and it is the responsibility of the Laboratory Supervisor or Principal Investigator to ensure that all personnel have read, understood, and signed the document. The BARD is for informational purposes only, and is not intended to be a substitute for professional medical advice, diagnosis, or treatment. Please consult a health care provider for any medical questions or concerns.

**INSTRUCTIONS**

- 1. Review the information contained in this document.**
- 2. Add any necessary information that is specific to your work in the laboratory (such as strain-specific information). Please be sure that the track changes function is turned on to indicate any changes that you make.**
- 3. Instruct all personnel to review the BARD and sign the last page, indicating that they have read and understood the information.**
- 4. Submit the BARD along with your IBC master protocol registration, amendment, or continuing review.**

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#### CHARACTERISTICS

<b>Morphology</b>	Pore-forming cytotoxin, belong to the aerolysin-like family of toxins.
<b>Characteristics</b>	Major virulence factor of <i>Clostridium septicum</i> , the causative agent of atraumatic "gas gangrene." Muscle cells exposed to the toxin undergo cellular oncosis, characterized by mitochondrial dysfunction and release of reactive oxygen species

#### HEALTH HAZARDS

<b>Host Range</b>	Humans, vertebrate and invertebrate animals
<b>Modes of Transmission</b>	Inhalation, mucous membrane contact, sharps injury, ingestion, dermal contact.
<b>Signs and Symptoms</b>	Possible swelling, necrosis, edema, blisters, and restriction in blood supply at site of exposure.
<b>Toxic Dose</b>	LD <sub>50</sub> = 10 µg/kg (mouse, i.p.)
<b>Incubation Period</b>	Unknown for toxin alone, 6 hours to 3 days for clostridial myonecrosis associated with bacterial infection

#### MEDICAL PRECAUTIONS / TREATMENT

<b>Prophylaxis</b>	None available for toxin
<b>Vaccines</b>	Not recommended
<b>Treatment</b>	Supportive treatment
<b>Surveillance</b>	Monitor for symptoms. Detection of toxin may be achieved by ELISA
<b>UVM IBC Requirements</b>	Report any exposures or signs and symptoms to your supervisor
<b>Additional Medical Precautions</b>	Immunocompromised individuals are at a higher risk for complications associated with exposure

#### LABORATORY HAZARDS

<b>Laboratory Exposures</b>	No data. At least six cases of laboratory-acquired infections with <i>Clostridium</i> spp. have been reported up to 1976
<b>Sources</b>	<i>Clostridium septicum</i>

#### CONTAINMENT REQUIREMENTS

<b>BSL - 2</b>	Preparation or dilution of the agent, work with clinical specimens and cultures known or suspected to contain the agent
<b>BSL - 3</b>	
<b>ABSL - 2</b>	Administration of the agent to an animal model. Animals may be housed at ABSL-1 post-exposure
<b>ABSL - 3</b>	
<b>Aerosol generating activities</b>	Centrifugation, homogenizing, vortexing or stirring, pipetting, pouring liquids, filling or expelling syringes
<b>Primary containment device</b>	Use a chemical fume hood, biosafety cabinet, or glove box for preparing stocks and dilutions

#### EXPOSURE PROCEDURES

<b>Mucous membranes</b>	Flush eyes, mouth or nose for 15 minutes at eyewash station.
<b>Other exposures</b>	Wash area with soap and water for 15 minutes
<b>Medical Follow-Up</b>	Contact UVM Infectious Disease Dept. directly at <b>(802) 847-2700</b> for immediate assistance. Bring this document with you if seeking medical care.
<b>Reporting</b>	Report all exposures or near misses to: <ol style="list-style-type: none"> <li>Your immediate Supervisor</li> <li>The UVM Biosafety Officer at <b>(802) 777-9471</b> and Risk Management at <b>6-3242</b></li> <li>Risk Management and Safety; <a href="https://www.uvm.edu/riskmanagement/incident-claim-reporting-procedures">https://www.uvm.edu/riskmanagement/incident-claim-reporting-procedures</a></li> </ol>

#### PERSONAL PROTECTIVE EQUIPMENT (PPE)

<b>Minimum PPE Requirements</b>	Nitrile gloves, lab coat or gown, appropriate eye/face protection. Wash hands after removing gloves.
<b>Additional Precautions (Risk assessment dependent)</b>	Store in a secure location

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VIABILITY	
<b>Disinfection</b>	10% bleach with a contact time of 30 minutes.
<b>Inactivation</b>	Autoclaving at 121°C for 15 - 30 min
<b>Stability in Environment</b>	Stable at normal room temperature and pressure

SPILL CLEAN UP PROCEDURES	
<b>Small Spill</b>	Notify others working in the lab. Allow aerosols to settle. Don appropriate PPE. Cover area of the spill with paper towels and apply approved disinfectant, working from the perimeter towards the center. Allow 30 minutes of contact time before clean up and disposal. Dispose in double biowaste bags and biobox.
<b>Large Spill</b>	<p><b>Inside of a lab:</b> Call UVM Service Operations at 656-2560 and press option 1 to speak to a dispatcher. Ask them to page Risk Management and Safety.</p> <p><b>Outside of a lab:</b> Pull the nearest fire alarm and evacuate the building. Wait out front of the building for emergency responders to arrive.</p>

REFERENCES	
Canadian PSDS	<a href="https://www.canada.ca/en/public-health/services/laboratory-biosafety-biosecurity/pathogen-safety-data-sheets-risk-assessment/clostridium.html">https://www.canada.ca/en/public-health/services/laboratory-biosafety-biosecurity/pathogen-safety-data-sheets-risk-assessment/clostridium.html</a>
BMBL	<a href="https://www.cdc.gov/labs/pdf/CDC-BiosafetyMicrobiologicalBiomedicalLaboratories-2020-P.pdf">https://www.cdc.gov/labs/pdf/CDC-BiosafetyMicrobiologicalBiomedicalLaboratories-2020-P.pdf</a>
Molecular Microbiology	<a href="https://onlinelibrary.wiley.com/doi/full/10.1111/j.1365-2958.2005.04774.x">https://onlinelibrary.wiley.com/doi/full/10.1111/j.1365-2958.2005.04774.x</a>
American Society for Microbiology	<a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC257555/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC257555/</a>
Toxins	<a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4344638/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4344638/</a>
Cayman Chemical	<a href="https://www.caymanchem.com/cms/caymanchem/LiteratureCMS/Detection%20of%20Clostridium%20Septicum%20Alpha%20Toxin.pdf">https://www.caymanchem.com/cms/caymanchem/LiteratureCMS/Detection%20of%20Clostridium%20Septicum%20Alpha%20Toxin.pdf</a>

STUDENT / EMPLOYEE NAME	SIGNATURE	DATE