



**RISK ASSESSMENT BY AGENT: DIPHTHERIA TOXIN (DT)**

CHARACTERISTICS	
<b>Type</b>	Biological Toxin
<b>Risk Group</b>	Risk group 2
<b>Natural Source</b>	Strains of <i>Corynebacterium diphtheria</i> that have been lysogenized by bacteriophage $\beta$
<b>Laboratory Source</b>	Solid lyophilized toxin
<b>Characteristics</b>	DT is an exotoxin that inhibits eukaryotic protein synthesis by ADP-ribosylating an elongation factor needed to translocate the ribosome along mRNA.

<b>Animal Work Practices</b>	ABSL-2 during administration of the agent to animal model, with mechanical or anesthetic restraint recommended. Respirator may be required if there is unavoidable risk of inhalation outside of the BSC.
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STABILITY AND VIABILITY	
<b>Disinfectants</b>	Susceptible to 1% sodium hypochlorite
<b>Physical Inactivation</b>	Autoclave at 121°C for 1 hour on liquid cycle with lid of primary container loosened

HAZARDS	
<b>Route of entry</b>	The toxin is harmful if inhaled, injected, or absorbed through the skin or eyes.
<b>Signs and Symptoms</b>	DT can cause weakness, sore throat, fever, swollen glands in the neck. DT destroys tissues in the respiratory system, and also get into the blood stream and cause damage to the heart, kidneys, and nerves.
<b>Toxicity Dose Data</b>	Humans are very susceptible to DT. Human LD50 = 0.1 µg/kg Intraperitoneal (mouse) LD50: 0.3 mg/kg Subcutaneous (mouse) LD50: 0.3 mg/kg Intraperitoneal (hamster) LD50: 6.5 mg/kg
<b>Metabolism Data</b>	There is minimal risk to animal caretakers as the amount of unmetabolized DT excreted by the injected mice is likely to be extremely low.

EMERGENCY PROCEDURES	
<b>Minor Spills</b>	Notify others working in the lab. Cover area of the spill with paper towels and apply decontamination solution, working from the perimeter towards the center. Allow contact time. Cleanup and dispose of spill materials.
<b>Major Spills</b>	Evacuate the laboratory and call EHS Biosafety: 305-243-3269.
<b>Exposures</b>	<i>Ocular</i> Wash eyes at eyewash station for 15 minutes
	<i>Full body</i> Remove clothes and rinse at emergency shower for 15 minutes
	<i>Other</i> Wash area at sink with soap and water for 15 minutes
	If there is any suspected exposures, go to the emergency room.
<b>Reporting</b>	Report all incidents to the DVR Director, IACUC and Employee Health immediately. Notify Biosafety: 305-243-3269.

EXPOSURE CONTROLS / PERSONAL PROTECTION	
<b>Containment</b>	BSL-2 , ABSL-1 or ABSL-2
<b>PPE</b>	Lab coat, double nitrile gloves, eye protection
<b>Animal +PPE</b>	Respirator (N95)
<b>Biohazardous Waste Management</b>	<i>Solid Waste:</i> Autoclave waste before placing in biohazardous waste boxes for off-site treatment. <i>Liquid:</i> Treat waste with bleach (1:10) for 30 minutes. Pour liquid down laboratory sink with copious amounts of water. <i>Animal Carcasses:</i> Place into biohazardous waste boxes for off-site treatment. <i>Sharps:</i> Place all sharps, vials, Eppendorf tubes and pipette tips in a puncture proof sharps container.
<b>Lab Work Practices</b>	Perform all DT work during regular business hours. Conduct all work DT work inside a biological safety cabinet. Do not work with the toxin in the dried state. Only liquid solutions of DT are allowed outside of engineering controls. Sharps must be handled with care. Needles must not be bent, sheared, broken, recapped, removed from disposable syringes, or otherwise manipulated before disposal.

FIRST AID / MEDICAL	
<b>First Aid or Treatment</b>	Administration of appropriate DT antitoxin.
<b>Prophylaxis</b>	Individuals working with DT should have a recent Diphtheria/Tenanus booster vaccine. A booster is usually given every 10 years.
<b>Immunization</b>	Immunization with diphtheria toxoid is typically combined with tetanus toxoid and the pertussis vaccine. In the US, there are four vaccines used to prevent Diphtheria: DTaP, Tdap, DT, and Td.

REFERENCES	
<b>BMBL: 6th Edition</b>	<a href="https://www.cdc.gov/labs/pdf/SF_19_308133-A_BMBL6_00-BOOK-WEB-final-3.pdf">https://www.cdc.gov/labs/pdf/SF_19_308133-A_BMBL6_00-BOOK-WEB-final-3.pdf</a>
<b>Canadian PSDS</b>	<a href="http://www.phac-aspc.gc.ca/lab-bio/res/psds-ftss/corynebacterium-diphtheriae-eng.php">http://www.phac-aspc.gc.ca/lab-bio/res/psds-ftss/corynebacterium-diphtheriae-eng.php</a>
<b>CDC</b>	<a href="https://www.cdc.gov/diphtheria/about/index.html">https://www.cdc.gov/diphtheria/about/index.html</a>