

Biological Toxin Reference Sheet

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BIOLOGICAL TOXIN REFERENCE SHEET

Tetanus Toxin

CHARACTERISTICS		LABORATORY HAZARDS					
<i>Description</i>	Tetanus toxin is produced by <i>Clostridium tetani</i> as a single chain, almost non-toxic, protein with a molecular weight of approximately 150,000 representing 1315 amino acids. Bacterial proteases cleave the molecule between positions A 457 and S 458 (extracellular activation), yielding a heavy chain (MW 100,000) and a light chain (MW 50,000) tetanus toxin (HC-TeTx, LC-TeTx). Tetanus toxin is one of the three most poisonous substances known to humans, the other two being the toxins of botulism and diphtheria	<i>Laboratory Acquired Infections</i>	Laboratory-acquired cases of Tetanus Toxin have occurred.				
<i>Natural Source</i>	<i>Clostridium tetani</i>	<i>Sources</i>	Inhaled, ingestion, skin absorption.				
<i>MW</i>	100 kDa heavy chain (fragment B) and a 50kDa light chain (fragment A)	REFERENCES					
<i>Type of Toxin</i>	Neurotoxin	<i>CDC</i>	https://www.cdc.gov/tetanus				
<i>Commercial presentation</i>	Powder	CONTAINMENT					
HEALTH HAZARDS		<i>ABSL1</i>	Follow Chemical Safety hazard assessment. Work inside the biosafety cabinet				
<i>Modes of Transmission</i>	Spores of <i>C. tetani</i> are found in soil, dust and animal feces. Transmission occurs through contamination of wounds with soil or foreign bodies contaminated with <i>C. tetani</i> spores. There is no person to person transmission.	<i>BSL2</i>	In vitro work should be conducted inside the BSC				
LD50 (ug/kg) in humans	0.003 ug/kg	SPILL PROCEDURES					
<i>Signs and Symptoms</i>	Unopposed muscle contraction and spasm, Risus Sardonius (a rigid smile), Trismus (commonly known as lock-jaw), and Opisthotonus (rigid, arched back). Seizures may occur, and the autonomic nervous system may also be affected	<i>Small</i>	Notify others working in the lab. Allow aerosols to settle. Don appropriate PPE. An EPA-registered disinfectant should be used to remove contaminating matter from surfaces (e.g., of bench tops and equipment). All decontamination litter and other disposable materials should be autoclaved.				
<i>Treatment</i>	Tetanus is a medical emergency requiring hospitalization, immediate treatment with human tetanus immune globulin (TIG), agents to control muscle spasm, aggressive wound care, antibiotics, and a tetanus toxoid booster. If tetanus immune globulin is unavailable, Immune Globulin Intravenous (IGIV) can be used.	<i>Large</i>	For assistance, contact Emory's Biosafety Officer (404-727-8863), or the EHSO Spill Team (404-727-2888)				
<i>Host range</i>	Human, domestic and wild animals	EXPOSURE PROCEDURES					
MEDICAL PRECAUTIONS / TREATMENT		<i>Mucous membrane</i>	Flush eyes, mouth or nose for 15 minutes at eyewash station.				
<i>Prophylaxis</i>	Follow CDC's protocol for tetanus prophylaxis with TIG in routine wound management	<i>Other Exposures</i>	Wash area with soap and water for 15 minutes.				
<i>Vaccines</i>	Vaccination during recovery: Tetanus disease does not result in tetanus immunity. Active immunization with a tetanus toxoid-containing vaccine should begin or continue as soon as the person's condition has stabilized. Individuals working with Tetanus Toxin should be offered the Tetanus vaccine. Adults should get one dose of the tetanus and diphtheria (Td) vaccine every 10 years.	<i>Reporting</i>	Immediately report incident to supervisor, complete an employee incident report using PeopleSoft.				
<i>Diagnosis</i>	Physical exam, medical and immunization history, and the signs and symptoms of muscle spasms, stiffness and pain. Laboratory tests generally aren't helpful for diagnosing tetanus.	<i>Medical Follow-up</i>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;"><u>7am-4pm (OIM):</u> 404-686-8587</td> <td style="width: 50%;"><u>After Hours:</u> OIM APP on Call 404-686-5500 PIC# 50464</td> </tr> <tr> <td><u>Needle Stick (OIM):</u> 404-686-8587 or APP On Call: 404-686-5500 PIC# 50464</td> <td><u>Yerkes:</u> Maureen Thompson Office (404-727-8012) Cell (404-275-0963)</td> </tr> </table>	<u>7am-4pm (OIM):</u> 404-686-8587	<u>After Hours:</u> OIM APP on Call 404-686-5500 PIC# 50464	<u>Needle Stick (OIM):</u> 404-686-8587 or APP On Call: 404-686-5500 PIC# 50464	<u>Yerkes:</u> Maureen Thompson Office (404-727-8012) Cell (404-275-0963)
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<i>Emory Requirements</i>	Report all incidents using PeopleSoft	VIABILITY					
		<i>Disinfection</i>	10% bleach				
		<i>Inactivation</i>	Steam Autoclave 1 hr 121C				
		<i>Survival Outside Host</i>	Does survive outside the host				
		PERSONAL PROTECTIVE EQUIPMENT (PPE)					
		<i>Minimum PPE Requirements</i>	Lab coat/scrub Gloves Eye protection when working outside the biosafety cabinet or a chemical fume hood. Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed. Additional PPE may be required depending on lab specific SOPs.				
		<i>Additional Precautions</i>	Use a biological safety cabinet (BSC) or a chemical fume hood for resuspension of the biological toxin or manipulations of stock solutions of toxins that can generate aerosols, such as pipetting, harvesting, infecting cells, filling tubes/containers, and opening sealed centrifuge canisters.				
		WASTE MANAGEMENT					
		<i>Solid waste</i>	Materials that are potentially contaminated with toxins shall be disposed of as biohazardous waste and sharps must be disposed of in a sharps container.				