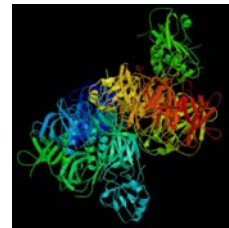


BioMaterial Fact Sheet: Pertussis Toxin (IN SOLUTION)

Pertussis toxin (PT) is a biological toxin that is secreted from the bacterium *Bordetella pertussis*, which is the causative agent of whooping cough. During a bacterial infection, the toxin is secreted and causes inflammation of the respiratory tract, which interferes with the clearing of pulmonary secretions. The toxin appears to produce systemic effects (such as high white blood cell counts) and allows the bacteria to evade host defenses. Reports of fetal morbidity among pregnant women with *Bordetella pertussis* are rare, and no causal relationship with abnormal fetal development, fetal morbidity, or adverse outcome of pregnancy has been confirmed.



The lethal dose (LD₅₀) for PT is 18ug/kg i.p. body weight for mice and is unknown for humans. In the laboratory setting, typical routes of exposure are through inhalation, mucous membrane contact, sharps injuries with contaminated materials, and ingestion of trace amounts of the material if hands are not washed prior to eating or smoking. **Tdap vaccination is recommended and is highly effective for the prevention of diphtheria, tetanus and pertussis. The vaccine is recommended to be given every 10 years. All employees working with PT and handling animals dosed with PT must be enrolled in the PT medical surveillance and report to OHS for medical clearance to participate in this protocol.**

Containment Level: Biosafety Level 2 (BSL2) criteria and animals infected with the agent should be handled and housed according to Animal Biosafety Level 2 criteria (ABSL2). *Concurrent approvals are needed from the Institutional Biosafety Committee (IBC) and the Institutional Animal Care and Use Committee (IACUC) prior to initiating work.*

Required Training: To work with *pertussis toxin*, laboratory and animal staff must have completed the Bloodborne Pathogen (BBP) training offered by EHS as well as specialized *pertussis toxin* training which is coordinated with the IBC Administrator. In addition, staff should receive 'hands-on' training from their laboratory supervisor or animal facility manager prior to manipulating the agent. Training should cover the hazards associated with the work, required practices and procedures and, if manipulating infected animals, proper handling of bedding, cages, and all other husbandry materials (i.e. carcasses disposal) associated with the experiment.

Personal Protective Equipment (PPE): Laboratory coat (or if in animal facility, PPE per building entry requirements); gloves (double gloves recommended); face shield. *A respirator is not required for working with PT in solution. If working with concentrated titers and highly aerosolizing procedures contact the Biosafety Officer 301-846-5038.*

Engineering Controls: All manipulations/injections/dissections with *pertussis toxin* or animals infected with *pertussis toxin* must be conducted within a Biological Safety Cabinet (BSC). *No work on the open bench!* **If used in animal studies, animals must be placed in ventilated caging racks maintained under negative pressure with HEPA-filtered supply and exhaust post-infection for the duration of the study. Alternate caging options may be determined and implemented on a case-by-case basis by the Animal Facility Manager in conjunction with EHS concurrence.**

Additional Safety Practices (Laboratory):

- Two-persons recommended to be present when the work is being conducted.
- Aerosol resistant tips must be used when pipetting.
- All sharps (one-time use) should be immediately disposed of into sharps container (located within BSC) and disposed of as hazardous waste.

Additional Safety Practices (Animal) in addition to those listed above:

- All bedding and caging should be handled as hazardous for the duration of the study (i.e. use of microisolator technique).
- Animals should be handled as hazardous for the duration of the study.

Disinfection (Laboratory and Animal Facility): Disinfect all work surfaces and materials *both* prior to and immediately following all work practices and procedures. (also see *Biosafety Technical Bulletin: Decontamination*)

- **Surfaces:** Dispatch™ or 10% (1:10) bleach solution (made daily) with a minimum of **30 minutes** contact time. Rinsing of surfaces with water is recommended after use of any chlorine-based disinfectant on metal surfaces to mitigate corrosion. **Cavicide™ and/or ethanol are not effective disinfectants for inactivating pertussis toxin.**
- **Liquid Waste:** Bring liquid waste to a final concentration of 10% bleach. If aspirating into a 1L flask, flask should first be filled with ~100mL bleach and diluted down to 10% (1:10) with liquid waste. Contact time should be **a minimum of 30 minutes** prior to drain disposal (while tap water is running).
- **Solid Waste:** Autoclave wastes prior to disposal, including all caging, bedding and animal carcasses. Dispose of all wastes, including animal's carcasses, as hazardous wastes.

Employee Exposure:

- **Eye Exposure from splash or aerosols:** Flush eyes for a *minimum* of 15 minutes in eyewash and then report to OHS immediately afterwards. Follow the NCI-Frederick Exposure Control Plan (<http://home.ncifcrf.gov/ehs/ehs.asp?id=12>) procedure for reporting occupational exposures to potentially infectious material. Dial 911 after-hours to report exposure and obtain assistance.
- **Needlesticks and/or non-intact skin exposure:** Wash contaminated skin for 15 minutes using a 10% povidone iodine solution (such as Betadine), a chlorhexadine scrub kit, or soap and copious amounts of water. Report to OHS immediately after scrub. If the exposure occurs after normal business hours contact the 911 emergency number. Follow NCI-Frederick Exposure Control Plan.

References:

Photo: <http://cassievk.wordpress.com/>

<http://www.cdc.gov/vaccines/pubs/pinkbook/downloads/pert.pdf>

<http://www.cdc.gov/mmwr/PDF/rr/rr5704.pdf>

List Biological Laboratories-MSDS for Pertussis Toxin in glycerol Product #179A,179B: <http://www.listlabs.com/index.php>