The University of Vermont
Risk Management & Safety
Biosafety Office

BIOHAZARDOUS AGENT REFERENCE DOCUMENT

Toxoplasma gondii

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	
Morphology	Obligate intracellular protozoan parasite, infectious stages include: sporozoites (in oocysts), tachyzoites, and bradyzoites (in tissue cysts).
Strain Specific Characteristics	

HEALTH HAZARDS	
Host Range	Cats and other felines are definitive hosts. Can also be carried by humans, warm-blooded vertebrates. Flies and cockroaches may spread contamination.
Modes of Transmission	Mucous membrane contact, ingestion, inhalation of aerosols. Trans-placental or through blood transfusion and organ transplant
Signs and Symptoms	Many infections are asymptomatic. Symptoms may be flu-like: fever, sore throat, rash, headache, malaise, enlarged lymph nodes, liver and/or spleen organomegaly, weight loss, weakness, pneumonia, muscle pain. Symptoms of ocular infection include reduced vision, blurred vision, pain, or redness of the eye.
Infectious Dose	As few as 10 sporulated oocysts. The infectious dose for tissue cysts is unknown.
Incubation Period	Tissue cysts may form as early as 2 - 3 days post-infection, although clinical presentation may not arise until 10 days or more

MEDICAL PRECAUTIONS / TREATMENT	
Prophylaxis	Titer recommended before starting work. Antiparasitics for organ transplant recipients
Vaccines	None available
Treatment	Pyrimethamine combined with either sulfadiazine or clindamycin
Surveillance	Monitor for symptoms and test using serology or PCR
UVM IBC Requirements	Report any exposures or signs and symptoms to your supervisor.
Additional Medical Precautions	Women who are pregnant or planning on becoming pregnant should be aware that pregnant women infected with Toxoplasma can transmit the parasite to their fetus. This can result in loss of pregnancy or serious birth defects. Severely immunocompromised individuals are also at risk of both severe acute infection and reactivation of a chronic infection.

LABORATORY HAZARDS	
Laboratory Acquired Infections	47 cases of lab-acquired toxoplasmosis infections have been reported as of 1999, as well as one death.
Sources	Blood, saliva, sputum, urine, tears, semen, milk, tissues, feces from infected cats, and laboratory cultures

CONTAINMENT REQUIREMENTS	
BSL - 2	Manipulation of known or potentially infected clinical samples and cultures of laboratory adapted strains (RG2)
BSL - 3	
ABSL - 2	Work with animals infected with risk group 2 strains
ABSL - 3	
Aerosol generating activities	Centrifugation, homogenizing, vortexing or stirring, changing of animal cages, cell sorting, pipetting, pouring liquids, sonicating, loading syringes
Primary containment device (BSC)	Use for aerosol-generating activities, large volumes, or high concentrations

EXPOSURE PROCEDURES	
Mucous membranes	Flush eyes, mouth or nose for 15 minutes at eyewash station.
Other exposures	Wash area with soap and water for 15 minutes
Medical Follow-Up	Contact UVMMC Infectious Disease Dept. directly at **(802) 847-2700** for immediate assistance
Reporting	Report all exposures or near misses to: 1. Your immediate Supervisor 2. The UVM Biosafety Officer at **(802) 777-9471** and Risk Management at **6-3242** 3. Risk Management and Safety; https://www.uvm.edu/riskmanagement/incident-claim-reporting-procedures

PERSONAL PROTECTIVE EQUIPMENT (PPE)	
Minimum PPE Requirements	Nitrile gloves, lab coat, appropriate eye/face protection. Wash hands after removing gloves.
Additional Precautions (Risk assessment dependent)	Limit sharps use.

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VIABILITY	
Disinfection	Tachyzoites and tissue cysts are susceptible to 1% sodium hypochlorite and 70% ethanol, with 20-minute contact time. Oocysts are resistant to most disinfectants, but 10% formalin significantly decreases viability. Treatment of oocysts with 1.3% sodium hypochlorite removes the outer layer.
Inactivation	Tissue cysts and oocysts inactivated by heating above 67°C. Tachyzoites are inactivated at pH below 4.0.
Survival Outside Host	Oocysts can survive in moist soil or water for up to 18 months, in uncovered feces for 46 days, and for 334 days when covered

SPILL CLEAN UP PROCEDURES	
Small Spill	Notify others working in the lab and the PI. 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.
Large Spill	**Inside of a lab:** Call UVM Service Operations at 656-2560 and press option 1 to speak to a dispatcher. Ask them to page Risk Management and Safety. **Outside of a lab:** Pull the nearest fire alarm and evacuate the building. Wait out front of the building for emergency responders to arrive.

REFERENCES	
Canadian PSDS	https://www.canada.ca/en/public-health/services/laboratory-biosafety-biosecurity/pathogen-safety-data-sheets-risk-assessment/toxoplasma-gondii-pathogen-safety-data-sheet.html
BMBL	https://www.cdc.gov/biosafety/publications/bmbl5/
CDC Guidelines	https://www.cdc.gov/parasites/toxoplasmosis/index.html
Mayo Clinic	https://www.mayoclinic.org/diseases-conditions/toxoplasmosis/symptoms-causes/syc-20356249

STUDENT / EMPLOYEE NAME	SIGNATURE	DATE

Biosafety Review:

_____ _____

Jeff LaBossiere, Biological Safety Officer — Date

Principal Investigator: _____ IBC Registration #: _____