The University of Vermont
Risk Management & Safety
Biosafety Office

BIOHAZARDOUS AGENT REFERENCE DOCUMENT

Borrelia burgdorferi

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.**

Principal Investigator: _____ IBC Registration #: _____

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CHARACTERISTICS	
Morphology	Tickborne zoonotic spirochete bacterium, causative agent of Lyme disease, carried by ticks of the genus *Ixodes.*
Strain Specific Characteristics	

HEALTH HAZARDS	
Host Range	Humans, deer, wild rodents, ticks are vectors.
Modes of Transmission	Exposure to an infected tick, accidental parenteral inoculation, inhalation of aerosols
Signs and Symptoms	Skin lesion at site of tick bite, polyarthritis, malaise, fatigue, fever, headache, stiff neck, muscle pain. Neurological and cardiac abnormalities weeks to months after infection. Chronic arthritis may develop.
Infectious Dose	Unknown
Incubation Period	3 - 32 days after tick exposure

MEDICAL PRECAUTIONS / TREATMENT	
Prophylaxis	Not generally warranted for tick bite alone
Vaccines	Under development
Treatment	Doxycycline, amoxicillin, or erythromycin to control infection and lessen severity of complications
Surveillance	Monitor for symptoms and test using serology
UVM IBC Requirements	Report any exposures or signs and symptoms to your supervisor.
Additional Medical Precautions	Endemic areas include east coast of USA, WI, MN, CA, OR, Southern Ontario, Europe, Soviet Union, Australia, China, Japan. Cases occur primarily during summer.

LABORATORY HAZARDS	
Laboratory Acquired Infections	None specifically for B. burgdorferi, but 45 reported cases with 2 deaths attributed to B. recurrentis and B. duttoni (up to 1976)
Sources	Blood, cerebrospinal fluid, urine, skin scrapings, retinal and synovial specimens. Infected mammals, their ectoparasites, infected tissues, 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 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)	Sharps use strictly limited.

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VIABILITY	
Disinfection	Susceptible to 1% sodium hypochlorite and 70% ethanol, with 10 minutes contact time
Inactivation	Inactivated by heat
Survival Outside Host	Capable of surviving in infected blood 28 – 35 days at room temperature, short periods of time in urine, and up to 48 days at 4°C in human blood.

SPILL CLEAN UP PROCEDURES	
Small Spill	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.
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/borrelia-burgdorferi-material-safety-data-sheets-msds.html
BMBL	https://www.cdc.gov/biosafety/publications/bmbl5/
CDC Guidelines	https://www.cdc.gov/lyme/index.html
Current Protocols in Microbiology	http://onlinelibrary.wiley.com/store/10.1002/9780471729259.mc12c01s4/asset/mc12c01.pdf?v=1&t=j5y6xibr&s=a44c077c8ca402f750d8834640f5d99af8b8c8d2

STUDENT / EMPLOYEE NAME	SIGNATURE	DATE

Biosafety Review:

_____
Jeff LaBossiere, Biological Safety Officer

_____
Date

Principal Investigator: _____ IBC Registration #: _____