## Biological Agent Reference Sheet (BARS)

**Agent:** *Francisella tularensis* subsp. *holarctica* Live Vaccine Strain

### Agent Characteristics

<table>
<thead>
<tr>
<th>Risk Group (RG)</th>
<th>RG-2</th>
<th>RG-3</th>
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<tbody>
<tr>
<td><strong>Agent Type</strong></td>
<td>Bacteria</td>
<td>Biohazard</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td><em>Francisella tularensis</em>, a gram-negative, non-spore forming bacterium, is the causal agent of tularemia (rabbit fever, deerfly fever). <em>F. tularensis</em> is endemic throughout North America and Eurasia and is one of the most infectious pathogenic bacteria known. Due to the low infective dose, ease of dissemination and high capacity for illness/death, wild type <em>F. tularensis</em> is considered a potential biological weapon and is classified as a select agent by the CDC. Though attenuated, <em>F. tularensis</em> subspecies <em>holarctica</em> causes Type B tularemia.</td>
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<tr>
<td><strong>Host Range</strong></td>
<td>Rabbits, humans, arthropod vectors.</td>
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<tr>
<td><strong>Host Shedding</strong></td>
<td>Blood, Urine, Feces, Animal Bites, Contaminated Items, Ingestion, Percutaneous</td>
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<tr>
<td><strong>Routes of Exposure to Humans</strong></td>
<td>Aerosol/Inhalation, Arthropod Vectors, Direct Contact, Mucous Membranes, Vertical Transmission, Broken Skin</td>
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<tr>
<td><strong>Infectious Dose</strong></td>
<td>Approximately 10 CFU (inhalation)</td>
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<tr>
<td><strong>Incubation Period</strong></td>
<td>Symptoms may appear between 1 to 14 days, usually within 3-5 days.</td>
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</tr>
</tbody>
</table>

1Based on NIH definitions. Final Risk Group (RG) designation will be assigned upon a case-by-case review by the Cornell University Institutional Biosafety Committee (IBC).

### Health Hazards

**Signs and Symptoms**

- **Flu-like symptoms** (i.e. fever, headache, dehydration, weight loss, lethargy)
- **Cutaneous symptoms** (i.e. skin lesions, rash)
- **Gastrointestinal symptoms** (i.e. loss of appetite, nausea, vomiting, diarrhea)
- **Respiratory symptoms** (i.e. coughing, sneezing)
- **Neurological symptoms** (i.e. loss of sensation, ataxia)
- **Musculoskeletal symptoms** (i.e. joint and muscle pain)
- **Lymphoreticular symptoms** (i.e. enlarged internal organs or lymph nodes)
- **Reproductive Health concerns** (i.e. abortion, fetal abnormalities) – request a Reproductive Health Consultation

**Immunizations**

- **Available**
- **Not Available**

**Prophylaxis**

- **Available**
- **Not Available**

### Laboratory Hazards

- High energy-creating activities (centrifugation, sonication, high pressure systems, vortexing, tube cap popping)
- Handling of sharps (needles, scalpels, microtome blades, broken glass, etc.)
- Splash/droplet-creating activities (shaking incubators, liquid culturing, mechanical pipetting)
- Equipment contamination
- Exposed skin/uncovered wounds

### Laboratory Handling Guidelines

#### Laboratory Biosafety Level (BSL)

- **BSL-2** with special practices

#### Attenuated Strain Alternatives

- Francisella tularensis ssp. holarctica LVS; non-tularensis Francisella or other species.

#### Training

- EHS Laboratory Safety Training (CULearn #2355)
- EHS Bloodborne Pathogens Training (CULearn #1070)
- Lab-specific protocol training
- BARS CULearn #2277.20

#### Lab Engineering Controls

- Benchtop
- Biosafety Cabinet (for aerosol containment)
- Chemical Fume Hood
- Centrifuge lids or safety cups; samples are loaded/unloaded inside the BSC
- Use of safety-engineered sharps

#### Personal Protective Equipment (PPE)

- Eye protection
- Single gloves
- Additional gloves
- Snap-front lab coat with cinch cuffs
- Disposable solid front gown
- Additional mucous membrane protection
- Disposable outer sleeves
- Other: Respiratory protection

#### Waste Management

Regulated Medical Waste (RMW)

1Final Biosafety Level designation will be assigned upon a case-by-case review by the Institutional Biosafety Committee.

2Recommended in addition to closed toed shoes and long pants

3BSL containment practices and waste management requirements are provided on the next page.

#### Animal Vivarium Guidance

<table>
<thead>
<tr>
<th>Animal Housing Biosafety Level (ABSL)</th>
</tr>
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<tbody>
<tr>
<td>☒ ABSL-1</td>
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</tbody>
</table>

#### Animal Biosecurity

- Experimental animals are housed separately
- Information not available

#### Perform Inoculations

- Benchtop
- Biosafety Cabinet

#### Change Cages

- Benchtop
- Biosafety Cabinet

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**Agent Viability**

- **Disinfection**
  - 1:10 Bleach Dilution
  - 70% Ethanol

- **Survival Outside Host**
  - Carcasses and organs: up to 133 days; grain dust, bedbugs: 136 days; rabbit meat: 31 days; straw: 192 days; water: up to 90 days; infected rabbit meat stored frozen at -15°C has remained infective longer than 3 years.
**Exposure and Spill Procedures**

### Mucous Membranes
- Flush eyes, mouth or nose for 15 minutes at eyewash station. See: [responding to exposures](#).

### Other Exposures
- Wash with soap and water for 15 minutes (open wounds, sores, etc.) and a minimum of 20 seconds of soap and water for areas with intact skin. See: [responding to exposures](#).

### Small Spills
- Notify others working in the lab. Evacuate area and allow 30 minutes for aerosols to settle. Don appropriate PPE. Cover area of the spill with paper towels and apply disinfectant, working from the perimeter toward the center. Allow 30 minutes of contact time before disposal and cleanup of spill materials. See: [spill cleanup](#).

### Large Spills
- Request assistance from the EHS Spill Team by calling CUPD dispatch. Call 911 from a campus phone or 607-255-1111 from a mobile phone.

### Incident Reporting
- Immediately report the incident to supervisor and complete the [EHS online injury/illness report](#) as soon as possible.

### Medical Follow Up

<table>
<thead>
<tr>
<th>During Business Hours</th>
<th>After Hours Care:</th>
<th>Emergencies:</th>
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</thead>
<tbody>
<tr>
<td>Cornell Health</td>
<td>Cornell Health Services 24-hour phone consultation line or local urgent care as listed on above webpage.</td>
<td>Call 911 from a campus phone or 607-255-1111 from a mobile phone.</td>
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<tr>
<td>607-255-5155 (24-hour phone consultation line)</td>
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</tbody>
</table>

### Biosafety Level 2 Containment Requirements Summary

#### Personal Hygiene
- Remove PPE before leaving the lab – avoid wearing PPE in public spaces.
- Wash hands frequently with soap and water after removing gloves, handling samples, leaving lab, etc.
- Change gloves frequently while working, and before removing samples from the biosafety cabinet to minimize potential contamination of equipment and surfaces within the lab.

#### Standard Microbiological Practices
- **In addition to** standard BSL1 practices:
  - Biohazard signs and labels on equipment.
  - Use a biological safety cabinet (BSC), such as a Class II Type A2, for manipulations that can generate infectious aerosols.
  - Use aerosol containing devices for high energy activities which may generate infectious aerosols. For example, centrifugation of agents which may generate infectious aerosols will use gasketed rotors or buckets. Rotors or buckets will be removed and opened inside a BSC. Centrifuge tubes will be filled and opened in a BSC.
  - Vacuum lines are protected with liquid disinfectant-filled traps and 0.45 micron filters.
  - **Sharps handling** and safety practices are implemented.
  - Decontaminate work surfaces after completion of work and after any spill or splash of potentially infectious material with appropriate disinfectant.
  - Chemically disinfect all surfaces and equipment.
  - Potentially infectious materials are placed in durable, leak proof, labeled primary containers during collection, handling, processing, and secondary containers during storage, or transport within a facility.
  - Windows in BSL-2 labs remain closed.

#### Special Practices
- All persons entering the laboratory are advised of the potential hazards and meet specific entry/exit requirements.
- The laboratory supervisor ensures that lab personnel demonstrate proficiency in standard and special microbiological practices before working with such agents.
- Laboratory equipment are routinely decontaminated, as well as, after spills, splashes or other potential contamination.
- Spills involving infectious materials are contained, decontaminated, and cleaned up by staff properly trained and equipped to work with infectious material.
- Equipment is decontaminated before repair, maintenance, or removal from the laboratory.

### Regulated Medical Waste (RMW)

#### Soft waste:
- All materials that come into contact with this agent must be placed in a biohazard waste bag.
- If working in a BSC, have a biohazard waste bag inside the BSC for waste collection.
- All equipment, tubes, and waste bags that are brought out of the biosafety cabinet are wiped with appropriate disinfectant.
- Place smaller red bag waste from BSC into larger red bag outside the BSC for transport.

#### Sharps waste:
- Place in leak proof sharps container labeled with the biohazard symbol. If working in a BSC, place a sharps container in the BSC.

#### Liquid waste:
- Add EHS-approved disinfectant to appropriate concentration, hold for contact time specified per manufacturer’s guidelines, and then gently pour down the drain.

### Special Considerations

**Experiment-Specific Requirements**

See lab protocols for additional information, any deviations from this BARS, and for lab-specific expectations.

### References

1. University of Iowa EHS Organism Fact Sheet: [http://ehs.research.uiowa.edu/francisella-tularensis](http://ehs.research.uiowa.edu/francisella-tularensis)

Cornell EHS would like to thank Emory University for the use of their Biological Agent Reference Sheet (BARS) format and some content.

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**BARS – F. tularensis subsp. holarctica LVS Effective 4/30/2018**

Controlled document if viewed online. Uncontrolled if viewed in print.

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