# Biological Agent Reference Sheet (BARS)

**Agent:** *Listeria monocytogenes*

## Agent Characteristics

| Risk Group (RG)
| --- |
| ☒ RG-2 associated with human disease, rarely serious; preventive or therapeutic interventions often available
| ☐ RG-3 associated with serious or lethal human disease; preventive or therapeutic interventions may be available

**Agent Type:** Bacteria

**Description:**

*Listeria monocytogenes* is a Gram-positive, pathogenic bacterium, in the division Firmicutes. Infection with *Listeria monocytogenes* can cause listeriosis. People usually become ill with listeriosis after eating contaminated food. The disease primarily affects pregnant women, newborns, older adults, and people with weakened immune systems. It is rare for people in other groups to get sick with *Listeria* infection. Listeriosis is usually a mild illness for pregnant women, but it causes severe disease in the fetus or newborn baby. Adults 65 years and older and people with weakened immune systems most commonly develop severe infections of the bloodstream (causing sepsis) or brain (causing meningitis or encephalitis). *Listeria* infections can sometimes affect other parts of the body, including bones, joints, and sites in the chest and abdomen.

**Host Range:** Humans, other mammals, fish, crustaceans, insects.

<table>
<thead>
<tr>
<th>Host Shedding</th>
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<tbody>
<tr>
<td>☐ Blood</td>
</tr>
<tr>
<td>☐ Direct contact</td>
</tr>
<tr>
<td>☐ Feces</td>
</tr>
<tr>
<td>☐ Saliva</td>
</tr>
<tr>
<td>☐ Urine</td>
</tr>
<tr>
<td>☐ Other:</td>
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<table>
<thead>
<tr>
<th>Routes of Exposure to Humans</th>
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<tbody>
<tr>
<td>☐ Aerosol/Inhalation</td>
</tr>
<tr>
<td>☐ Animal Bites</td>
</tr>
<tr>
<td>☐ Anthropod Vectors</td>
</tr>
<tr>
<td>☐ Contaminated Items</td>
</tr>
<tr>
<td>☐ Direct Contact</td>
</tr>
<tr>
<td>☐ Ingestion</td>
</tr>
<tr>
<td>☐ Mucous Membranes</td>
</tr>
<tr>
<td>☐ Percutaneous</td>
</tr>
<tr>
<td>☐ Vertical Transmission</td>
</tr>
<tr>
<td>☐ Broken skin</td>
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<thead>
<tr>
<th>Infectious Dose</th>
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<tbody>
<tr>
<td>Healthy hosts: 10-100 million CFU; Immunocompromised: 0.1 to 100 million CFU</td>
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<tr>
<th>Incubation Period</th>
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<tbody>
<tr>
<td>Ranges from 3-70 days; median incubation period is 21 days.</td>
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## Agent Viability

<table>
<thead>
<tr>
<th>Disinfection</th>
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<tbody>
<tr>
<td>☒ 1:10 Bleach Dilution</td>
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<tr>
<td>☒ 70% Ethanol</td>
</tr>
<tr>
<td>☐ Other: Inactivated by moist heat (15 minutes at 121°C), dry heat (1 hour at 160-170°C), and short wave UV and gamma irradiation.</td>
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<thead>
<tr>
<th>Survival Outside Host</th>
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<tbody>
<tr>
<td>Able to survive outside of hosts (water, soil, food, feces); capable of growing at low temperatures (-4 to 40.1°C)</td>
</tr>
</tbody>
</table>

## 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

- Unknown

### Training

- ☒ EHS Laboratory Safety Training (CULearn #2355)
- ☒ EHS Bloodborne Pathogens Training (CULearn #1070)
- ☒ Lab-specific protocol training
- ☒ BARS CULearn #2277.22

### 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

### Waste Management

- Regulated Medical Waste (RMW)

### Shipping Guidance

- Refer to EHS Biological Materials Shipping

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

*Recommended in addition to closed toe shoes and long pants

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

## Animal Vivarium Guidance

### Animal Housing Biosafety Level (ABSL)

- ☐ ABSL-1
- ☒ ABSL-2
- ☐ ABSL-3

### Animal Biosecurity

- ☒ Experimental animals are housed separately
- ☐ Information not available

### Perform Inoculations

- ☒ Benchtop
- ☒ Biosafety Cabinet
- ☒ Cage Changing Station

### Change Cages

- ☒ Benchtop
- ☒ Biosafety Cabinet
- ☒ Cage Changing Station

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**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)
- ☒ Reproductive Health concerns (i.e. abortion, fetal abnormalities) – request a Reproductive Health Consultation

**Immunizations**

- ☐ Available
- ☒ Not Available

**Prophylaxis**

https://www.cdc.gov/listeria/index.html

For formal medical advice is obtained during medical consultations with Cornell Health or primary healthcare provider as needed.

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BARS – *Listeria monocytogenes*

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EHS/Biosafety

Page 1
**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 that 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 associated with working with such agents.
- 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

**Regulated Medical Waste Guidance**
- See lab protocols for additional information, any deviations from this BARS, and for lab-specific expectations.

### References

1. Biological Agent Reference Sheet (BARS). Emory University. [http://ehso.emory.edu/content-guidelines/BARS_Listeria%20monocytogenes.pdf](http://ehso.emory.edu/content-guidelines/BARS_Listeria%20monocytogenes.pdf)

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