### Agent Characteristics

<table>
<thead>
<tr>
<th>Risk Group (RG)</th>
<th>Description</th>
<th>Host Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>☒ RG-2</td>
<td>Toxoplasma gondii belong to the phylum Apicomplexa and family Sarcocystidae. They are obligate intracellular parasitic protozoa. Toxoplasma gondii is a parasite of birds and mammals. Felines are the only definitive hosts and the only animals that pass infective oocysts in their feces. Warm-blooded animals, including humans, are intermediate hosts that harbor tissue cysts in their bodies. Three major infectious stages and major morphological forms occur: oocyst-containing two sporocysts and four sporozoites each, quickly-multiplying tachyzoites, and slow-growing bradyzoites contained in persistent tissue cysts.</td>
<td>Cats and other felines, humans, and warm-blooded vertebrates, including most mammals and birds.</td>
</tr>
</tbody>
</table>

### 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**
  - Unknown

### 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

<table>
<thead>
<tr>
<th>Laboratory Biosafety Level (BSL)</th>
<th>Attenuated Strain Alternatives</th>
<th>Training</th>
<th>Lab Engineering Controls</th>
<th>Personal Protective Equipment (PPE)</th>
<th>Waste Management</th>
<th>Shipping Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>☒ BSL-2 ☐ with special practices</td>
<td>☒ EHS Laboratory Safety Training</td>
<td>☒ EHS Bloodborne Pathogens Training</td>
<td>☒ Benchtop</td>
<td>☒ Additional gloves (recommended)</td>
<td>☒ Regulated Medical Waste (RMW)</td>
<td>Refer to EHS Biological Materials Shipping</td>
</tr>
</tbody>
</table>

### Animal Vivarium Guidance

<table>
<thead>
<tr>
<th>Animal Housing Biosafety Level (ABSL)</th>
<th>Animal Biosecurity</th>
<th>Perform Inoculations</th>
<th>Change Cages</th>
</tr>
</thead>
<tbody>
<tr>
<td>☒ ABSL-1 ☒ ABSL-2 ☐ ABSL-3</td>
<td>☒ Experimental animals are housed separately</td>
<td>☒ Benchtop ☐ Biosafety Cabinet</td>
<td>☒ Benchtop ☒ Biosafety Cabinet</td>
</tr>
</tbody>
</table>

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**Agent Viability**

<table>
<thead>
<tr>
<th>Disinfection</th>
<th>☒ 1:10 Bleach Dilution</th>
<th>☒ 70% Ethanol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inactivation</td>
<td>6% NaCl solutions, gamma irradiation = 1.0 kGy, temperature ≥ 67°C</td>
<td></td>
</tr>
<tr>
<td>Survival Outside Host</td>
<td>In moist soil or water for up to 18 months; in uncovered feces for 46 days and for 334 days when covered.</td>
<td></td>
</tr>
</tbody>
</table>

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**Other**

- Formal medical advice is obtained during medical consultations with Cornell Health or primary healthcare provider as needed.
Biosafety Level 2 Containment Requirements Summary

**Exposure and Spill Procedures**

<table>
<thead>
<tr>
<th><strong>Membranes</strong></th>
<th><strong>Other Exposures</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard Microbiological Practices</strong></td>
<td><strong>Large Spills</strong></td>
</tr>
<tr>
<td><strong>Small Spills</strong></td>
<td><strong>Medical Follow Up</strong></td>
</tr>
</tbody>
</table>

### Medical Follow Up

**During Business Hours**
- Cornell Health
  - 607-255-5155
  - (24-hour phone consultation line)

**After Hours Care:**
- Cornell Health Services 24-hour phone consultation line or local urgent care as listed on above webpage.

**Emergencies:**
- Call 911 from a campus phone or 607-255-1111 from a mobile phone.

### 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 BSL-1 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-risk activities that 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.
  - Sharp 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 is 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


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