Neurological symptoms (i.e. loss of sensation, ataxia)

Respiratory symptoms (i.e. coughing, sneezing)

Cutaneous symptoms (i.e. skin lesions, rash)

Lymphoreticular symptoms (i.e. enlarged internal organs or lymph nodes)

Gastrointestinal symptoms (i.e. loss of appetite, nausea, vomiting, diarrhea)

Health Hazards

By the Cornell University Institutional Biosafety Committee (IBC).

Lymphoreticular symptoms (i.e. enlarged internal organs or lymph nodes)

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

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 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

Biohazard

Description

Human derived materials are potentially infected with bloodborne pathogens and are therefore included in the OSHA Bloodborne Pathogens (BBP) Standard 1910.1030, which includes unfixed blood, cell lines, breast milk, tissues, and fluids such as synovial, cerebrospinal, and pericardial - known as "other potentially infectious materials (OPIM)." These materials are exempt from the standard if they have been chemically fixed, which inherently inactivates the pathogens and renders them non-infectious. Saliva, urine, sweat, emesis, and feces are only considered potentially infected with bloodborne pathogens if they are visibly contaminated with blood. These materials are exempt from the standard if they are not visibly contaminated with blood. Please see the Human Feces BARS for additional guidance when working with this material.

Materials covered by the OSHA BBP Standard may contain a variety of bloodborne pathogens, including bacteria, viruses, and parasites. Pathogens that could be found in human materials include HIV, Hepatitis B, and Hepatitis C, along with other infectious diseases. Primary human materials (those derived directly from a donor) are at high risk of containing bloodborne pathogens. Established human cell lines (purchased from a vendor or shared by a collaborator) may be unintentionally contaminated upon receipt or during routine experimentation. Some cell lines are known to carry additional pathogen genetic material such as Human Papillomavirus (HPV) DNA in HeLa cells. Cancerous cell lines pose the additional risk of causing localized tumors or, if malignant, additional carcinogenic concerns if exposed. Autologous blood samples (one's own blood) may become altered during handling in the lab. If an individual is exposed to his/her own blood that has been contaminated with a pathogen from the lab, the immune system may respond less vigorously than it does to allogeneic (non-self) cells. Also, if autologous blood samples are genetically engineered and then accidentally reintroduced into the donor, the altered cells could escape the usual rejection (killing) by the immune system which would kill accidentally introduced allogeneic cells.

Host Range

Humans, animals (experimentally inoculated with human-derived materials (such as xenografts)).

Host Shedding

Blood

Direct contact

Feces

Saliva

Urine

Infectious Dose

Unknown

Incubation Period

Varies

Infection History

Multiple infections as a result of contact with infected human materials. One case of cancer as a result of needle stick with adenocarcinoma.

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 Acquired Exposure to Pathogens

Special risk of infection with bloodborne pathogens due to the potential for direct exposure

Host Range

Humans, animals (experimentally inoculated with human-derived materials (such as xenografts)).

Route of Exposure

Direct contact

Indirect contact

Ingestion

Other - human derived materials (such as xenografts)).

Documented history

Additional Contact

Blood and other potentially infectious materials can harbor bloodborne pathogens for days or weeks in proper conditions outside the body. Dried blood can harbor bloodborne pathogens for hours or days.

Laboratory Handling Guidelines

Laboratory Biosafety Level (BSL)

BSL-2 with special practices

BSL-2

BSL-3

BSL-4

Attenuated Strain Alternatives

Using fixed tissues/samples, pathogen screening, cell line verification testing, and use of lower mammalian blood/cell lines first are all viable alternatives to practice procedures prior to handling these materials.

Lab Engineering Controls

Benchtop

Biosafety Cabinet (for aerosol containment)

Chemical Fume Hood (per EHS review)

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

Laboratory Acquired Infection History

Multiple infections as a result of contact with infected human materials. One case of cancer as a result of needle stick with adenocarcinoma.

Infection History

Multiple infections as a result of contact with infected human materials. One case of cancer as a result of needle stick with adenocarcinoma.

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.

Laboratory Biosafety Level (BSL)

BSL-2

BSL-3

BSL-4

Animal Housing Biosafety Level (ABS)

ABSL-1

ABSL-2

ABSL-3

Animal Biosecurity

Experimental animals are housed separately

Information not available

Perform Inoculations

Benchtop

Biosafety Cabinet

Cage Changing Station

Animal Vivarium Guidance

Animal Housing Biosafety Level (ABS)

ABS-1

ABS-2

ABS-3

Change Cages

Benchtop

Biosafety Cabinet

Cage Changing Station

Hepatitis B Booster, antivirals based on risk assessment

Available

Not Available

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

BARS – Human-Derived Materials

Effective 4/10/2018

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

EHS/Biosafety

Page 1
### Exposure and Spill Procedures

<table>
<thead>
<tr>
<th>Mucous Membranes</th>
<th>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.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Exposures</td>
<td>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.</td>
</tr>
<tr>
<td>Small Spills</td>
<td>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.</td>
</tr>
<tr>
<td>Large Spills</td>
<td>Immediately report the incident to supervisor and complete the EHS online injury/illness report as soon as possible.</td>
</tr>
</tbody>
</table>

### Medical Follow Up

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

**Guidance**

- 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.