

## **Biological Agent Reference Sheet (BARS)**

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## BIOLOGICAL AGENT REFERENCE SHEET

### Monkeypox virus (MPXV)

| CHARACTERISTICS            |   |
|----------------------------|---|
| <i>Morphology</i>          | Belongs to family Poxviridae, sub-family Chordopoxvirinae and genus <i>Orthopoxvirus</i> . MPXV is a 200-250 nm brick-shaped enveloped virus with characteristic surface tubules and a dumbbell-shaped core component. The MPXV genome consists of linear double-stranded DNA. MPXV is antigenically related to the variola and vaccinia viruses. There are two distinct clades of MPXV—West African (thought to be less severe) and Central African (more clinical manifestations, easier to transmit, higher mortality rate than West African clade). |
| <i>Growth Conditions</i>   | Cell culture.   |
| <i>Select Agent Status</i> | Laboratory testing has indicated that the 2022 outbreak is associated with the West African clade of monkeypox virus. The West African clade of monkeypox virus is not subject to <a href="#">select agent regulations (42 CFR § 73)</a> .  |

| HEALTH HAZARDS               |   |
|------------------------------|---|
| <i>Host Range</i>            | Humans, squirrels, non-human primates, black-tailed prairie dogs, African brush-tailed porcupines, rats, and shrews   |
| <i>Modes of Transmission</i> | MPXV is transferred from infected animals through a bite or scratch, through direct contact with infected animal's blood, body fluids, or lesions, and via bush meat preparation. It is also transmitted from human-to-human via skin-to-skin contact, by direct contact with body fluids of an infected person or with virus-contaminated objects, and by respiratory droplets via prolonged face-to-face contact. |
| <i>Signs and Symptoms</i>    | Fever, malaise, headache, muscle aches, backache, swollen lymph nodes, chills, exhaustion. Rash developing 1-7 days later. Rash may be present in multiple stages at once (macule>papule>vesicle>pustule lesions>crusting>resolution). Rash can last 2-4wks. Patient is considered infectious 5 days prior to onset of rash until lesions have crusted and fresh layer of skin has formed.                          |
| <i>Infectious Dose</i>       | Unknown.  |
| <i>Incubation Period</i>     | Approximately 5 to 21 days.   |

| MEDICAL PRECAUTIONS / TREATMENT  |  |
|----------------------------------|--|
| <i>Prophylaxis</i>               | Post-exposure prophylaxis (PEP) consists of vaccination within 4 days from date of exposure for best chance to prevent onset of disease. If given between 4-14 days after exposure, vaccination may reduce symptoms of disease.  |
| <i>Vaccines</i>                  | Vaccination with vaccinia virus (smallpox vaccine) is approximately 85% effective against monkeypox. (a) JYNNEOS (aka Imvamune or Imvanex)-licensed by U.S. FDA for prevention of MPXV infection, 2 doses, individuals are considered fully vaccinated 14 days after second dose; and (b) ACAM2000-licensed by U.S. FDA, 1 dose, individuals are considered fully vaccinated 4 wks after dose, should not be used in people who have certain health conditions such as weakened immune system, skin conditions like eczema or other exfoliative skin conditions, or pregnancy. |
| <i>Diagnosis &amp; Treatment</i> | Tecovirimat is considered as a potential therapeutic agent for MPXV infections, as it has been shown to have activity against many DNA viruses <i>in vitro</i> , including MPXV.   |
| <i>Surveillance</i>              | Monitor for symptoms (unexplained fever, rash, or prominent lymphadenopathy)   |
| <i>Emory Requirements</i>        | Symptoms to be reported to supervisor, Occupational Health Services, and Biosafety Officer immediately for further evaluation.   |

| LABORATORY HAZARDS                           |  |
|--|--|
| <i>Laboratory Acquired Infections (LAIs)</i> | None reported to date. However, LAIs with other Orthopoxviruses have been reported. Lab exposures to poxviruses occur primarily through needle-sticks, direct contact with the specimen or aerosols that may be generated. |
| <i>Sources</i>                               | Lesion fluids or crusts, respiratory secretions, and tissues from infected animals or humans.  |

| SUPPLEMENTAL REFERENCES                |   |
|--|---|
| <i>CDC</i>                             | <a href="https://www.cdc.gov/poxvirus/monkeypox/index.html">https://www.cdc.gov/poxvirus/monkeypox/index.html</a>   |
| <i>World Health Organization (WHO)</i> | <a href="https://www.who.int/news-room/fact-sheets/detail/monkeypox">https://www.who.int/news-room/fact-sheets/detail/monkeypox</a>   |
| <i>Public Health Agency of Canada</i>  | <a href="https://www.canada.ca/en/public-health/services/laboratory-biosafety-biosecurity/pathogen-safety-data-sheets-risk-assessment/monkeypox-virus.html">https://www.canada.ca/en/public-health/services/laboratory-biosafety-biosecurity/pathogen-safety-data-sheets-risk-assessment/monkeypox-virus.html</a> |
| <i>PubMed</i>                          | Preparation of Cell Cultures and Vaccinia Virus Stocks - <a href="https://pubmed.ncbi.nlm.nih.gov/26528781/">https://pubmed.ncbi.nlm.nih.gov/26528781/</a>  |

| CONTAINMENT         |  |
|---------------------|--|
| <i>BSL2+/ABSL2+</i> | BSL2 facilities with BSL3 practices should be used for handling respiratory secretions, stool, or tissues for procedures performed in microbiology or pathology labs.  |
| <i>BSL3/ABSL3</i>   | MPXV propagation in cell culture and initial characterization of viral agents recovered in cultures of MPXV specimens. Inoculation of animals for potential recovery of MPXV from samples, research studies involving animal inoculation for characterization of MPXV agents must be performed in ABSL-3 facilities. |

| SPILL PROCEDURES |   |
|------------------|---|
| <i>Small</i>     | Notify others working in the lab. Allow aerosols to settle. Don appropriate PPE. An EPA-registered disinfectant should be used to remove contaminating matter from surfaces (e.g., of bench tops and equipment). All decontamination litter and other disposable materials should be autoclaved then disposed via Emory approved biological waste vendor (Stericycle) |
| <i>Large</i>     | Contact Emory's Biosafety Officer (404-357-1821) or the Spill Response Team (404-727-2888).   |

| EXPOSURE PROCEDURES      |   |   |
|--------------------------|---|---|
| <i>Mucous membrane</i>   | Flush eyes, mouth, or nose for 15 minutes at eyewash station.   |   |
| <i>Other Exposures</i>   | Wash area with soap and water for 15 minutes.   |   |
| <i>Reporting</i>         | Immediately report incident to supervisor, complete an employee incident report using HR Self-Service portal. |   |
| <i>Medical Follow-up</i> | <b>7am-4pm (OHS)</b>  | EUH (404-686-7941), EUHM (404-686-7106), WW (404-728-6431)    |
|                          | <b>After Hours</b>  | OHS NP On Call 404-686-5500<br>PIC# 50464                     |
|                          | <b>Needle Stick (OHS)</b>   | EUH (404-686-8587), EUHM (404-686-2352)                       |
|                          | <b>ENPRC</b>  | Maureen Thompson - Office (404-727-8012), Cell (404-275-0963) |

| VIABILITY                    |  |
|------------------------------|--|
| <i>Disinfection</i>          | Orthopoxviruses are susceptible to 0.5% sodium hypochlorite, chloroxyleneol-based household disinfectants, glutaraldehyde, formaldehyde, and paraformaldehyde. |
| <i>Inactivation</i>          | Orthopoxviruses are inactivated by heat (autoclaving and incineration).  |
| <i>Survival Outside Host</i> | Orthopoxviruses are stable at ambient temperatures when dried.   |

| PERSONAL PROTECTIVE EQUIPMENT (PPE) |  |
|-------------------------------------|--|
| <i>Minimum PPE Requirements</i>     | At minimum, personnel are required to don two pairs of gloves, closed toed shoes, solid front gown, and appropriate face and eye protection prior to working with Additional PPE may be required depending on lab specific SOPs. |
| <i>Additional Precautions</i>       | All procedures that may produce aerosols or involve high concentrations or large volumes should be done inside the Class II BSC.   |