

# MONKEYPOX (MPX) TREATMENT

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Therapeutic Agent	Mechanism of action	Dosing	Side effects & Counseling	Warnings or interactions	Current Data available
<b>Tecovirimat (TPOXX®)</b>	Prevents viral maturation by inhibiting the VP37 envelope wrapping protein	<u>Oral (PO):</u> 40 - 120kg: 600mg bid 120kg+: 600mg thrice daily (tid)  <u>Intravenous (IV):</u> 35 - 120kg: 200mg q12h 120kg+: 300mg q12h	Oral capsules should be taken ~30 minutes after a full meal of moderate to high fat.  IV is a 6 hour (hr) infusion, infusion site pain	Warning label to avoid IV use with severe renal impairment  Weak CYP3A4 inducer, weak CYP2C8 and CYP2C19 inhibitor	Approved for smallpox using the animal rule  Case reports/series with human efficacy data against MPX
<b>Cidofovir (Vistide®)</b>	Competitively inhibits incorporation of dCTP into viral DNA	Adults: 5 mg/kg IV once weekly for 2 weeks, then every other week  Pre-hydration and probenecid required	Neutropenia, metabolic acidosis, proteinuria, drug interactions  Counsel on embryo & fertility toxicity, and sulfa allergies	Significant risk of severe nephrotoxicity & fertility impairment.  Contraindicated for patients with a SCr > 1.5 mg/dL, CrCl ≤ 50 mL/min, or a urine protein ≥ 100 mg/dL	Human safety data from use in the treatment of cytomegalovirus  In vitro activity against smallpox and MPX. No MPX efficacy data in humans
<b>Brincidofovir (Tembexa®)</b>	Oral prodrug of cidofovir. Same mechanism of action.	48kg +: 200 mg PO once weekly x 2 doses	Take on an empty stomach. Diarrhea, nausea, vomiting  Pregnancy test, liver function elevations, hyperbilirubinemia	Transporter inhibitor: BCRP, MRP2, BSEP, OATP1B1, OAT1, OAT3  Embryo-fetal toxicity. Irreversible infertility potential	Approved for smallpox using the animal rule  Case reports/series with human efficacy data against MPX
<b>Vaccinia immune globulin (VIGIV)</b>	Human derived immune globulins from donors who received smallpox vaccination with the <i>Vaccinia Virus</i>	6,000 U/kg IV x 1.  Repeat doses at 9,000U/kg IV can be considered  Max infusion rate: 4 mL/min	Headache, nausea, rigors, dizziness, sweating, AKI	Use caution in renal insufficiency  Lab interactions: some glucose monitoring systems, serological tests  Contraindicated for severe reaction to human globulins	Used for the treatment of <i>Vaccinia Virus</i> infection or complications after the smallpox vaccine  No data available on efficacy in treating MPX

## Indications for Antiviral Treatment

- Severe disease such as sepsis and/or confluent lesions
- High risk for severe disease:
  - Immunocompromised
  - Age < 8 years old
  - Pregnant or breastfeeding
  - Comorbidities that increase the risk of a stricture or fistula
  - Significant active exfoliative dermatologic conditions
- Patients with complications.
  - Ex: dehydration, severe vomiting or diarrhea
- Lesions in areas constituting a special hazard such as the eye, mouth, genitals, and anus

## Symptomatic Treatment and Supportive Care

### Genital and Anal Lesion Pain

Warm sitz baths for 10 minutes, several times/day

### Skin lesions and rash

Keep clean and dry when not showering/bathing.

**Pruritis** - warm oatmeal baths, oral antihistamines, or topical agents (ex: calamine lotion, petroleum jelly)

**Pain** - topical treatments (e.g., benzocaine/lidocaine gels) for temporary relief in limited doses

### Gastrointestinal symptoms

**Nausea** over the counter (OTC) - meclizine, dimenhydrinate, bismuth subsalicylate, ginger, peppermint  
**Diarrhea** OTC - diphenoxylate/atropine hydration, electrolyte replacement

### Oral Lesion Pain

Rinse mouth with salt water four times/day  
 Ice chips/ice pops  
 Alcohol-free oral antiseptic ex: Magic Mouthwash®, chlorhexidine, viscous lidocaine



	Pre-exposure Prophylaxis (PrEP)	Post-Exposure Prophylaxis (PEP)
<b>Who should get it?</b>	Potential occupational exposures (ex: healthcare workers on the response team, clinical laboratory personnel, researchers of orthopoxviruses)	Within 4 days (d) of exposure is preferred. Can be given up to 14 d post-exposure to reduce symptoms
	JYNNEOS®	ACAM2000®
<b>Type of vaccine</b>	Live, non-replicating vaccine	Live, replicating <i>Vaccinia virus</i> vaccine
<b>How many shots do you need?</b>	Approval: 0.5 mL subcutaneous x 2 doses separated by 28 d EUA: 0.1 mL intradermal x 2 doses separated by 28 d Booster dose after 2 years	A bifurcated needle dipped in vaccine solution pricks the upper arm 15 times Booster dose after 3 years
<b>Efficacy</b>	Non-inferiority was established when comparing geometric mean titers of Jynneos® vs ACAM2000®	
<b>Safety</b>	No risk of spreading to others, local injection site erythema/pain /induration/ swelling/ itching, fatigue, headache, muscle pain  Pertinent excipients: chicken embryo fibroblast DNA, protein, gentamicin, ciprofloxacin	Contraindicated in patients that are immunodeficient or immunocompromised and drug allergies to neomycin or polymyxin B. Several boxed warnings ranging from dermatologic conditions to blindness  False positive syphilis RPR, false negative PPD, viral shedding until inoculated site scab falls off on its own

## Beware of Misinformation

### "I don't need to worry if I'm not near monkeys." - False

While this virus was first identified in monkeys, the original source of the virus is unknown. Many different mammals have been reported with MPX infection, including humans.

### "I am not a gay male so I do not need to get vaccinated." - False

The CDC recommends the following indications for MPX vaccination:

- Contact with someone who tested positive for MPX
- Sexual partners have been diagnosed within the past 2 weeks
- Multiple sexual partners in the past 2 weeks
- Occupation requires continuous exposure to MPX (ex: laboratory and healthcare workers)

### "TPOXX treatment is not safe for people living with HIV" - False

Tecovirimat is considered a first-line treatment for patients living with HIV and MPX. Clinically relevant drug interactions with antiretrovirals should still be screened before administration

### "I got the smallpox vaccine. I don't need a MPX vaccine" - Probably

- Several studies have demonstrated long term immunity and potential protection against other Orthopoxviruses.
- Prior smallpox vaccines were strains of *Vaccinia virus* from the skin of calves. ACAM2000® is a clone of this virus
- 2003 case series demonstrated potential cross protective immunity against MPX infection in those who receive the smallpox vaccine.
- CDC estimates smallpox vaccine efficacy to be 85% against MPX.

### "MPX clades are West African and Congo Basin so it's restricted to Africa, right?" - False

- Concerns about the potential impact of geographic prejudices led the World Health Organization to rename the clades numerically on August 12, 2022. The current strain circulating is Clade IIb.
- Best practices of newly-identified viral species names are chosen to avoid offense to any culture, social, and ethnic groups in addition to avoiding negative impacts to the travel industry.