MONKEYPOX: THE RETURN OF A FORGOTTEN VIRUS

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ABSTRACT

Just as the world began to recover from the COVID-19 pandemic, a new viral threat emerged on the global stage—monkeypox. Often misunderstood and underestimated, monkeypox gained international attention in 2022 and 2023 as cases spread across continents, evoking memories of recent pandemics. What exactly is monkeypox, how dangerous is it, and should we be concerned? Monkeypox, an emerging zoonotic disease caused by the monkeypox virus (MPXV), has re-emerged as a significant global health concern following a widespread outbreak in 2022. First identified in monkeys in 1958 and subsequently in humans in 1970, the virus resurfaced dramatically, affecting over 120 countries and prompting the World Health Organization (WHO) to declare it a Public Health Emergency of International Concern. Closely related to the smallpox virus, MPXV is a complex, double-stranded DNA virus that spreads through direct contact with infected individuals, animals, or contaminated materials. Recent outbreaks have revealed atypical clinical manifestations, including genital and mucosal lesions, particularly among men who have sex with men, presenting new challenges in diagnosis and containment. In India, the detection of locally transmitted cases highlights the evolving epidemiology of the virus. Although no definitive cure currently exists, antiviral agents such as Tecovirimat and the smallpox vaccine offer partial protection. Strengthened surveillance systems, rapid diagnostic capabilities, and proactive public health measures are essential to prevent monkeypox from escalating into another global health crisis.

KEYWORDS: Monkeypox, Orthopoxvirus, Zoonotic Disease, Public Health Outbreak, Viral Transmission, Smallpox Vaccine

INTRODUCTION

Monkeypox, also known as "mpox," is caused by the monkeypox virus (MPXV), which belongs to the subfamily Chordopoxvirinae and the genus Orthopoxvirus within the Poxviridae family. The Poxviridae family consists of large, complex, double-stranded DNA viruses that can infect various vertebrate hosts, including humans. The genus Orthopoxvirus is the most studied and includes several viruses such as variola (which causes smallpox), vaccinia, camelpox, cowpox, canarypox, raccoonpox, deerpox, and goatpox. Most members of this virus family are zoonotic, meaning they can be transmitted from animals to humans, with the exception of the variola virus and molluscum contagiosum virus, which primarily infect humans. Members of this family are characterized by their brick-shaped structure and possess an extensive genome that encodes a wide range of both structural and non-structural proteins.

Unlike smallpox, monkeypox is generally less severe and often self-limiting. However, recent outbreaks have demonstrated that it can lead to serious complications, particularly in vulnerable groups such as children or individuals with weakened immune systems.

A GLOBAL WAKE-UP CALL

Monkeypox (mpox) is a viral disease first identified in 1958 in research monkeys in Denmark, with the first human case reported in 1970 in the Democratic Republic of the Congo. After the global eradication of smallpox in 1980 and the end of smallpox vaccination, mpox began to emerge more frequently in Central, East, and West Africa. The virus is classified into two main clades: clade I (Central Africa), which is more severe, and clade II (West Africa), which is

generally milder. In 2003, the first outbreak outside of Africa occurred in the United States due to imported wild animals carrying clade II. Since 2005, thousands of cases have been reported annually in the Democratic Republic of the Congo. In 2017, mpox re-emerged in Nigeria and began spreading to other countries through international travel.

In May 2022, a major global outbreak began, rapidly spreading across Europe, the Americas, and all six WHO regions. The outbreak primarily affected gay, bisexual, and other men who have sex with men, with transmission occurring mainly through sexual networks. Around the same time, outbreaks of clade I were reported in Sudanese refugee camps, and a new offshoot called clade Ib began spreading person-to-person in the Democratic Republic of the Congo and beyond. From January 2022 to August 2024, over 120 countries reported more than 100,000 laboratory-confirmed mpox cases and over 220 deaths.

In India, the first mpox case was reported on July 14, 2022, in Kerala, involving a 35-year-old man who had returned from the UAE. A total of 25 cases have since been reported across several Indian states, mostly linked to international travel. The country recorded one fatality—a 22-year-old man who died from encephalitis, a rare complication of the disease. Due to the rapid global spread and impact of the 2022 outbreak, the World Health Organization (WHO) declared mpox a Public Health Emergency of International Concern (PHEIC).

UNUSUAL SYMPTOMS AND NEW CONCERNS

What's striking in the recent Indian outbreak is the **unusual clinical presentation** of monkeypox. A case series from a tertiary care hospital in North India revealed that most patients had **genital ulcers**, painful skin lesions and mucosal involvement, with 83% showing oral and genital erosions.

Many of the infected had traveled from Nigeria, suggesting that global mobility continues to play a critical role in virus transmission. Surprisingly, some patients had no international travel history, hinting at possible local transmission—a cause for concern.

HOW DOES IT SPREAD?

Monkeypox can spread through various modes of transmission, with the most common being direct contact with infected animals or humans. Most human infections result from close contact with contagious animals. Transmission from animals to humans can occur through direct contact, and the virus can also be shed in animal feces, posing another source of infection. In some regions of Africa, limited resources and infrastructure force people to sleep outdoors or live near forests, increasing their exposure to infected animals. Additionally, food scarcity may lead individuals to hunt and consume small wild animals, further raising the risk of infection.

Human-to-human transmission primarily occurs through prolonged exposure to respiratory droplets or direct contact with the lesions of an infected person. Other sources of transmission include sharing beds, rooms, or eating utensils, as well as general household contact. The virus can also spread through contact with contaminated objects or surfaces and through direct contact with a patient's lesions. Both monkeypox and smallpox share a similar infectious pathway, which begins with exposure to respiratory droplets. The virus then multiplies at the site of entry into the body.

THE SCIENCE OF THE VIRUS

Poxviruses have a unique structure compared to other viruses. Their life cycle includes several stages: entry into host cells, replication of viral DNA, assembly of viral components, and the release of mature virions (MVs). During the assembly stage, the virus undergoes a process called **morphogenesis**, in which the viral particles acquire their final structure and become infectious. This process occurs within the cytoplasm of infected cells.

Mature virions are typically brick-shaped or ovoid, measuring approximately 200–250 nm, and have a complex structure. Each virion consists of an outer envelope derived from the host cell's plasma membrane, surrounding a core that contains the viral genome, enzymes, and structural proteins. The core is further organized into the viral genome and lateral bodies, which play essential roles in viral replication and morphogenesis.

Once fully assembled, the virions are released from the host cell either by cell lysis or through **budding**, during which they acquire their

envelope from the host cell membrane. These mature virions can then infect neighboring cells or be transmitted to new hosts, continuing the infection cycle.

The poxvirus genome is large, ranging from 130 to 300 kilobase pairs (kbps), and features inverted terminal repeats (ITRs), a hallmark of the virus (see Fig. 2). Within the ITRs, there is a conserved region of fewer than 100 base pairs that contains an A+T-rich hairpin loop. This loop, characterized by incomplete base pairing, is essential for maintaining the structural stability of the viral genome.

PREVENTION AND TREATMENT

There's no "cure" for monkeypox yet, but the antiviral **Tecovirimat** has been approved for treatment in some countries. Interestingly, the **smallpox vaccine** offers about 85% protection against monkeypox due to the viruses' close relationship.

India's health authorities were quick to act—developing guidelines, setting up isolation facilities, and training healthcare workers. The Indian Council of Medical Research (ICMR) also called for the development of diagnostic kits and vaccines, with companies like Serum Institute of India showing interest in creating an mRNA-based monkeypox vaccine.

A NEW VIRUS OR AN OLD MENACE?

Monkeypox isn't a new virus—it's an old enemy resurfacing in modern times. But unlike the early days of COVID-19, the world is now better prepared. With improved surveillance, rapid diagnostics, and greater public health awareness, there's hope that monkeypox can be contained before it becomes a full-scale global crisis.

REFRENCES

B. Moss, I.K. Damon, in: D.M. Knipe, P.M. Howley (Eds.), Fields Virology, 2, sixth ed., Wolters Kluwer, Philadelphia, 2013, pp. 2129–2160.

Goradwar, V. U., & Agrawal, A. (2023). Monkeypox Pathogenesis, Transmission, Preventive Measures and Treatment Modalities. *Journal of Clinical & Diagnostic Research*, *17*(3).

Krishna, S., Kurrey, C., Yadav, M., Mahilkar, S., Sonkar, S. C., Vishvakarma, N. K., ... & Koner, B. C. (2024). Insights into the Emergence and Evolution of Monkeypox Virus: Historical Perspective, Epidemiology, Genetic Diversity, Transmission, and Preventative Measures. *Infectious medicine*, 100105.

World Health Organization, Multi-country outbreak of mpox, 2025. Available at: https://www.who.int/docs/default-source/coronaviruse/situationreports/20231222_mpox_external-sitrep_31.pdf?sfvrsn=7545c953_9&download=true. Accessed May 16, 2025.

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