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Review Article

Monkeypox transmission and control strategies in the modern era

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Abstract

Monkeypox is a viral infection caused by a double-stranded DNA virus, a member of poxviridae family and the *Orthopoxvirus* genus. It was first discovered in monkeys in 1958.1970 marked the first human case of monkeypox, and 2022 marked the outbreak. Several countries in central and western Africa have reported cases of monkeypox. Although it is known as "monkeypox," the disease's origin is still unknown. However, the virus may infect humans and be carried by monkeys and rodents from Africa. The Clinical manifestations include fever, lymphadenopathy, and characteristic vesiculopustular rashes. The global outbreak from 2022 to 2024, driven by increased international travel and close human-to-human contact, poses major public health responses, including stricter containment measures, expanded vaccination efforts, and heightened surveillance. Currently, available control strategies include vaccinations like JYNNEOS and ACAM2000, strict isolation protocols, and antiviral treatments such as Tecovirimat. Although it's a low mortality rate, monkeypox poses a significant global health threat due to its potential for sustained transmission. This review discusses epidemiology, pathophysiology, transmission, clinical features, diagnostic methods, and available prevention and treatment strategies for monkeypox. Understanding these aspects is crucial for effective management of future outbreaks.

Keywords: Monkeypox, Transmission, Control strategies.

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1. Introduction

Monkeypox (MPX) is a rare viral zoonotic disease, caused by monkeypox virus which belongs to the family *Poxviridae*, subfamily *Chordopoxvirinae* and genus *Orthopoxvirus*.[1] This zoonotic orthopox virus has clinical presentation similar to smallpox (variola virus) in humans. However, monkeypox is less severe compared to smallpox, which was completely eradicated and declared officially at the 33rd World Health Assembly on 8th, May 1980.[2] With frequent outbreaks of monkeypox, it has been an emerging condition in different regions of Africa after the pre-existent COVID-19 pandemic. It was initially identified from sick monkeys (*Macaca cynomolgus*) at a Danish Laboratory in 1958.[3] However, human infection was first traced in 1970 in Central Africa.[4] The causative virus was named as “Monkeypox” because the lesions (vasicular illness) seen in monkeys are identical to other Pox-forming diseases.[4] Several studies showed that monkeypox virus has sustained in African rodents endemically. The first human to be diagnosed with monkeypox was a 9 year old boy in the Democratic Republic of Congo (DRC), town of Basankusu in 1970.

The second appearance of human case was reported in Zaire, 1996-1997.[5] The major outbreak of monkeypox began in Nigeria, 2017 and spread to over 11 states. Nearly 74 suspected people were diagnosed positive with monkeypox.[5] Monkeypox is a zoonosis which infects humans from animal transmission. The animal host is mostly a rodent, even though the definite reservoir has not been identified. According to a study in the late 1900’s showed that, wild squirrels (*Heliosciurus rufobrachium and Funisciurus anerythrus*) have played a vital role in transmission of the monkeypox

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virus.[6] Additionally, Dormice, Gambian pouched rats and different species of monkeys in Africa have been documented as other possible animal sources of monkeypox virus (MPX) transmission.[7]

The monkeypox virus (MPXV) has been genetically divided into two monophyletic biological groups, the West African Group and the Central African (Congo basin) Group. These distinct groups have varying transmission and Case Fatality Rate (CFR).[8] The West African Group reported Case Fatality Rate (CFR) of 3-4% and exhibits no human-to-human transmission.[9] By contrast, the Central African (Congo basin) Group reported Case Fatality Rate (CFR) of up to 11% and causes greater severity of disease exhibiting human to human transmission.[9] With these two genetic clades, MPX was included in the national list of High Consequence Infectious Diseases (HCID) in England.[9]

Transmission of MPX occurs when an individual is exposed to close contact with open lesions or lesions of buccal mucosa, respiratory droplets and body fluids from the infected human or animal; even contact with the fomites contaminated with MPXV. [10] The virus invades the body through broken skin, mucous membrane or the respiratory tract.[10]

2. History and Epidemiology

The monkeypox virus is native to central and western Africa's rainforest regions. The nations where the monkeypox virus is found are Benin, Cameroon, the Central African Republic, the Democratic Republic of the Congo (Zaire), Ghana, Gabon, Liberia, Nigeria, South Sudan, and Sierra Leone.[11] First reported in 1958 in monkeys, monkeypox was later shown to have infected many African rodents, according to tests conducted on their blood.[11] The first recorded case of monkeypox in humans occurred in 1970. A 9-month-old baby was sick on August 22, 1970, with a fever that lasted for two days before developing a rash. He was hospitalized to the hospital on September 1, 1970, the ninth day of the rash, which had the smallpox centrifugal distribution. After six days, on October 23, the patient passed away from measles, even though he had recovered and was ready to depart.[12] From 1981 to 1986, there were 37 confirmed cases of monkeypox in the Democratic Republic of Congo. The greatest outbreak occurred from February 1996 to February 1997. From February to August 1996, 71 clinical cases of monkeypox, including six fatalities, were reported from 13 villages in Zaire.[12] August was the month with the most secondary cases. Eleven specimens were gathered, and every one of them tested positive for monkeypox. Comparing those specimens to strains obtained between 1970 and 1979, there was very little genetic variation found. Human monkeypox cases were recorded from the Central African Republic, Congo, Cameroon, and Zaire in 394 cases between 1970 and 1986, and from Nigeria, Liberia, and Sierra Leone in 10 cases.[13] In Zaire, 72% of cases of monkeypox were determined to be the result of zoonotic transmission during the WHO's active surveillance program between 1981 and 1986. There were 400 human cases documented in 1986. Monkeypox was only seen in central and western African rainforests until 2003.[14]

In 2003, several cases of fever, rash, respiratory symptoms, and lymphadenopathy were reported from the Midwest region of the United States. Being around sick pet dogs, particularly prairie dogs infected with the monkeypox virus, was the cause of the sickness.[15] Following the importation of 800 African animals into Texas from Ghana, this was the first outbreak outside of Africa to be documented in the United States. Among them, there were two enormous, pouched rats, three rope squirrels, and nine dormice that had monkeypox.[15] These diseased animals were distributed to wholesalers, where they regularly interacted with American prairie dogs that were native to the area. Consequently, the diseased prairie dogs infected humans across the United States. In 2017, the outbreak started again in Nigeria and proceeded to 11 other states, affecting 74 people who were suspected of being affected.[16] 74 visitors from Nigeria visiting Israel, the UK, and the US were identified as having monkeypox between 2018 and 2021. Since January 1, 2022, the WHO has received reports of a certain number of monkeypox cases.[16] 42 WHO member states and five regions—Africa, America, Eastern Mediterranean, Europe, and Western Pacific—have recorded instances of monkeypox. Men who had sex with men are the source of the prolonged transmission MSM that is associated with this outbreak. As of June 15, 2022, the United Kingdom has the most cases (524), followed by Canada (159 cases), Portugal (241 cases), Germany (263 cases), and Spain (313 cases). Because of the disease's low death rate, the World Health Organization (WHO) has classified monkeypox as a moderate health concern.[1]

In 2023, the epidemiology of monkeypox (mpox) saw a significant rise in cases, particularly in Africa. The Democratic Republic of the Congo (DRC) reported a dramatic surge in mpox infections, with over 14,000 confirmed and suspected cases across several countries, including Cameroon, Nigeria, and Central African Republic.[18] The outbreak in the DRC was notably more severe than in previous years, with a higher number of cases and deaths. The spread of mpox beyond its typical endemic regions raised concerns about its potential for global transmission. In Europe, countries like the United Kingdom observed new cases, particularly linked to the more transmissible Clade 1b variant, prompting an increase in vaccination efforts.[18] The epidemiology of monkeypox continued to evolve in 2024, with further developments in both Africa and other parts of the world (**Figure 5**). By August 2024, the World Health Organization (WHO) declared the mpox situation in parts of Africa, especially the DRC, a Public Health Emergency of International Concern (PHEIC).[19] The total number of confirmed and suspected cases in African countries exceeded 24,000, with over 600

deaths reported. In the United States, the first cases of the Clade I variant were confirmed in November 2024, linked to international travel (**Table 1**). The evolving nature of mpox, with cases sometimes being asymptomatic or presenting atypical symptoms, continues to challenge public health responses, underscoring the importance of continued surveillance and vaccination campaigns.[20]

Table 1: Comparison of four monkeypox virus clades (Ia, Ib, IIa, IIb) based on timeline, geography, transmission, affected populations, mortality, mutation rates, trends, and public health impact. Clades Ia and IIa are endemic; Ib and IIb are linked to recent global outbreaks.

Feature	Clade Ia[21]	Clade Ib[22]	Clade IIa[23]	Clade IIb[24]
Time Period	Circulating from 1970 to 2024	Emerged during 2023–2025 global outbreak	Reported between 1970 and 2018	Circulated globally during 2022–2023
Geographic Pattern	Mainly confined to Central Africa, especially western DRC	Spread globally, with widespread cases reported outside Africa	Predominantly seen in West Africa	Global outbreak, with an earlier outbreak in Nigeria (2017)
Mode of Transmission	Mostly zoonotic (>70%) with occasional human-to-human transmission	Primarily human-to-human (household, vertical, close contact)	Zoonotic with notable human-to-human transmission	Direct contact, fomite-based, and sexual transmission pathways
Key Affected Groups	Primarily children	Children, pregnant women, and sex workers	Mostly adults	Adult men who have sex with men (MSM)
Mortality Risk	High virulence with 1–11% mortality rate	Considered more virulent than Clade II, with relatively higher mortality	Mild disease with mortality <1%	Lowest virulence among all clades; <1% mortality
Genetic Stability	Stable genome, showing minimal mutations	Very unstable genome, high mutation rate	Moderately stable genome with low mutation frequency	Genetically unstable, associated with high mutation rates
Trend & Outbreak Scale	Gradual rise in cases post-2010 within endemic regions	Explosive global outbreak in 2024	Limited outbreaks, mostly localized to West Africa	Widespread transmission during 2022; marked global concern
Public Health Note	Endemic and persistent in traditional African zones	Declared a Public Health Emergency of International Concern (PHEIC) by WHO in August 2024	Low public health threat globally	Declared a PHEIC by WHO on 23 July 2022

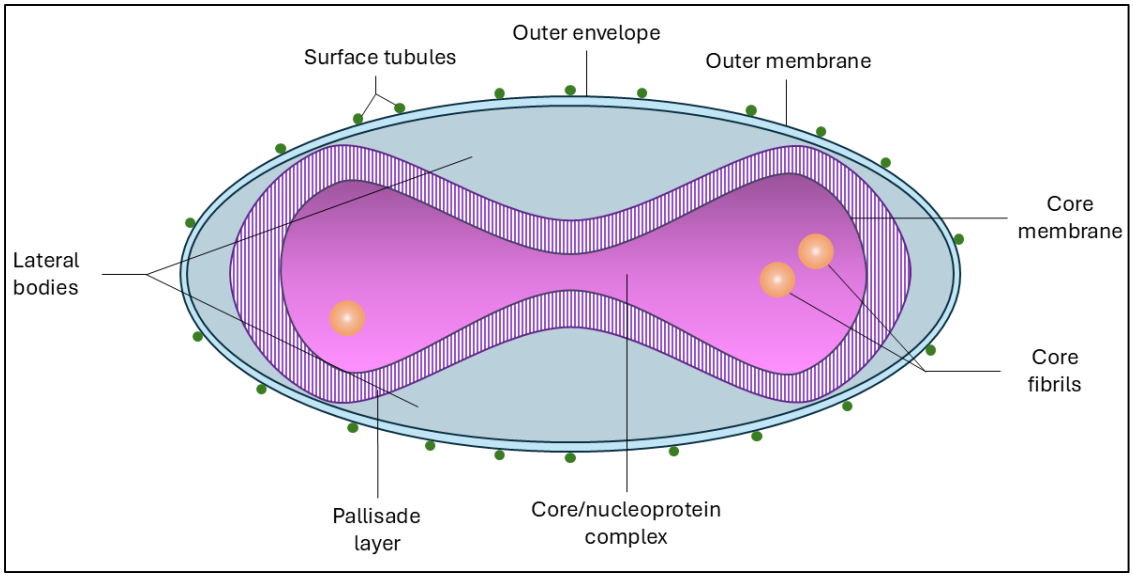

Figure 1: Schematic representation of a poxvirus particle

3. Etiology

Class: The monkeypox virus is a species in the family Poxviridae of the genus Orthopoxvirus.[25]

Structure: The virions of monkeypox are brick-shaped, large, and enveloped. Each viron contains a core containing the enzymes necessary for virus uncoating and replication and a linear, double-stranded DNA genome.[26] It measures 200-250 nm, it replicates through cytoplasm and not with the nucleus (**Figure 1**).

3.1. Transmission

Though the natural host is unknown, certain rodents (such as squirrels, rope squirrels, dormice, and Gambian pouched rats) and non-human primates appear to be natural reservoirs. The Monkeypox virus, which is a zoonotic virus, is spread from animals to humans through contact with infected animals.[27] Inadequately cooked meat from infected animals can also spread the disease. Monkeypox virus transmits to humans from humans by direct contact with body fluids (respiratory secretions), blood and cutaneous or mucosal lesions of infected animals; contaminated materials and objects (fomites).[28] The monkeypox virus spreads through respiratory droplets or aerosolized particles in close contact, direct contact of the skin or mucous membranes with infectious materials (in particular, the discharge of pustules, crusts, or fomites), exposure of the eye, and consumption or use of polluted food, mugs, or eating. Skin lesion material (highly infectious), respiratory secretions, saliva, ocular secretions, and perhaps blood, urine, and stool, although these tend to have somewhat uncertain roles. Of these, skin lesions and respiratory secretions are the most hazardous, followed by saliva in close-contact scenarios (**Figure 2**). The placenta can also carry the monkeypox virus from the mother to the fetus. Men who engage in sexual activity with other men are at risk for sexual transmission (MSM).[29]

3.2. Clinical features

The time between infection and the onset of symptoms is known as the incubation period.[30] It typically lasts between 6 and 13 days.[31] There are no symptoms during the incubation period. The infection can be broken down into two phases:

1. Invasive period lasts between 0 and 5 days and is characterized by a fever, headache, myalgia (muscle pain), back pain, chills, lymphadenopathy (swollen lymph nodes), and exhaustion (lack of energy).[32]
2. Skin eruption period begins one to three days after a fever appears. Rash begins on the face and spreads throughout the body.[33] The rash is primarily on the face. The face, hand palms, and foot soles are all affected by the monkeypox virus. Macules, which are lesions with a flat base, give way to papules, which are slightly raised from the lesions, vesicles, which are lesions filled with clear fluid, pustules, which are filled with yellowish fluid, and crusts.[33] Crusts are dried and desquamates. Monkeypox is usually self-limited with symptoms which lasts for 2-4 weeks.[34] **Figure 3** shows the clinical features of Monkey pox.

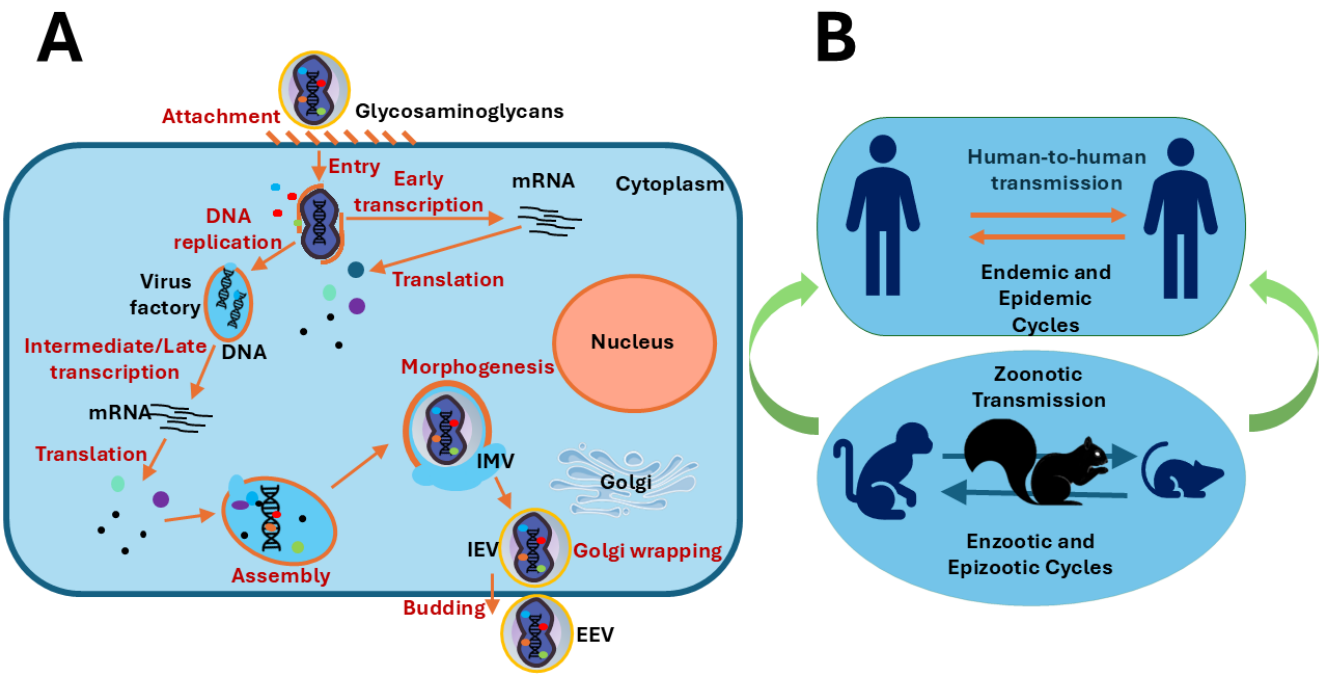

Figure 2: (**A**): Overview of the monkeypox virus replication cycle in the host cell attachment. (**B**): Monkeypox virus transmission via zoonotic and human-to-human pathways

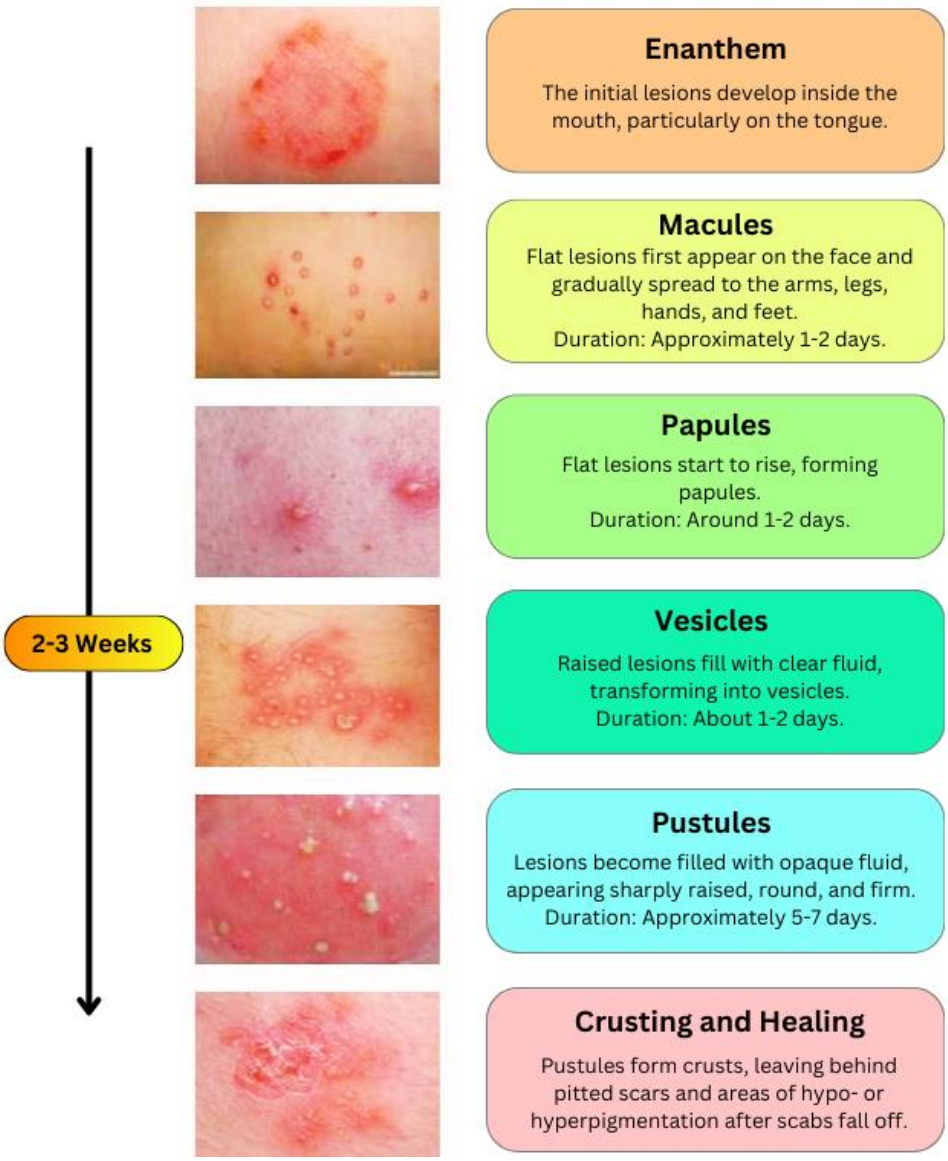

Figure 3: Clinical features of monkey pox

3.3. Pathophysiology

Monkeypox virus infectious pathway is similar to smallpox. First it begins with the exposure of host's oropharyngeal or respiratory mucosa. In human-to-human transmission, the oropharyngeal and respiratory mucosa serve as the site of inoculation for the monkeypox virus. After the exposure of Monkeypox virus in the site of inoculation it starts to replicate (i.e, the viral replication takes place).[35] The virus proliferates in mononuclear phagocytic cells before being released and traveling through the blood stream to other locations. As the viral replication occurs the viral load is formed. In the primary viremia, the viral load spreads to nearby lymph nodes.[36] In secondary viremia, the virus is planted in distant organs and lymph nodes via circulation after it has spread. The incubation stage lasts anywhere from 6 to 13 days. Because the signs and symptoms do not appear during the incubation stage, the incubation period is not contagious.[37] The swelling of the lymph nodes and the resulting fever are signs of the immune system's initial activation. The rash spreads centrifugally throughout the body and appears on the face. The day (or up to three days) following the onset of the rash, the fever decreases.[38] The infected person's nutritional intake is hampered by the lesions (**Figure 3**), which appear like rashes on their skin. The extensive perturbation caused by skin lesions raises the risk of a secondary bacterial infection.[38] The disseminated vesiculopustular rash is the Monkeypox virus's most recognizable characteristic. There are several stages to the rash before the scabs and desquamates begin to peel off. Macules, papules, vesicles, and pustules are the distinctive lesions that have been observed to develop crusting (**Figure 4**). A person is said to be cured when the crusted lesions fall off and new skin emerges underneath.[39]

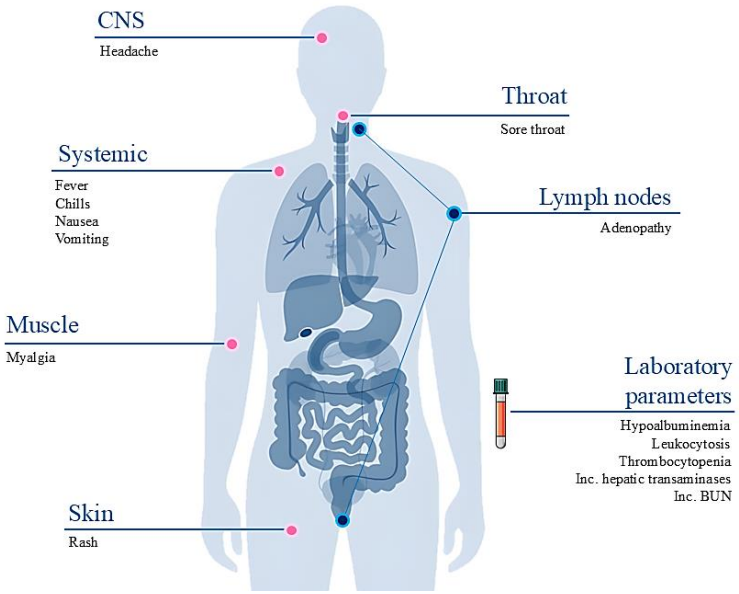

Figure 4: Overview of clinical manifestations and laboratory findings associated with monkeypox infection. Abbreviation: BUN, blood urea nitrogen

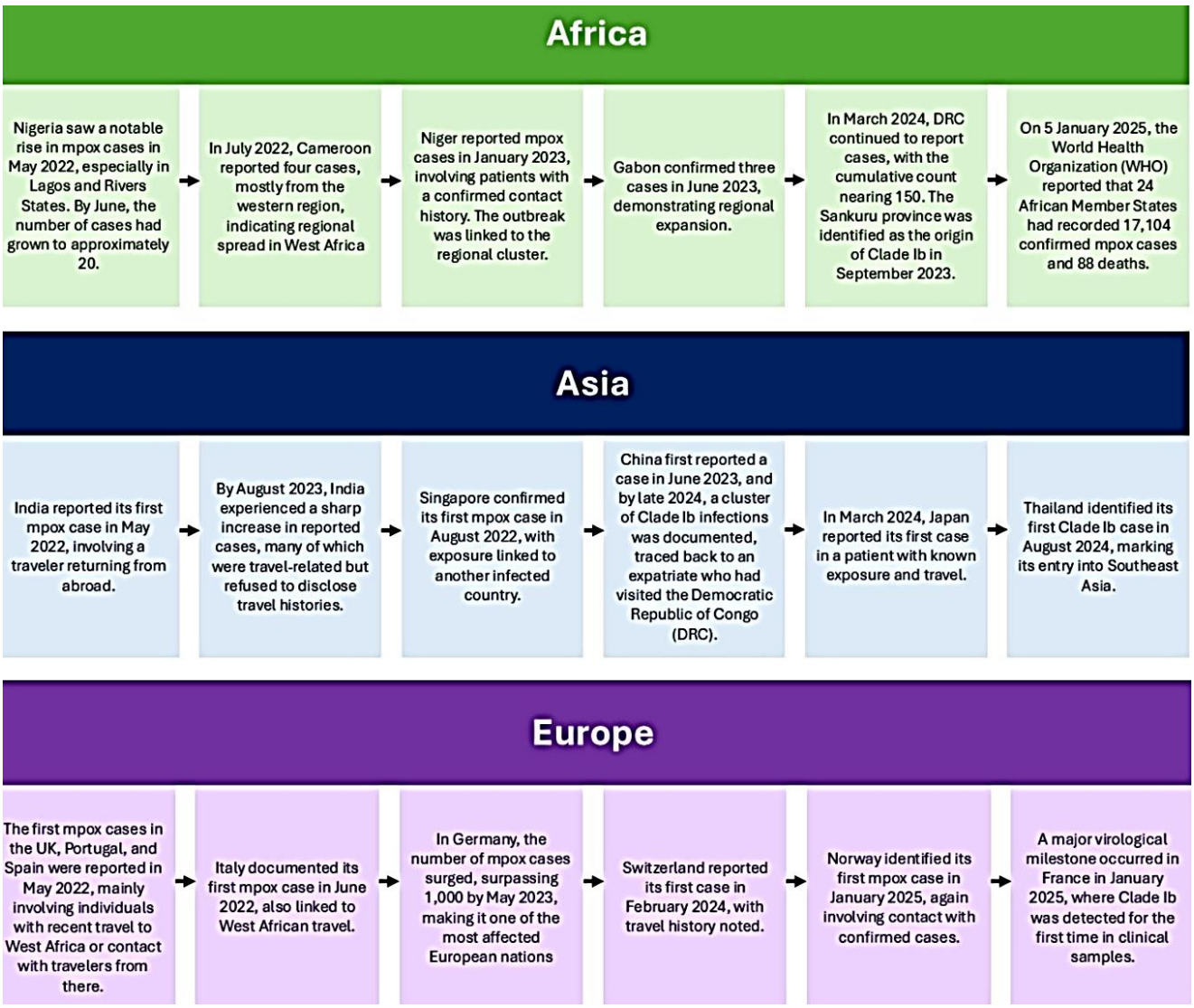

Figure 5: Global Monkeypox events from 2022 to 2025, including major outbreaks, the emergence of Clade Ib and Clade 1a, WHO emergency declarations, and evolving transmission patterns across Africa, Asia, and Europe

4. Diagnosis

Differentiation of Monkeypox from chickenpox is important. Lymphadenopathy during the prodromal stage of illness in the Monkeypox infection is the clinical feature to differentiate the monkeypox from smallpox.[40] The diagnosis is carried out by the skin lesions, followed by confirmation by the PCR. The Real time PCR is the preferred laboratory test for Monkeypox.[41] The available diagnostic assays for the Monkeypox virus includes virus isolation and electron microscopy, PCR, ELISA, enzyme-linked immunosorbent assay, serum immunoglobulins M and G, histopathologic analysis and immunofluorescent antibody assay.[41] Differential diagnosis must be considered includes measles, varicella, chancroid, scabies, secondary syphilis, infectious mononucleosis, disseminated herpes zoster, herpes zoster simplex and molluscum contagiosum.

5. Prevention and Control

As a primary prevention strategy, raising people's awareness of Monkey pox risk factors and teaching them about control measures can reduce their virus exposure. Vaccination against smallpox provides protection against the human Monkeypox infection. Improper or inadequately cooked meat should be avoided. Avoid close contact with the infected animals as the Monkeypox virus is a zoonotic virus.[42] To prevent the virus from spreading to others, people who have been infected with monkeypox should stay away from animals and rodents in particular. Isolation of the people who are infected by Monkeypox virus should be followed. People should avoid touching or using the fomites that are used by the infected ones. Proper hygiene methods should be followed after the contact with infected animals and patients by using alcohol based sanitizers and washing the hand with soap and proper cleaning and disinfection in areas where the patient, animals are kept for isolation helps in controlling the transmit of Monkeypox virus. The infected animals or patients can be quarantined and their contacts can be tracked to stop the spread of monkeypox. Physicians and health care practitioners should follow protective kids while handling the patients.

5.1. Preventive care vaccines

5.1.1. JYNNEOS vaccine

JYNNEOS (Modified Vaccinia AnkaraBavarian Nordic; MVA-BN) is a third-generation, non-replicating live vaccinia virus vaccine developed by Bavarian Nordic against smallpox as well as monkeypox. It is derived based on the Modified Vaccinia Ankara (MVA) strain, which is incapable of replication in human beings, making it a safe vaccine, especially among immunocompromised individuals.[43] Vaccination ensures the use of a two-dose series vaccine (0.5 mL at a time) subcutaneously with an interval of 28 days between the doses. JYNNEOS is approved as pre-exposure prophylaxis in persons at enhanced occupational danger (e.g., healthcare workers, laboratory staff members who deal with orthopoxviruses) and post-exposure prophylaxis in close contacts of proven instances.[43] It is not capable of replication, thus cannot grow to cause vaccinia or progressive vaccinia, and makes it appropriate in persons with contraindications to replication-competent vaccinia vaccines. No significant adverse events have been identified in clinical studies (including post-marketing surveillance), and strong immunogenicity and sustained antibody responses were shown in clinical trials and post-marketing surveillance. Anamnestic responses were observed with booster doses.

5.1.2. ACAM2000 vaccine

ACAM2000 is a second-generation, replication-competent live vaccinia virus vaccine, created by Emergent BioSolutions, initially authorized by the FDA to prevent smallpox and also confers cross-protection against monkeypox because of the antigenic similarity between vaccinia and monkeypox viruses. It is injected in a single dose by percutaneous injection, using a bifurcated needle, which causes a localized lesion at the point of inoculation that is suggestive of a successful vaccination. The resultant local viral replication causes potent humoral and cell responses. Because of its replication competence, ACAM2000 has an increased risk profile compared to non-replicating vaccines, especially in immunodeficient patients, patients with eczema, other exfoliative conditions of the skin, or some heart diseases. Reported events that occurred in response to adverse events include inadvertent autoinoculation, person-to-person transmission to close contacts with serious complications, including myocarditis, pericarditis, and post-vaccinial encephalitis. Individuals who have received the vaccine can shed the vaccinia virus onto the site of inoculation until the scab has completely separated, and this requires close wound care and precautions to prevent secondary transmission. ACAM2000 is usually limited to use with healthy adults who lack contraindication and need fast protection (soldiers or other specific emergency workers).

5.1.3. LC16 vaccine

LC16m8 is a third-generation, replication-competing, attenuated live vaccinia virus vaccine invented by KM Biologics, Japan, that aims at preventing smallpox and monkeypox, the safer alternative to conventional replicating vaccinia vaccines. It is based on the Lister strain of vaccinia virus with the attenuation provided by selectively choosing temperature aberrant mutations that have led to a decrease in replicative capacity and raise the safety with stability of immunogenicity. It is a single percutaneous dose with a bifurcated needle that is administered as LC16m8. It induces long-lasting humoral and cellular immunity similar to ACAM2000 with an extremely low rate of severe adverse reactions such as myocarditis and eczema vaccinatum. The attenuated form of the pathogen prevents systemic spread but provides environmental replication of the pathogen sufficient to result in a serious protective response. The vaccine is

licensed in Japan and some other areas as part of response and preparedness programs against the outbreak. Yet as they are significantly less dangerous than fully replication-competent vaccines, use of LC16m8 is contraindicated in persons with severe immunodeficiency, and decisions are made to administer it on a national basis (under national public health policy and based on a risk-benefit analysis).

6. Monkeypox Treatment

There is no treatment specific to monkeypox, but its treatment is based on the use of antiviral treatments in conjunction with relief from symptoms, and also assistance to manage problems and speed up recovery. Although most cases of monkeypox will disappear within a couple of weeks, some cases are more susceptible to complications, particularly those who have immune-compromised diseases or severe illness and require specific medical treatment. The primary goal of treatment is to alleviate symptoms, reduce complications, and lower the risk of transmitting the virus.[45]

6.1. Antiviral therapy

6.1.1. TPOXX (Tecovirimat)

Tecovirimat, also known as TPOXX is an antiviral medication specifically designed for the treatment of orophoxvirus-related infections like monkeypox.[46] In the 2022 outbreak of monkeypox, tecovirimat was extensively utilized in the prevention of the Centers for Disease Control and Prevention's (CDC) Expanded Access Investigational New Drug (EA-IND) protocol which permitted the use of tecovirimat for emergency treatments even though there was no research evidence from clinical trials conducted on human subjects. While its effectiveness against monkeypox in humans is being tested during ongoing clinical studies preclinical and in vitro research has shown promising antiviral effects. Tecovirimat is a drug which is a drug that targets the VP37 protein that is vital in the reproduction of viruses and spreading across the entire body. By preventing this protein, it blocks the virus from maturing into a virus, thereby reducing its severity, the incidence of illness, and the burden of the virus. 42 The drug is offered in both oral and intravenous (IV) formulations, making it ideal for hospitalized as well as outpatient patients. Dosing is determined by weight, which ensures the appropriate dosage for each patient. The usual course of treatment is 14 days; however, adjustments may be required according to medical conditions and other aspects that are specific to the individual patient. Because of its safety and efficacy, tecovirimat is the most popular antiviral treatment to treat monkeypox, particularly for those at risk of developing the disease like those suffering from severe signs of immune suppression.

6.1.2. Cidofovir

Cidofovir is an antiviral with broad-spectrum properties that have been demonstrated to have in vitro activity against the scourge of monkeypox.[47] It is a nucleotide analog and can integrate into viral DNA by interacting with the DNA polymerase of viral DNA and disrupting the replication of viruses. Originally designed for cytomegalovirus (CMV) disease in patients with immunocompromised immune systems Cidofovir was repurposed to treat orthopoxvirus-related infections, such as monkeypox. Although it is effective, its usage is restricted because it has a significant amount of nephrotoxicity. It is therefore able to cause damage to the kidneys. To limit the risk Cidofovir is typically used together with probenecid and intravenous hydration to reduce the possibility of kidney toxicities. The medication is administered in the form of an intravenous injection. It is generally reserved for the most severe instances of monkeypox, when other treatments, such as tecovirimat, aren't readily available or do not work. Because of the risk of negative side effects, Cidofovir should not be considered for use regularly in the case of monkeypox only if needed (**Figure 6**).

6.1.3. Brincidofovir

Brincidofovir is an oral antiviral that has been approved by the FDA to combat smallpox. It was made accessible under the emergency protocols for treating monkeypox.[47] This is a drug made up of lipids coupled with cidofovir created to reduce the nephrotoxicity caused by the drug while retaining its antiviral effects. Like cidofovir brincidofovir acts by blocking the DNA polymerase of viral infection. It stops viruses from reproducing in the host's cells. It is a drug that is taken by mouth, making it more effective when compared with intravenously administered cidofovir. For patients who weigh more than 48 kg, it is recommended to take 200 mg once a week for 2 weeks. While brincidofovir is much more efficient in terms of safety and effectiveness than Cidofovir and Cidofovir, it is also linked to increased liver enzymes, which require constant monitoring of liver function during treatment. Because of its oral administration, and less toxic to the kidneys, it is considered to be an affordable option for those who require antiviral treatment but aren't able to receive the intravenous treatment of Cidofovir. However, like other antivirals that treat monkeypox, additional studies are needed to confirm its long-term efficacy and safety.[48]

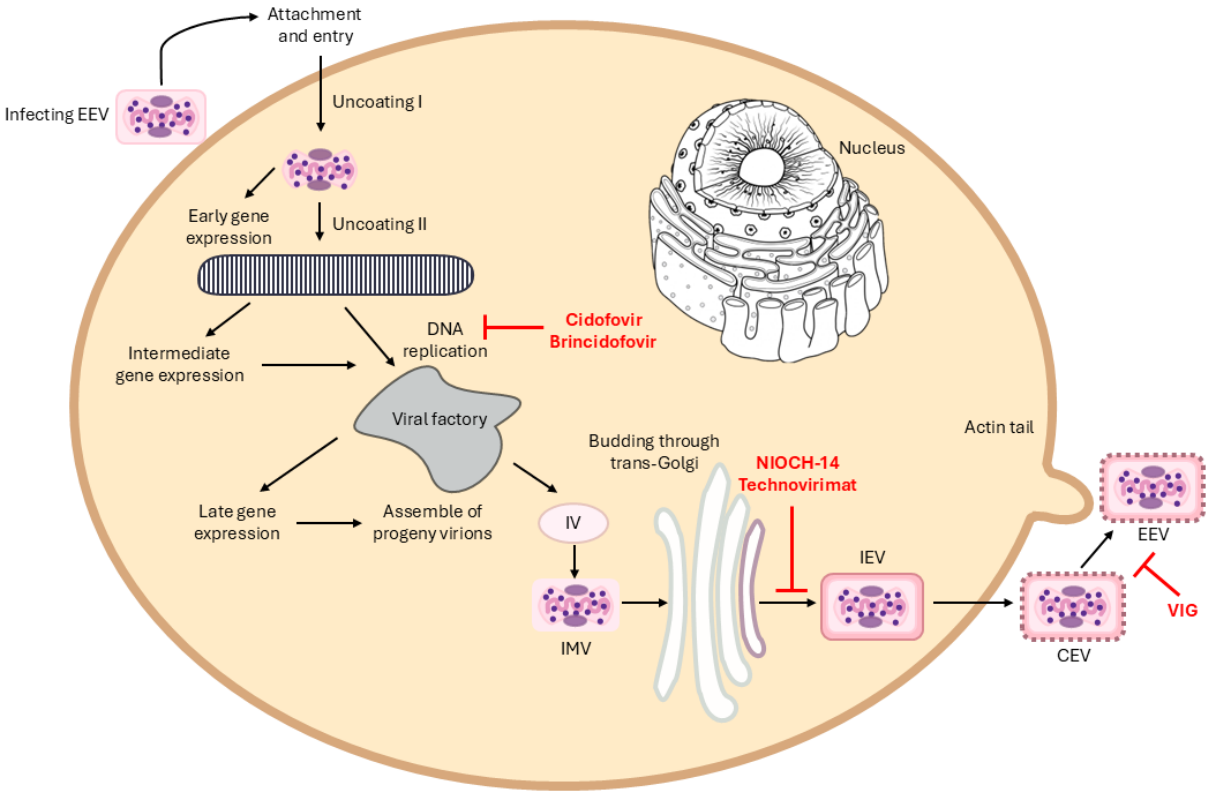

Figure 6: Monkeypox virus replication cycle and mechanism of action of antiviral agents. Replication occurs in the cytoplasm. Cidofovir and brincidofovir inhibit DNA polymerase; tecovirimat and NIOCH-14 block CEV and EEV formation; VIG prevents infection of new cells

6.2. Symptom management

The ability to control symptoms is crucial to ensure patients' comfort and avoid the progression of any further complications. Fever, body aches, and fatigue are common when it comes to monkeypox. It is treated with antipyretic or analgesic medications like Ibuprofen and acetaminophen. Pain can be a significant issue, especially for those with large lesions, or even involvement of the oral, genital, or perianal areas. The treatment of severe pain can require more intense analgesics. This includes opioids. Patients who are suffering from inflammation and pain in the rectal area, which is known as proctitis, may get relief from anesthetics applied to the skin such as lidocaine and stool softeners that ease discomfort and soak in sitz baths to provide the relief of irritation. Lesions on the skin require care to avoid further infection by bacteria. This could cause further damage and slow healing. The affected areas should be kept clean and dry and antiseptic solutions are a good way to prevent infections. The irritation and itching are treated by using calamine lotions, colloidal oatmeal baths, or an antihistamine. If a superinfection caused by bacteria is present the treatment of antibiotics may be necessary to prevent the spread of disease.

6.3. Hydration and nutrition

Hydration and nutrition are crucial for the process of healing after suffering from monkeypox. Many patients are unable to eat due to painful oral lesions which can cause a decline in the consumption of food and dehydration. Be sure to consume sufficient fluids, soft foods, and an appropriate diet to keep the health of your immune system and improve its performance. In the most extreme instances in which patients are not able to drink enough fluids, the need for intravenous hydration becomes essential. A balanced diet of an individual helps with the body's recuperation more efficiently and speeds up the healing process of skin lesions.

6.4. Hospitalization and intensive care

Although most monkeypox cases can be managed at home, some patients develop severe complications that necessitate hospitalization. Those who have extensive skin lesions, respiratory distress, dehydration, or secondary bacterial infections often require close medical supervision. Intravenous fluids and electrolyte therapy are administered to prevent dehydration and maintain physiological balance. In cases where breathing difficulties arise, oxygen therapy may be required. Skin and wound care become even more critical in hospitalized patients to prevent the formation of deep scars and secondary infections. In certain high-risk cases, particularly in immunocompromised individuals, the use of vaccinia immune globulin (VIG) may be considered.[49] This antibody-based treatment has been used for severe *orthopoxvirus* infections, though its effectiveness against monkeypox is still being studied. Hospitalized patients are closely monitored for potential complications such as sepsis,

encephalitis, or long-term organ dysfunction, which can arise in a small subset of severe cases.

7. Recovery and Long-Term Care

The majority of monkeypox cases are resolved within two to four weeks, but some individuals may experience lingering symptoms that require ongoing medical attention. Fatigue and generalized weakness can persist for weeks after the infection has cleared up, making rest and gradual return to activity important. Skin scarring is a common long-term effect, particularly in patients who have extensive lesions or secondary infections.[49] Dermatological treatments, including moisturizing agents and scar-reducing creams, may help improve the appearance of healed lesions. In some cases, patients may experience psychological distress due to the visible effects of monkeypox, as well as the isolation required during the contagious phase of the illness. Counseling and mental health support may be beneficial for individuals struggling with anxiety, depression, or social stigma related to their condition. Long-term follow-up is often recommended for immunocompromised individuals, ensuring that any delayed complications are promptly identified and managed.

8. Conclusion

This article discusses that monkey pox is a rare viral zoonotic disease that is caused by the monkey pox virus, which belongs to the genus Orthopoxvirus, the family Poxviridae, and the subfamily Chordopoxvirinae. The monkeypox virus is spread from humans to humans through direct contact with infected animal cutaneous or mucosal lesions, blood, and body fluids (respiratory secretions), objects and materials that have been contaminated (fomites). To prevent the virus from spreading to others, people who have been infected with monkeypox should stay away from animals, especially rodents, since these species can act as reservoirs and contribute to further transmission. Isolation of the people who are infected by Monkeypox virus should be followed. People should avoid touching or using fomites (such as clothing, bedding, utensils, or personal items) used by infected individuals, and strict contact precautions should be followed to prevent transmission. Proper hygiene methods should be followed after contact with infected animals and patients by using alcohol based sanitizers and washing hand with soap and proper cleaning and disinfection in areas where the patient, animals are kept for isolation helps in controlling the transmit of Monkeypox virus. Since there are no specific treatment, the vaccination for smallpox could protect against the monkey pox virus. The treatment of monkeypox requires a comprehensive approach, combining antiviral therapy, symptom relief, and supportive care to promote recovery and prevent complications. Tecovirimat remains the primary antiviral agent used, while symptomatic management with pain relief, hydration, and wound care is crucial in ensuring patient comfort. Severe cases may require hospitalization, particularly in immunocompromised individuals or those with extensive lesions. Recovery is usually complete within a few weeks, but post-viral symptoms such as fatigue and scarring may persist, highlighting the importance of long-term follow-up and psychological support. Early detection, appropriate medical care, and public health measures remain key in controlling the impact of monkeypox and reducing its spread.

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10. Conflict of Interest

None.

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