

The transmission and pathogenicity of monkeypox virus during the 2022 outbreak in non-endemic countries

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Abstract:

The transmission and pathogenicity of monkeypox virus during the 2022 outbreak in non-endemic countries was different from that of previous outbreaks. Mutations were found in the monkeypox virus isolates of the 2022 outbreak.

Key Word: *Monkeypox virus; Transmission; Pathogenicity; Mutation.*

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I. Background

The monkeypox virus belongs to the genus *Orthopoxvirus* of the family *Poxviridae*, as does the variola virus. The usual geographic distribution of monkeypox virus is in western and central Africa. The reservoir host of the virus is unknown (likely rodent). The virus may infect monkeys, zoo animals, humans and prairie dogs as well [1].

The transmission of monkeypox virus occurs through contact with the skin lesions, body fluids or respiratory droplets of the infected animals. The virus enters the body via the respiratory tract, broken skin, or mucous membranes (e.g., the eyes) [2].

The prodromal symptoms of the clinical disease of monkeypox virus infection include fever, headache, backache and fatigue. In unvaccinated individuals, cutaneous lesions evolve in any one part of the body from macules, papules, vesicles, pustules, and then crust and scar. In previously vaccinated individuals, rash lesions develop [1]. The mortality rate was reported to range from 1% to 10% [3].

II. The transmission of monkeypox virus during the 2022 outbreak in non-endemic countries

The 2022 outbreak of monkeypox virus infection in non-endemic countries started from May. 1475 confirmed cases were distributed in 43 countries, which include United Kingdom, Spain, France and USA [2].

It was found that the monkeypox outbreak was mostly affecting men who have sex with men. And it was speculated that monkeypox might have mutated in ways that allowed it to transmit more easily [4]. The transmission of monkeypox virus through sexual contact in the outbreak was confirmed [5].

III. The pathogenicity of monkeypox virus during the 2022 outbreak in non-endemic countries

The prevalence of fatigue, asthenia, or lethargy among patients of the 2022 outbreak was much lower than seen in previous outbreaks. Fewer patients reported fever or febrile chills, compared with previous outbreaks [6].

In patients of the 2022 outbreak, skin lesions on the genital or perianal skin were more frequently seen, while the prevalence of lesions on the face and neck was much lower, compared with in the patients of previous outbreaks [6].

IV. Discussion

Given that the monkeypox virus in the 2022 outbreak in non-endemic countries exhibited different transmission pattern and pathogenicity characteristics compared to the virus in previous outbreaks, one would expect that the monkeypox virus in the 2022 outbreak might have acquired many mutations. Indeed, the isolates from the 2022 outbreak shared 40 mutations that distinguish these isolates from their closest variant. In typical evolutionary timelines, it would take at least 50 years for monkeypox virus to pick up so many mutations. An

explanation for the accelerated mutation rate of monkeypox virus is that some enzymes in the host's immune system can induce mutations in the infecting virus [2].

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