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**MONKEYPOX: A INCLUSIVE ANALYSIS OF DEVOLUTION,
ETIOLOGY AND EXTERIORIZATION**

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ABSTRACT

The main purpose of telling people about monkey pox is to make people aware of this dangerous disease, how this disease spreads among us, what is the cause of it, how can we identify this disease, how it can be treated and what precautions need to be taken. Monkey pox is a rare disease caused by infection with the monkey pox virus. Monkey pox virus is part of the same family of viruses as variola virus, the virus that causes smallpox. Monkey pox symptoms are similar to smallpox symptoms, but milder, and monkey pox is rarely fatal. Monkey pox is not related to chicken pox. The structure of the monkey pox virus is large, envelope and brick shaped. Few symptoms are there which is help to identify this disease Muscle aches and backache, Respiratory symptoms (e.g. sore throat, nasal congestion, or cough), Swollen lymph nodes, fever.

Keywords: Monkeypox, virus, medicines

INTRODUCTION

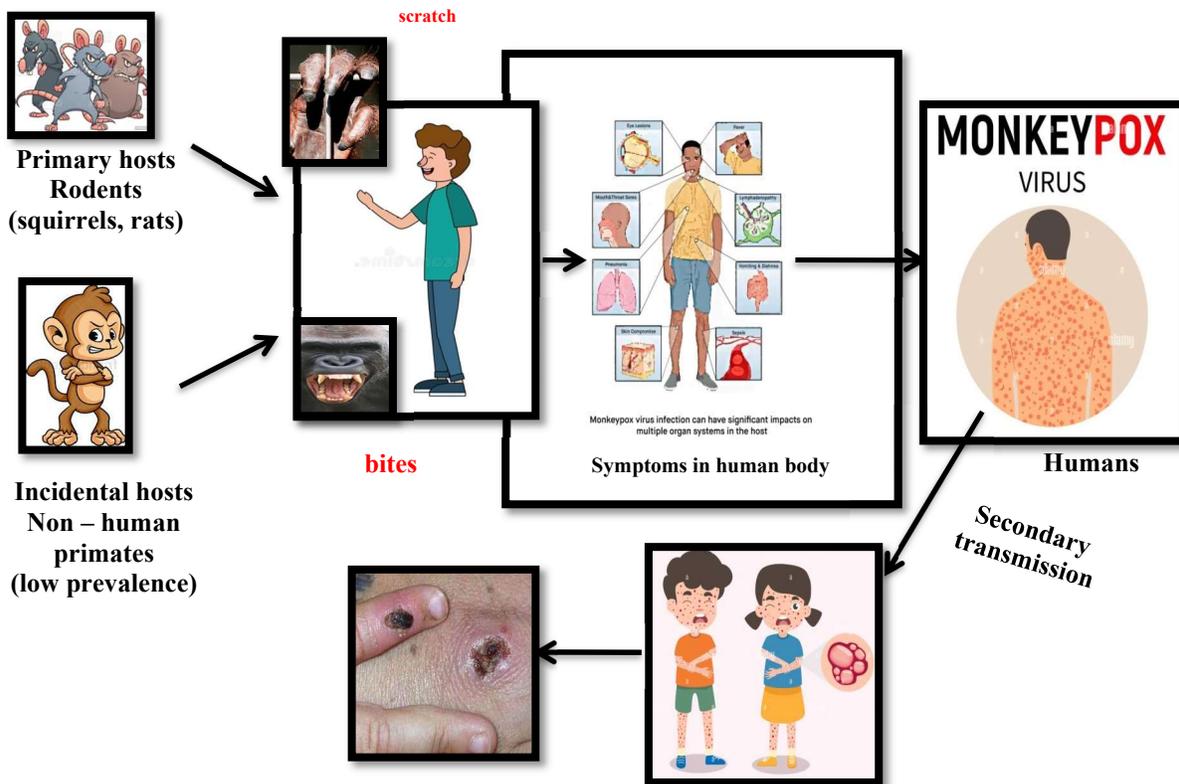
Monkey pox is a viral zoonotic disease belongs to the family poxviridae and orthopox virus genus [1]. Monkey pox is viral zoonotics orthopox virus with a presentation similar to small pox [2]. Monkey pox virus (MPXV) is a double standard DNA virus a member of the orthopox virus genus within the proxiviride

family [3]. Monkey pox virus is an orthopox virus, a genus that includes complex, cowpox, vaccinia, and variola viruses. The virus is the foremost orthopox virus affecting human population since smallpox eradication confirmed by the “World Health Organization in 1980” [4].



Figure 1.1: Monkey pox virus infection

Steps of monkeypox



1.1 CONDITION:-

- Acute Monkey pox virus infection definitive criteria: - Detection of monkey pox virus specific sequences using next generation sequencing for clinical specimens isolation of monkey pox virus by culture from clinical specimens [5].
- Suggestive Criteria: - Detection of orthopox virus by nucleic acid amplification testing in clinical specimens. Detection of orthopox virus by electron microscopy from clinical specimens in the absence of exposure to another orthopox virus [6].

1.2 TYPES OF MONKEY POX –

Two decided genetic species of the monkey pox virus to be found: - The first one is central African (Congo basin clade) [7].

The Congo basin species has historically caused more disorder and was thought to be more transmissible. The West African clade [8].

Monkey pox has two generic groups: - Central African east African. There is less number of death and human to human transmission in West African and vice versa in central African [9].

Categorizing of Monkey pox: - Monkey pox virus belong to -The orthopox virus genus in the family poxviridae [10].

The orthopox virus genus also includes variola virus (which causes smallpox), vaccine virus (used in the smallpox vaccine), and cowpox virus [11].

1.3 WORLD SCENARIO OF MONKEY POX VIRUS: -

You were in an area where the monkey pox virus has been recorded or an where monkey pox is more commonly found the democratic republic of the congo, republic of the congo, Nigeria, Central African republic, Cameroon, Sudan [12]. Since the beginning of the current global outbreak, 5,115 cases have been confirmed in 51 countries, including the United States [13].

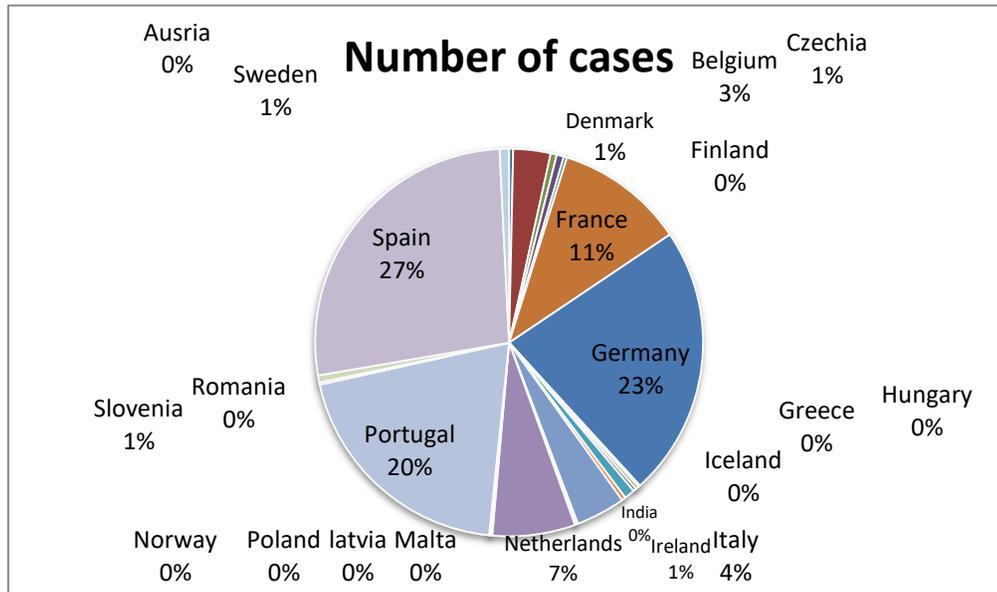


Chart 1.1- Monkey pox cases of different countries

India scenario of monkey pox virus:-

- In July 14th 2022 there is first cases of monkey pox virus found in Kerala, that man returned to the state from the United Arab.
- A second case of monkey pox virus has been confirmed in Kerala a 31 years old man who reached Kannur from Dubai, via Mangalore on July 13th 2022 [14].
- The third case reported in Kerala on Friday 22 July 2022, resident of Malappuram who returned from the U.A.E.
- The fourth case of monkey pox is reported in Delhi on Sunday 24 July 2022, 34 years old man testing positive for the disease the man is a resident of Paschim Bihar in West

Delhi and has no history of travels. (Up to July 2022).

2. HISTORY OF MONKEY POX VIRUS:

-

- Monkey pox virus was firstly announced in 1959 as an outbreak of a pox-like disease in monkeys kept at a research institute in Copenhagen, Denmark [15].
- In medical history the first human MPXV case was acknowledged when, on 1 September 1970, a nine-month-old child was admitted to the Basankusu Hospital in the Democratic Republic of Congo (at that time, known as the Republic of the Congo). The boy had a smallpox-like disease from which MPXV-like virus was isolated [16].

- Six cases of human MPXV were report in Liberia, Nigeria, and Sierra Leone between October 1970 and May 1971. The first index MPXV case in Nigeria was recorded in 1971, and 10 MPXV cases were reported between 1971 and 1978 [17].
- The name Monkey pox originated from the initial discovery of the virus in Monkeys in a Danish laboratory in 1958 [18].
- Since that time Monkey pox has become endemic in the DRC and has spread to other African countries, mainly in central and west African, at the time of this systematic review, the most recent cases were in 2019. Over the past 50 years, periodical outburst have been appear mainly in African countries, with several thousand human cases set down to date. Occasional cases and limited outburst linked to travel or importation of animals shelter the virus have also been described in non-endemic countries [19].

3. CAUSES: -

- Monkey pox virus is a communicable disease which is caused by monkey pox virus, which is member of orthopraxy

virus, belongs to family pox viridae [20].

- Monkey pox symptoms can develop 5-21 days after someone is affected [20].
- It caused if victim come directly contact with that person who already have infections rash, scabs or body fluid [20].
- It is transmitted to human through close contact with an infected people or with material contaminated with the virus [21].
- Directly contact or touching those items that already infectious races or body fluid [21].
- This virus also spread by the pregnant lady to their fetus through the placenta [22].
- The other way of spreading virus from infected animals by scratching or beaten by them [23].
- Eating the meat of an infected animal [23].
- Respiratory drop its that you breathe in [23].
- Contact with body fluid like blood or semen, research is in under process [24].

3.1 HOST OF MONKEY POX VIRUS [25]: -

Some animal species have been pick out as susceptible to monkey pox virus

- Rope squirrel
- Tree squirrels
- Gambian pouched rats
- Dormice
- Non-human primates

3.2 SIGN AND SYMPTOMS [25]:-

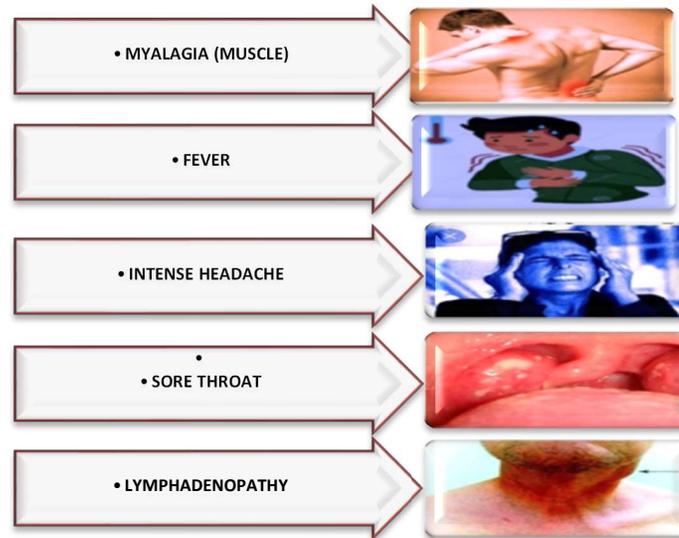


Figure 3.1: Sign and symptom of human body

3.3 RACES HAVE DIFFERENT STAGES:-

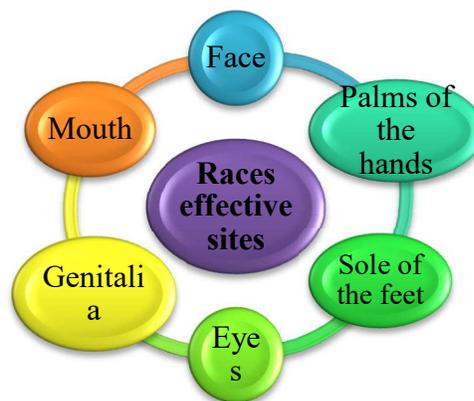


Figure 3.2: Different stages of viruses' effects in body

Not all the peoples show all of the symptoms of monkey pox virus. In fact, in the current (2022) date, many cases aren't following the

same pattern of symptoms. This unusual presentation includes only a few abrasion, no swollen lymph nodes, less fever and other

signs of complaint. WHO officials say most of the May 2022 cases were sexually transmitted, especially among men who have sex with man [25].

4. LABORATORY TESTING STANDAR D FOR THE MONKEY POX VIRUS: -

Testing for the presence of MPXV should be performed in appropriately equipped laboratories by staff trained in the relevant technical and safety procedures [26]. Confirmation of MPXV infection is based on nucleic acid amplification testing (NAAT), using real time or conventional polymerase chain reaction (PCR), for detection of unique sequences of viral DNA. PCR can be used

alone, or in combination with sequencing. Before an assay is utilized to test human clinical specimens within a laboratory, it should be validated or verified within the laboratory by appropriately trained staff [27]. Testing for the presence of MPXV should be performed in appropriately equipped laboratories BT staff trained in the relevant technical and safety procedures. Measures should be taken to minimize the risk of laboratory transmission based on risk assessment when testing routine clinical specimens from confirmed or suspected monkey pox virus patients [28].

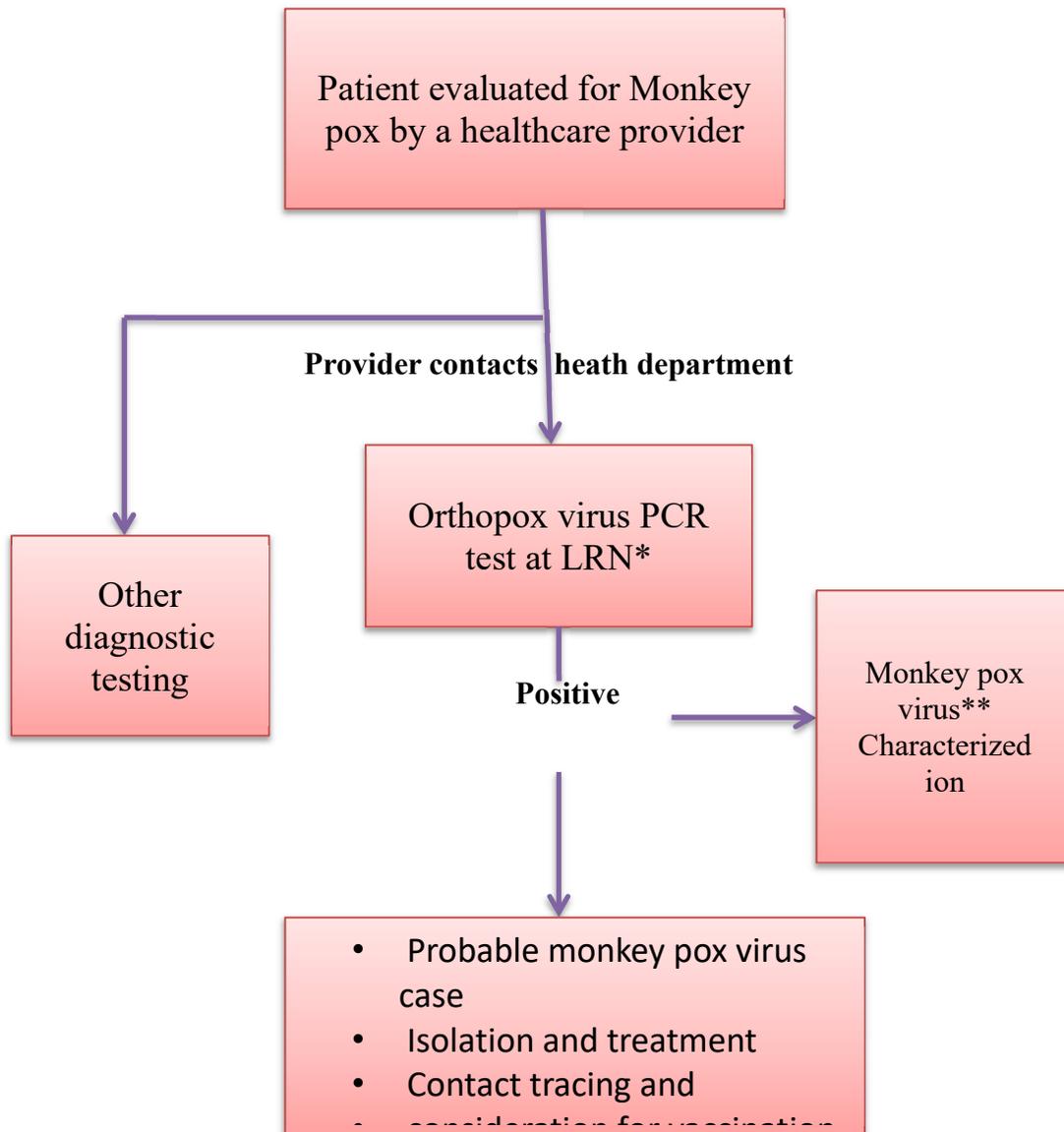
EQUIPMENTS					
Real time PCR instrument	Microcentrifuge	Pipette man, including a p2, p20, and p200 as needed.	Refrigerator	Vortexer	Freezer (preferably $\leq -20^{\circ}\text{C}$)

4.2 SUITABLE SAMPLES AND SPECIMEN COLLECTON:-

Lesion material should be collected from persons with suspected monkey pox virus infection with an active lesion or rash. Acceptable sample types include lesion fluid, lesion tissue, lesion crust or skin biopsy. Materials can be collected using a sterile dry swab (e.g. nylon, polyester or Dacron) suitable for nucleic acid amplification (NAA)

testing [29]. Samples should be collection on the tip of the swab and ideally exudates should be visible. Vigorously rub the bottom of the lesion to ensure cellular materials from the lesion base are collection. It may be necessary to deroof the lesion. Each sample should be placed in individual sterile containers or collection tubes.

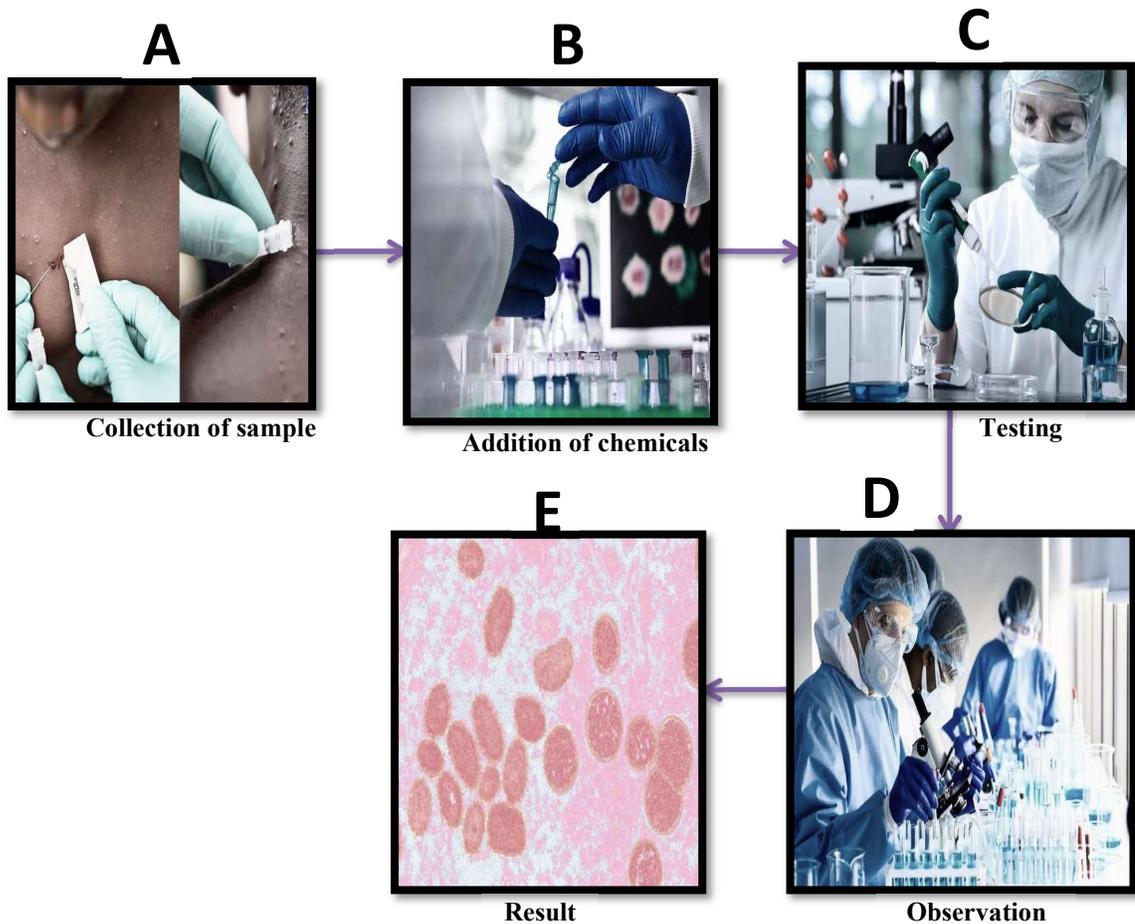
4.3 DIAGNOSTIC PROCESS FOR MONKEY POX VIRUS TESTING –



PCR – polymerase chain reaction; LRN – laboratory response network
*Monkey pox is a member of the orthopox group of viruses *

4.4 SAMPLE COLLECTION –

Steps :-



5. TREATMENT AND VACCINES –

There is no specific treatment or vaccine available for monkey pox infection. In the past, the Anti smallpox vaccine was shown to be 85% effective in preventing monkey pox

but the world was declared free of smallpox in 1980 so the vaccine isn't widely available anymore.

1. TECOVIRIMAT (capsule)



Figure 5.1: Tecovirimat for monkey pox

PRODUCT DESCRIPTION				
Packaging size	Strength	Composition	Treatment	price
42 capsules	200 mg	Tecovirimat	Monkey pox	8,800/ bottle

Dosage of Tecovirimat – The dose of tecovirimat is calculated based on the body weight of the patients who are selected for monkey pox and smallpox treatments.

The recommended dose of tecovirimat in about and pediatric patients who weight – Dose adjustment of tecovirimat is not necessary while treating patients with a kidney or liver disease.

Table 5.1: dosages of drug is according to body weight

Above 13 kg to below 25 kg	one capsule(200mg) two times daily
Above 25 kg to below 40kg	Two capsule (400mg) two times daily.
40 kg and above	Three capsule (600mg) two times daily.

Table 5.2 – Side effects of the drug (Tecovirimat)

Gastrointestinal	Nervous system	Respiratory system	Skin	Others
Nausea, vomiting, indigestion, pain in the stomach, taste disturbances	Headache, dizziness, attention difficulties, depression, anxiety, mood irritation	Throat pain with airway disorders	Rashes, itching, redness, swelling of the face	Fever, weakness, pain in the joints, heart, rhythm abnormalities, low hemoglobin level

Note – PREGNANCY RISK OF DRUG –

- Monkey pox infection can also be transmitted to the fetus, and it is more difficult for pregnant woman to get the disease.
- Animal multiplying studies have shown no fetal adverse events.
- It has not been proven effective in human pregnancy.

2. MONKEY POX VACCINE, LIVE, NONREPLICATING (Rx): - [30].

BRAND AND OTHER NAME - JYNNEOS

Dosage forms & strengths injectable, SC suspension 0.5ml/single dose vial

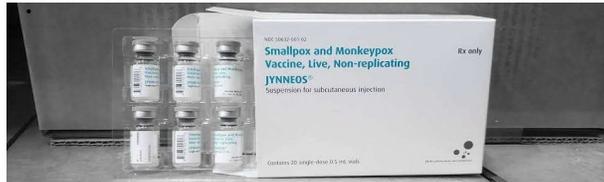


Figure: 5.2 – JYNNEOS Money pox Vaccine

Prevention of Monkey pox disease –

- 0.5 ml SC x2 doses 4 weeks apart.
- Indicated for prevention of monkey pox disease in adults who are at high risk for monkey pox infection [31].

Table 5.3: Adverse Effects

S.N.	%	INJECTION SITE	SYSTEMIC
1.	>10%	Pain (84.9%) Redness (60.8%) Swelling (51.6%) Itching (43.1%)	Muscle pain (42.8%) Headache (34.8%) Fatigue (30.4%) Chills (10.4%)
2.	>1 %	Swelling ≥100 mm (0.8%) Indurations ≥100mm (0.3%)	Fever, grade ≥ 3 (0.2%)
3.	1-10 %	Pain, grade 3 (7.4%) Redness ≥ 100mm (1.5%) Itching, grade 3 (1.6%)	Muscle pain, grade 3 (2.6%) Headache, grade 3 (2.4%) Fever (1.7%) Chills, grade 3 (1%)

3. CIDOFOVIR –

Brand name - Benemid

Generic name - Probenecid



Figure 5.3: CIDOFOVIR injection of monkey pox virus

- Date on the effectiveness of cidofovir available. It is indicated for in human cases of monkey pox is not cytomegalovirus in the united states.

- Although cidofovir has proven activity against poxviruses in inviro and animal studies, it is not known whether or not a patient with severe monkey pox infection will benefit from treatment.
- The CDC holds an expanded access investigational new drug (EAIND), also called compassionate use, that allows for the use of stockpiled cidofovir for treatment of orthopox viruses (including monkey pox) in an outbreak [32].

Table 5.4: Side Effects of Injection

S. No.	Common side effects	Other side effects
1.	<ul style="list-style-type: none"> • Protein in the urine • Low white blood count • Change in eye pressure <ul style="list-style-type: none"> • Fever • Infection 	<ul style="list-style-type: none"> • Shortness of breath • Nausea and vomiting

CONCLUSION –

All the information given by us regarding to monkey pox in this review, Its main purpose is to make people aware of this disease, it is a kind of sociable disease, which is only caused by monkey, Gambian pouched rats, Dormice, tree squirrels or if victim directly contact with the infected person. The main symptom is myalgias (muscles pain), fever, intense headache, sore throat. A person who infected with monkey pox can carry a very high risk severe congenital infection, pregnancy loss and mortality and maternal morbidity. There is no specific vaccine available but for preventive purpose we use small pox vaccine which is shown to be 85% effective. Formerly, Monkey pox was not transmitted through respiratory route and not able to sustain in humans but now it is possible due to genetic changes. So, there is a

great need of having an antiviral drug for its treatment.

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