

Poxviridae

Double-stranded DNA, enveloped viruses that are large in size and replicate in the cytoplasm

Variola virus (the cause of smallpox الجدرى الذي تم القضاء عليه من خلال حملة تطعيم عالمية وانتهى في العالم منذ (السبعينات)

Monkeypox virus (جدرى القردة والذي اكتشفت حالات بشرية بسببه في بداية السبعينات وانتشر بكثافة في العام 2022)

Molluscum contagiosum virus (مرض جلدي يُشفى تلقائياً شوف تأخذونه بالتفصيل الفصل القادم بإذن الله تعالى)

IMPORTANT: Why the campaign for eradication of smallpox was successful? مهم جداً: لماذا نجحت حملة القضاء على الجدرى؟

1. Variola virus is a DNA virus that is stable antigenically.
2. The live-attenuated vaccine was effective and gave long-term immunity.
3. The disease affected humans only with animal reservoir.
4. All cases were symptomatic with no subclinical infections or carrier states.
5. The disease had a high mortality rate and for those who survived infection, permanent scars remained causing emotional damage. So, people collaborated in the vaccination efforts.

Parvoviridae

Single-stranded DNA, non-enveloped viruses that are very small in size and replicate in the nucleus

Parvovirus B19 and bocaviruses

Transmission: respiratory secretions, mother-to-child

Tropism: erythroid progenitors for B19 virus. Why not in mature RBCs? Because they lack nuclei.

Respiratory cells for bocaviruses.

Clinical features: For bocavirus: upper and lower respiratory tract infections.

For parvovirus B19: In children, it causes fever and rash which is called erythema infectiosum (fifth disease or slapped cheek syndrome). In adults, primary infection can cause arthritis (التهاب المفاصل)

Other parvovirus B19 disease in special groups of patients:

- A. Immunosuppressed patients: Pure red cell aplasia (chronic anemia)
- B. Underlying chronic anemia: Transient aplastic crisis (severe acute anemia)
- C. Congenital infection: Hydrops fetalis (anemia that could be fatal)

Diagnosis:

- A. Clinical
- B. PCR.
- C. Serology: IgM in primary infection and IgG to indicates past infection.

Treatment: Supportive.

Prevention: Vaccines have not been approved for prevention so far.

Epidemiology: Common infection. No latent state.

Adenoviridae

Double-stranded DNA, non-enveloped viruses that replicate in the nucleus. The virus has many serotypes.

Transmission: respiratory secretions, fecal-oral, direct contact

Tropism: epithelial cells of the respiratory tract, eyes, gastrointestinal tract and urinary tract.

Clinical features:

- A. Upper and lower respiratory tract infections (adenoviruses are the most common causes of pharyngitis).
- B. Gastroenteritis.
- C. Conjunctivitis.
- D. Cystitis (urinary bladder infection التهاب المثانة البولية)

Diagnosis: Antigen detection; PCR.

Treatment: Supportive.

Prevention: Live attenuated vaccine is available for a few serotypes (Ad4 and Ad7) that can cause pneumonia.

Epidemiology: Infection can occur year around without seasonality (ليس موسميًا).

Important note: Adeno-associated virus (AAV) is a defective ss DNA virus with adenovirus as the helper virus. In 2022–2023, acute severe hepatitis cases in children that were negative for hepatitis A – E viruses were linked to AAV-2 infection in genetically susceptible children.

Papillomaviridae (Human papillomaviruses (HPV))

Double-stranded DNA, non-enveloped viruses that replicate in the nucleus. The virus has many types.

Transmission: direct contact, sexual

Tropism: epithelial cells of the skin and mucous membranes.

Important features:

- 1. HPV is the most common cause of sexually transmitted infections worldwide.
- 2. Most HPV infections resolve spontaneously within 2-3 years.
- 3. Many infections are totally asymptomatic, so the patient can have HPV without knowing
- 4. Some HPV types are benign, some have low-risk of causing cancer and some are high-risk types that can cause the following cancers: cervical, penile, anal, oropharyngeal, and vulvar cancers.
- 5. High-risk HPV types have transforming proteins that are related to cancer development.

Clinical features:

- A. Common warts (الثآليل)
- B. Condyloma acuminata (genital warts الثآليل التناسلية) caused mainly by HPV-6 and HPV-11
- C. Laryngeal papilloma.
- D. Cervical cancer (سرطان عنق الرحم في الإناث) caused mainly by HPV-16 and HPV-18
- E. Other cancers: penile, anal, oropharyngeal, and vulvar cancers. Caused by high-risk HPV types (e.g., HPV-16 and HPV-18)

Diagnosis:

- A. Clinical.
- B. Pap smear (Papanicolaou smear is a cytology method of cervical screening to look for precancerous lesions in the cervix).
- C. PCR.

Treatment: Most do not require treatment. Other methods: surgical excision, laser therapy, chemical agents (e.g., podophyllotoxin and podophyllin, imiquimod).

Prevention: Subunit vaccines:

- 1. Cervarix (bivalent vaccine for HPV-16 and 18).
- 2. Gardasil (quadrivalent vaccine for HPV-6, HPV-11, HPV-16, and HPV-18).
- 3. Nonavalent vaccine (for the following types: 6, 11, 16, 18, 31, 33, 45, 52, 58).

Epidemiology: The global HPV prevalence is about 10%.

Polyomaviridae

Double-stranded DNA, non-enveloped viruses that replicate in the nucleus

JC virus, BK virus and Merkel cell polyomavirus

The vast majority of these infection remain latent in the body without symptoms.

Transmission: not established

Clinical features:

- A. BK virus: cystitis in bone marrow transplant patients
- B. JC virus: progressive multifocal leukoencephalopathy (PML) in AIDS patients.
- C. Merkel cell polyomavirus: Merkel cell carcinoma (rare skin cancer). So, Merkel cell polyomavirus is an oncovirus

Diagnosis:

- A. PCR
- B. Radiology
- C. Histopathologic examination

Treatment: No specific treatment.

Prevention: Vaccines have not been approved for prevention so far.

Epidemiology: Widely spread. A majority of humans have had the infection by BK and JC viruses.