



Medical Virology for 2nd Year M.D. Students



Adenoviruses

University of Jordan

School of Medicine

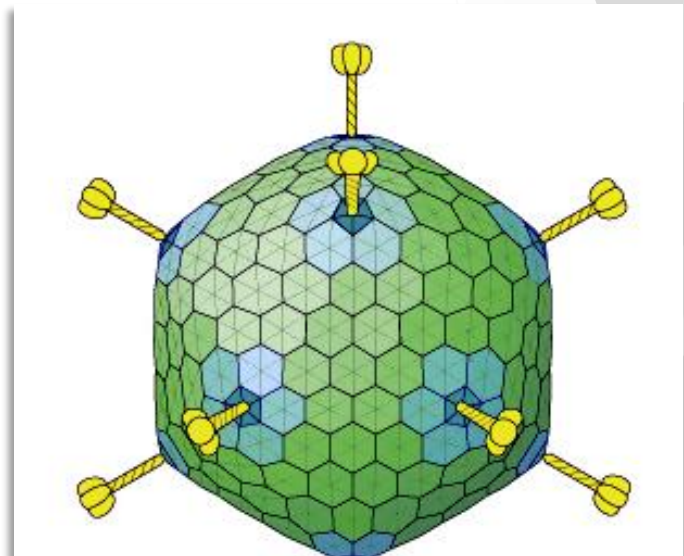
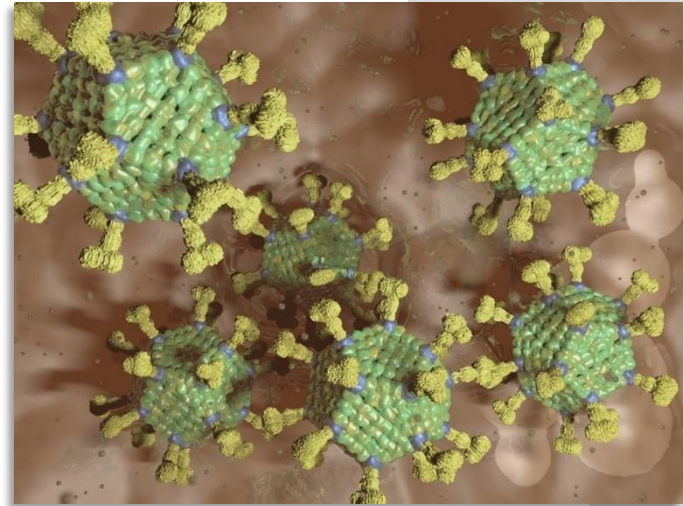
Section of Microbiology & Immunology

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Adenoviruses

- First found in adenoid tissue (tonsils).
- Naked viruses.
- Icosahedral
- Contain double-stranded DNA genome.
- At the 12 vertices of the capsid, fibers that contain type-specific antigens are protruding which are important in serotyping.





Adenovirus (Ad)-Classification

- There are 57 serotypes in the seven species of human Ads:
- species A (Ad12, 18, 31).
- species B (Ad3, 7, 11, 14, 16, 34, 35, 50, 55).
- species C (Ad1, 2, 5, 6).
- species D (Ad8 to 10, 13, 15, 17, 19, 20, 22 to 30, 32, 33, 36 to 39, 42 to 49, 51, 53, 54, 56).
- species E (Ad4).
- species F (Ad40 and 41).
- species G (Ad52).



Adenovirus-Pathogenesis

- ▶ Adenoviruses infect and replicate in **epithelial cells** of the *respiratory tract, eye, gastrointestinal tract and urinary bladder*.
- ▶ Usually, adenoviruses cause **localized infection** and do not spread systemically.
- ▶ Most human adenoviruses replicate in intestinal epithelium after ingestion but usually produce **subclinical infections** rather than overt symptoms.

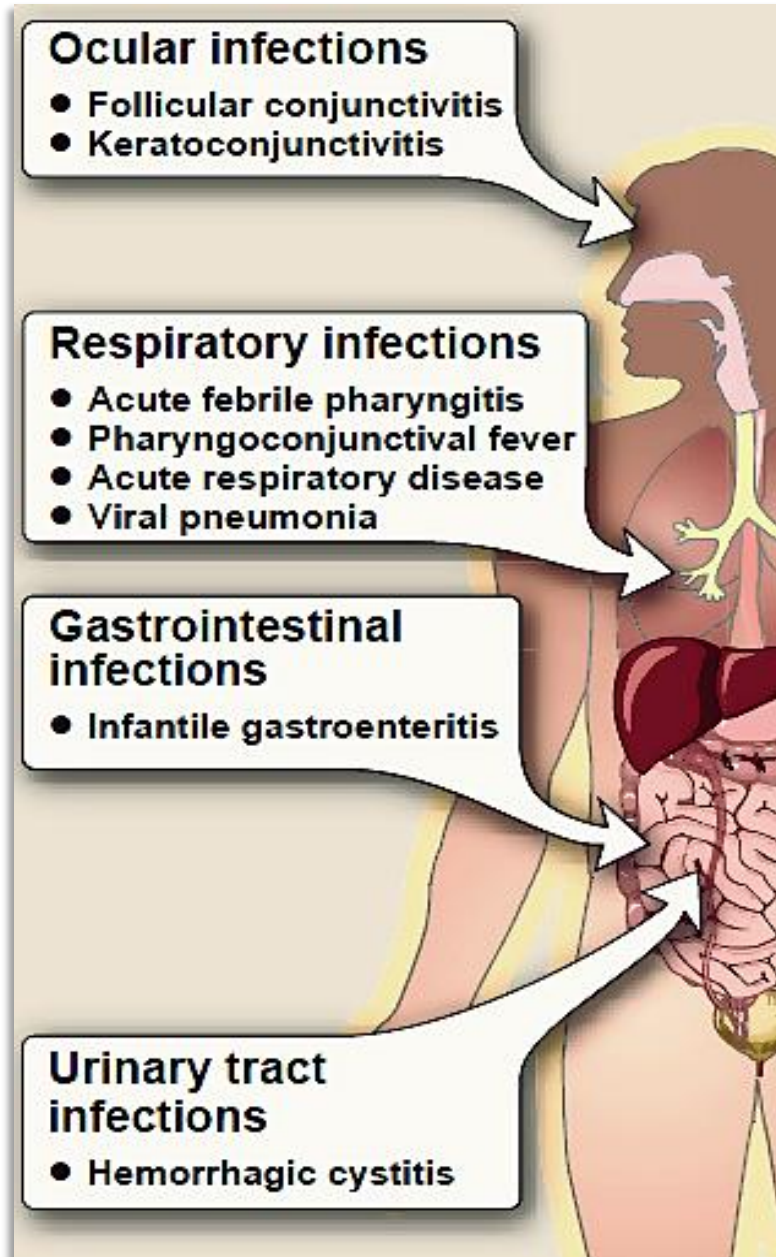


Adenovirus-Transmission

- The site of the **clinical syndrome** caused by an adenovirus infection is generally related to the **mode of virus transmission**.
- Most adenoviruses are primarily agents of **respiratory disease**, which are transmitted via the **respiratory route**. The **GI disease** is transmitted via the **fecal-oral route**.
- Similarly, ocular infections are transmitted by **direct inoculation of the eye** by virus-contaminated hands, ophthalmologic instruments, or bodies of water in which groups of children swim together.



Adenovirus-Summary of Clinical Features





Adenovirus-Respiratory Disease

- ▶ The most common manifestation of adenovirus infection of infants and young children is **acute febrile pharyngitis**, characterized by a cough, sore throat, nasal congestion, and fever.
- ▶ Some adenovirus types tend additionally to produce conjunctivitis, in which case the syndrome is referred to as **pharyngoconjunctival fever**.





Adenovirus-Respiratory Disease



- Adenoviruses are thought to be responsible for about 10–20% of pneumonias in childhood.
- Adenoviral pneumonia has been reported to have an 8–10% mortality rate in the very young.



Adenovirus-Epidemic Keratoconjunctivitis





Adenovirus-GI Disease

- Most human adenoviruses multiply in the GI tract and can be found in stools; however, these are generally asymptomatic infections.
- Two serotypes (types 40 and 41) have been associated specifically with infantile gastroenteritis and may account for 5–15% of cases of viral gastroenteritis in young children.
- Clinical manifestations include: Long-lasting diarrhea, less frequent vomiting, frequent development of dehydration, and abdominal pains and distension.



Acute Hemorrhagic Cystitis

- An illness that is associated with Ad11.
- Characterized by gross hematuria.
- Its significance lies in the potential confusion with other, more serious diseases of the kidney (such as glomerulonephritis).
- This self-limited disease is usually not accompanied by fever or hypertension, and tests of renal excretory and concentrating functions have been essentially normal.



Epidemiology of Adenoviruses

- Adenoviruses exist in all parts of the world and they are present year round. The most common serotypes in clinical samples are the low-numbered respiratory types (1, 2, 3, 5, and 7) and the gastroenteritis types.



Diagnosis, Treatment and Prevention

- Dx: Ag detection or PCR.
- There is no specific treatment for adenovirus infections.
- Careful hand washing is the easiest way to prevent infections.
- Live adenovirus vaccine containing types 4 and 7 is available.