

SSRNA, Naked

Picoraviridae "IC"

Enteroviruses

(3 serotypes)

(25 serotypes)

(28 serotypes)

- polio, coxsackie, Echovirus

Human enterovirus (43 serotype)

Rhinoviruses

- Human Rhinoviruses

A+B+C → more than 150 serotypes.

Hepatoviruses

- Hepatitis A
single serotype.

Enteroviruses	Polioviruses	Coxsackie	Echovirus	Rhinovirus A, B, C
<p>* Transmitted via respiratory droplets and ingestion of contaminated food or water. → Fecal-oral Route</p> <p>* Acid stable, replicate in GI → excreted in the stool.</p> <p>Pathogenesis: Replicate in the oropharynx + intestinal tract lymphoid tissue → leave to the bloodstream → spread to various target organ.</p> <p>The majority infections are asymptomatic infections.</p> <p>All enteroviruses can cause CNS disease. They are the major cause of acute aseptic meningitis.</p>	<p>Pathogenesis: multiplies in the oropharynx, The tonsils, lymph nodes of the neck Peyer patches and the small intestine. Then The virus enter the blood → CNS, it can also invade muscle from blood and spread along axons of peripheral nerves to the CNS. * notes: it does not multiply in muscle in vivo.</p> <p>Manifestations: 1- Mild disease: fever, malaise, drowsiness, headache, nausea, vomiting, constipation and sore throat [full recovery occurs in a few days]. 2- Nonparalytic poliomyelitis (aseptic meningitis): - symptoms of mild disease + stiffness, pain in the back and neck [recovery is rapid and complete]. 3- Paralytic poliomyelitis: muscle atrophy, flaccid paralysis (فلج فلج); Respiratory paralysis</p> <p>Treatment: vaccines: 1) live-attenuated (Sabin) 2) killed Polio</p>	<p>Divided into two groups: A, B</p> <p>1) Group A: infect children under 5, mild diseases such as - HFM: hand-foot and mouth disease caused by A16, A10, EV71 - Herpangina (Vesicular pharyngitis) - fever, sore throat Usually self-limited and disappears within a few days. - Acute hemorrhagic conjunctivitis caused by A25, EV70</p> <p>2) Group B is usually related to visceral organs: - Pleurodynia (epidemic myalgia) - fever + chest pain. - Myocarditis - Pericarditis - Aseptic meningitis - Encephalitis</p>	<p>Enteric Cytopathogenic Human Orphan Viruses</p> <p>Aseptic meningitis, Encephalitis Febrile illnesses with or without rash, common cold and ocular disease.</p> <p>Human Enteroviruses EV 70: The main cause of acute hemorrhagic conjunctivitis EV 70 + EV 71: associated with severe CNS disease EV 71: associated with HFM disease</p>	<p>They are the common cold viruses - Most common cause mild upper respiratory illnesses. - Isolated from nasal secretion, throat and oral secretion</p> <p>Acid labile viruses: Usual symptoms: - sneezing - nasal obstruction - nasal discharge - sore throat - headache - mild cough (may persist for 2-3 weeks) - malaise - chilly sensation - little fever - The nasal and nasopharyngeal mucosa become red and swollen. - The avg adult has 1 or 2 attacks each year. - Secondary bacterial infection may produce acute otitis media, bronchitis, sinusitis or pneumonia</p> <p>No specific prevention method or treatment available.</p>

SSRNA, Enveloped segmented

ORTHOMYXOVIRUSES "IC"

Infect humans, horses and pig, divided into 3 types: influenza A, B, C

Structure:	Classification:	Manifestations:
<p>1) Influenza A, B → 8 separate segments Influenza C → 7 separate segments which lacking of neuraminidase gene.</p> <p>2) Nucleoprotein (NP)</p> <p>3) Three large proteins (PB1, PB2, PA) which responsible for RNA transcription and replication.</p> <p>4) The matrix M1 protein (form a shell underneath the viral lipid envelope).</p> <p>5) Hemagglutinin (HA): HA1 and HA2</p> <p>6) Neuraminidase: end of viral replication (Sialidase enzyme).</p>	<p>Antigenic differences exhibited by two of the internal structural proteins (NP and M protein) which divide influenza viruses into types A, B and C.</p> <p>Antigenic variations (HA and NA) used to subtype the viruses. only type A has designated subtypes</p> <p>- Influenza A contains human and animal strains. - Influenza B & C contain human strains mostly.</p> <p>The standard nomenclature system for influenza virus isolates include the following info: (1) - Type / (2) - host of origin (3) - geographic origin / (4) strain number (5) - year of isolation.</p> <p>note: we don't add the host of origin in B & C as the main reservoir is human.</p> <p>- So far 15 subtype of HA and 9 subtype of NA (HA1-HA5) > Recovered from humans (NA1, NA2)</p>	<p>Influenza attacks mainly the upper respiratory tract.</p> <p>Symptoms: classic influenza, chills, headache, dry cough, high fever, generalized muscular aches, malaise and anorexia. C caused by influenza A+B</p> <p>Influenza syndrome: common cold illness, coryza, cough may last for several weeks. C caused by influenza C</p> <p>Most infections are asymptomatic infections.</p> <p>Complications: usually in elderly adults and debilitated individuals especially those with chronic disease. - Pneumonia, complicating influenza infections can be viral secondary bacterial or a combination of the two. staph. aureus, staph. pneumonia and H. influenza</p>
<p>Genetic Variability: - Minor antigenic changes (antigenic drift). - Major antigenic changes in HA or NA (antigenic shift). Drift → accumulation of point mutations → amino acid changes. Shift → drastic changes in the sequence of the viral surface protein Influenza B and C do Not exhibit antigenic shift.</p>	<p>Treatment: * first generation antiviral agents effective against influenza A: given early in infection. Amantadine + rimantadine which inhibit M2 membrane protein reduce the duration and severity of flu symptoms * second generation: against influenza A and B: Zanamivir + oseltamivir which inhibit NA. Vaccination: inactivated viral vaccines</p>	<p>Epidemiology: - Cause annual epidemics of seasonal influenza. - The incidence peaks during the winter. Antigenic drift → epidemic results. Antigenic shift → pandemic results. Diagnosis: viral antigen + PCR</p>

†SSRNA, Enveloped

Togaviridae "IC"

Arboviruses = Alphaviruses

Arthropod borne

chikungunya virus

acute arthropathy
febrile illness with
a flulike syndrome.

Equine encephalitis viruses

acute encephalitis

Rubiviruses

Rubella

Manifestations:

1) German measles (3 days measles) ^{children} Rash (morbilliform-red macule) which start on the face, extend over the trunk and extremities, malaise, fever and lymphadenopathy.

In adult women → arthralgia & arthritis.

2) Subclinical.

3) Congenital rubella syndrome (From mum to fetus)

vasculitis → tissue damage, hearing loss, deafness, eye abnormalities (cataracts and retinopathy), damage to the retina, congenital heart disease and CNS damage

Antibodies appear → give lifelong immunity bcz only one antigenic type of the virus exists. **Arubella vaccine is available.**

* SSRNA, enveloped
non-segmented
genome.

Paramyxoviridae

very Important

Medical Capsid

Subfamily	Paramyxovirinae				Pneumovirinae	
Genus	Respirovirus	Rubulavirus	Morbillivirus	Henipavirus	Pneumovirus	Metapneumovirus
Species	Parainfluenza 1, 3	Mumps parainfluenza 2, 4	Measles	Hendra Nipah	Respiratory syncytial virus	Metapneumovirus

Measles	Mumps	Parainfluenza	Respiratory Syncytial Virus	Metapneumovirus
<p>Transmission: via respiratory droplets - extremely infectious - (all individuals develop a clinical illness).</p> <p>- Replicate in the respiratory epithelium and various lymphoid tissue.</p> <p>- Enter the cell via CD46.</p> <p>Manifestations:</p> <p>1) Incubation period (10-14) days</p> <p>2) Begins with fever, upper respiratory tract symptoms, conjunctivitis</p> <p>3) A few days later → Koplik spots (small white spots on bright red mucous membrane of the mouth & throat) - Definitive diagnosis - macular rash beginning at the head and traveling slowly to the lower extremities</p> <p>Complications:</p> <p>- pneumonia (1° or 2°)</p> <p>- Encephalitis → Electroencephalograph</p> <p>- Postinfectious encephalomyelitis: occur within 2 weeks after the onset of rash - AI disease (immune response to myelin basic protein).</p> <p>- Subacute sclerosing panencephalitis (very rare, lead to death, measles virus in CNS impossible to make sure of diagnosis. Isolation of the virus from the brain isn't possible)</p> <p>Treatment</p> <p>1. Live attenuated measles vaccine</p> <p>MMR ↓ ↓ Measles Mump</p> <p>Diagnosis</p> <p>- Clinically in an epidemic situation</p> <p>- The presence of Koplik spots (definitive diagnosis)</p> <p>Disease → life long immunity bcz it's single serotype.</p>	<p>Transmission: via respiratory droplets</p> <p>Pathogenesis:</p> <p>Infect epithelial cells of nasopharynx → local damage to the tissue → viremia</p> <p>Clinical manifestation:</p> <p>Swelling of the salivary glands and parotid glands. Infect the pancreas, CNS (meningitis) and testes (orchitis)</p> <p>Diagnosis: clinical findings</p> <p>Treatment: live attenuated vaccine (MMR)</p> <p>Two doses of MMR vaccine are recommended for school entry.</p> <p>should not be administered to immunocompromised patients.</p>	<p>Pathogenesis:</p> <p>- Infect nose & throat resulting in common cold syndrome</p> <p>PIV 1+2: croup laryngotracheobronchitis</p> <p>PIV 3: pneumonia</p> <p>PIV 4 doesn't cause serious disease</p> <p>Complications: otitis media</p> <p>Can cause severe disease in infant and young children.</p> <p>Hendra & Nipah</p> <p>cause respiratory infections</p>	<p>Pathogenesis: RSV</p> <p>is the most common cause of lower respiratory tract illness in infants & young children.</p> <p>- Bronchiolitis, pneumonia in infants</p> <p>- Edema</p> <p>- otitis media</p> <p>Diagnosis:</p> <p>- Radiographic finding (non-specific)</p> <p>- DFA</p> <p>- RT-PCR</p> <p>- Laboratory diagnosis</p> <p>Treatment:</p> <p>- supportive care: removal of secretion administration of oxygen</p> <p>- Antiviral drugs: ribavirin → for infant of high risk for severe disease the drug administered in an aerosol for 3-6 days</p> <p>- Monoclonal Ab (palivizumab) → reduce viral shedding</p>	<p>Pathogenesis:</p> <p>- flulike symptoms</p> <p>- Asymptomatic infections</p> <p>- less severe than RSV</p> <p>Pop. at risk:</p> <p>- children</p> <p>- elderly adult</p> <p>- immunocompromised individual</p> <p>No vaccine is available</p>

