

POLIOVIRUSE S

Polioviruses

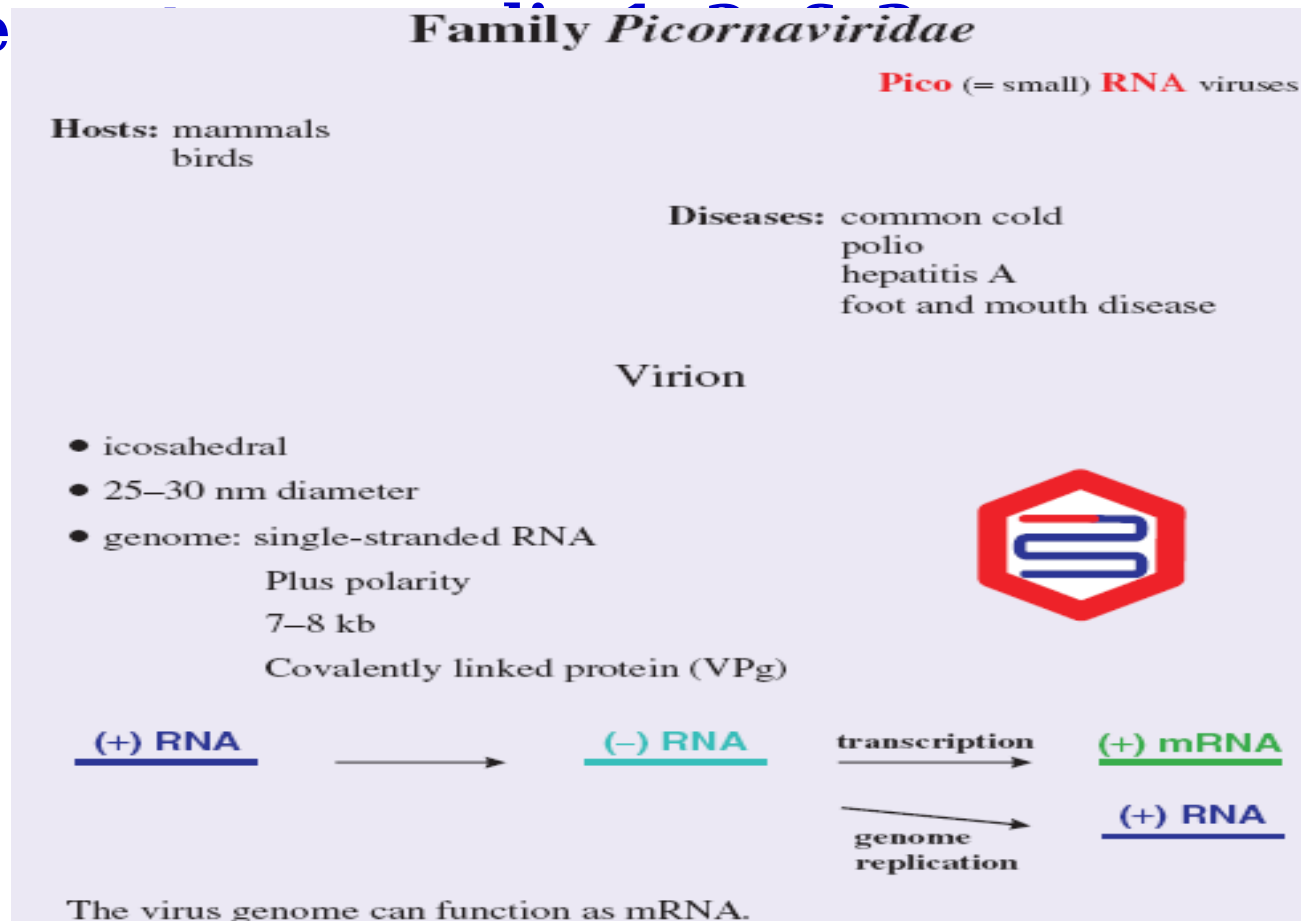
- **Causes poliomyelitis: An acute infectious disease that affects**
- **CNS & motor neurons in the spinal cord ... Flaccid paralysis**

Properties

- **Family: Picornaviridae (Enterovirus group)**
- **ss RNA virus**
- **Non-enveloped with icosahedral capsid**
- **Restricted host range**

- Resistance to low P^H , lipid solvents & some detergents

- 3 se



Epidemiology

- **Endemic in tropics**
- **Occurs in all age group, but children are more affected**
- **Seasonal variations**
- **Transmission: faecal - oral route**
- **Source of infection is infected individuals**
- **1^o infections in adulthood cause paralytic**⁴

Pathogenesis

- **Virus gains access to the body via ingestion**
- **Replicates in gut associated lymphoid tissues**
- **Followed by a viraemia & haematogenous spread to the CNS**
- **Lytic infection of motor neurons in the anterior horns of the spinal cord leads to a lower motor neuron weakness (flaccid paralysis)**
- **Incubation period:7-14 days**

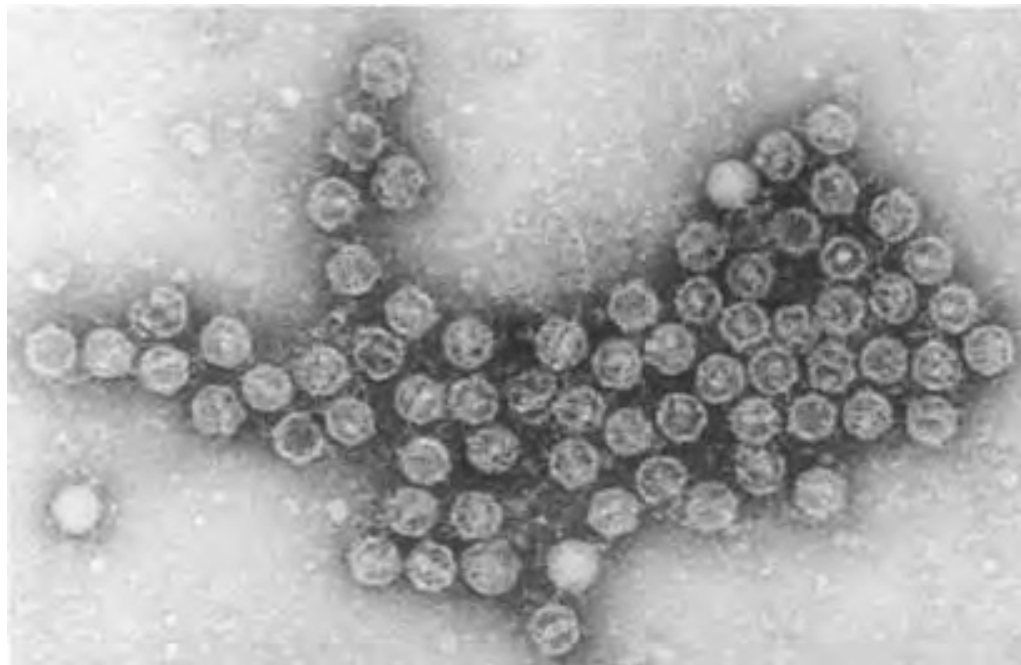
Clinical outcomes

- **Paralysis: due to damage to motor neurons of spinal cord**
- **Non - paralytic poliomyelitis**
 - ▶ **Headache, fever, and muscle pain**
- **Bulbar paralysis: Involves medulla & brain stem**
 - ▶ **Respiratory paralysis & death**

Lab .DX

- Isolation of virus and other methods (discussed earlier)

Cell culture: From human & monkey kidney cells



Electron micrograph of poliovirus

Prevention & control

- **Polio vaccine**
- **Community surveillance**
- **Education of the community**

Control through an effective vaccine

- **Two effective poliovirus vaccines are available (as of 1950s):**
 - A) live attenuated (Sabin) and**
 - B) formalin inactivated /killed (Salk) vaccine**
- **Both contain the 3 strains of virus responsible for paralytic polio (polioviruses 1, 2 & 3)**
- **the live attenuated vaccine was created by serial passage of the virulent virus in cell culture to produce strains of poliovirus which retained the antigenicity, but were unable to cause disease.**
- **The inactivated (killed) vaccine contains formalin-inactivated polioviruses. Both vaccines are highly effective at protecting against infection**

Attributes of polio vaccines

	Formalin inactivated vaccine (Salk)	Live attenuated vaccine (Sabin)
Route of administration	Injection	Oral drops
Immune response	Good, IgG in blood	Good, IgA in gut
Duration of immunity	Medium	long
Cost	expensive	cheap
Stability of vaccine	stable	Not stable, cold chain important
Transmission to vaccine contacts	No	yes
Dangers	None	Reversion to virulence (very rare) Prolonged shedding in immune compromised