POLIOMYELITIS (POLIO)

DEFINITION

Poliomyelitis is an acute infectious disease caused by poliovirus, characterized by selective involvement and destruction of motor neurons in the anterior horn of the spinal cord and motor nuclei of cranial nerves, leading to acute flaccid paralysis. It affects young children under five years of age

TYPES OF POLIOMYELITIS

- 1.Inapparent (subclinical) infection
- 2. Abortive polio or Minor illness
- 3.Non paralytic polio
- 4.Paralytic poli

ETIOLOGY

- Causative agent: Poliovirus
- Family: Picornaviridae
- Genus: Enterovirus

TYPES

- Type 1 → most virulent, most common
- Type 2 → eradicated in wild form
- Type 3 → less common

MODE OF TRANSMISSION

- Feco-oral route (major)
- Contaminated:

1. Water
2. Food

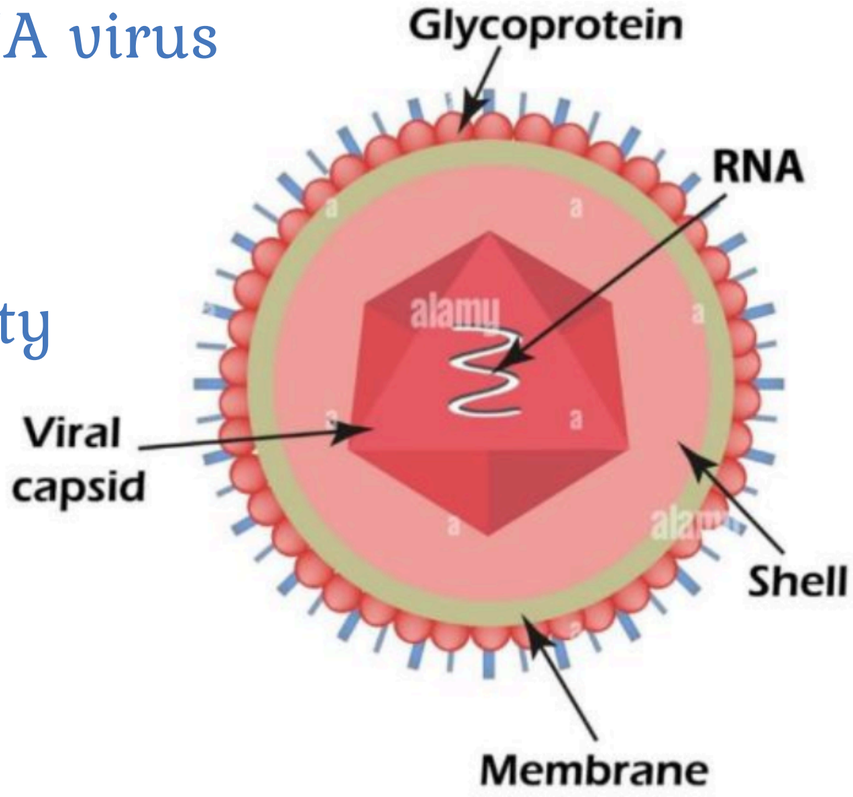
- Occasionally: Respiratory droplets

- Direct contact - Polio virus can be transmitted through direct contact with someone infected with virus.
- Ingestion - Most commonly it can be transmitted through contaminated food and water

PROPERTIES OF POLIO

- Small (20–30 nm), non-enveloped RNA virus
- Icosahedral capsid
- Single-stranded positive-sense RNA
- Acid-resistant → survives gastric acidity
- Resistant to ether and detergents

Structure of Polio



EPIDEMIOLOGY

- Occurs worldwide; largely controlled by vaccination
- Common in:
  - Children <5 years
  - Areas with poor sanitation
- Humans are the only reservoir

PATHOPHYSIOLOGY

Entry of Poliovirus (fecal-oral route)

⬇

Replication in oropharynx and intestinal mucosa (tonsils, Peyer patches)

⬇

Spread to regional lymph nodes

⬇

Primary viremia (virus enters bloodstream)

⬇

Further replication in reticuloendothelial system (liver, spleen, lymphoid tissue)

⬇

Secondary viremia

⬇

Virus crosses blood–brain barrier / via peripheral nerves

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Infection of anterior horn cells of spinal cord

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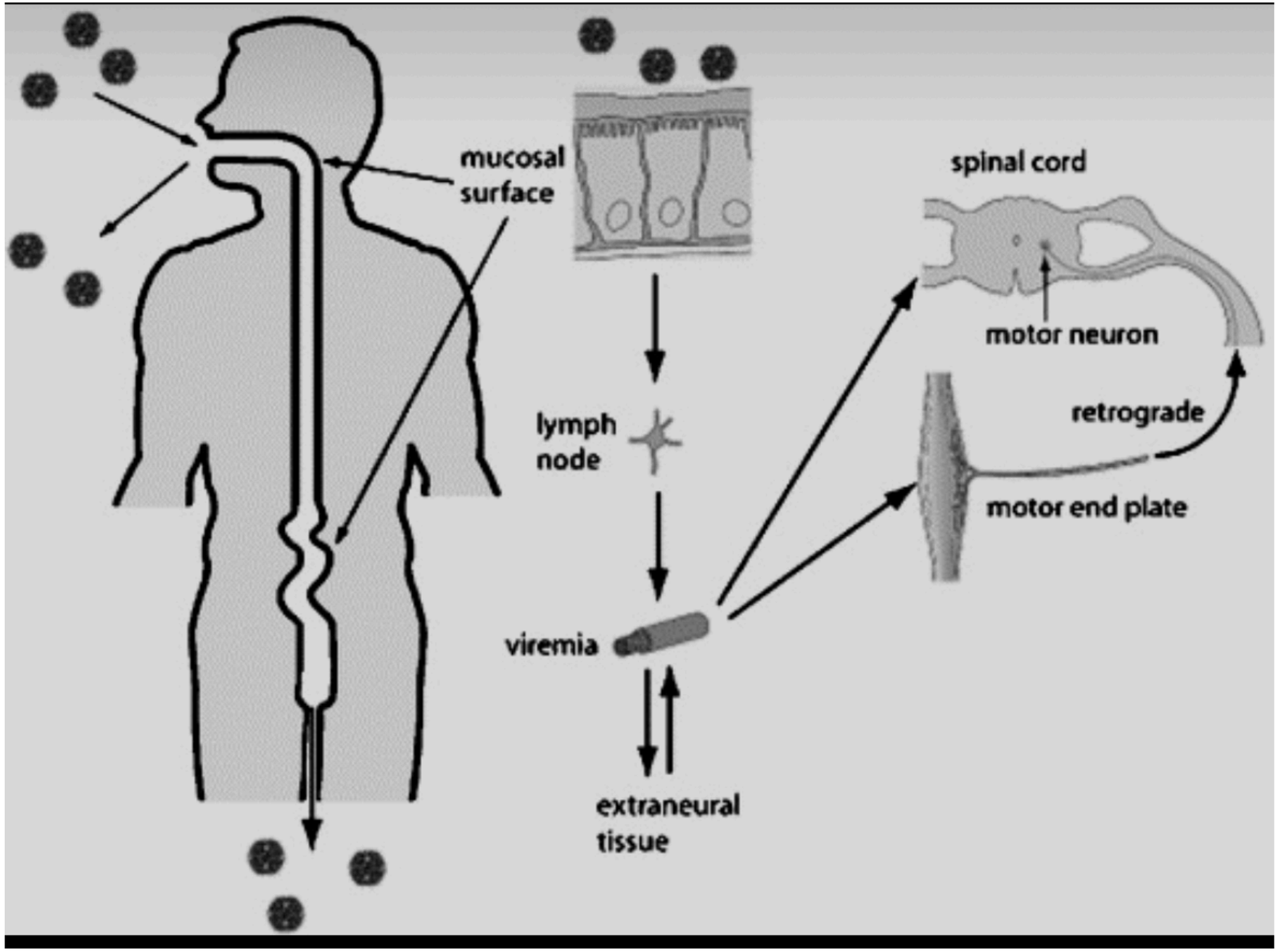
Destruction of motor neurons

⬇

Denervation of muscles

⬇

Flaccid paralysis and muscle atroph


mucosal surface
spinal cord
motor neuron
retrograde
lymph node
motor end plate
viremia
extraneural tissue

PATHOLOGY

GROSS

- Spinal cord: softening, congestion

MICROSCOPY

- Neuronal degeneration
- Neuronophagia
- Perivascular lymphocytic infiltration
- Microglial nodules

CLINICAL FEATURES

1. Subclinical infection (most common)

- Mild or no symptoms

2. Abortive poliomyelitis

- Fever, malaise
- Sore throat
- No CNS involvement

CLINICAL FEATURES

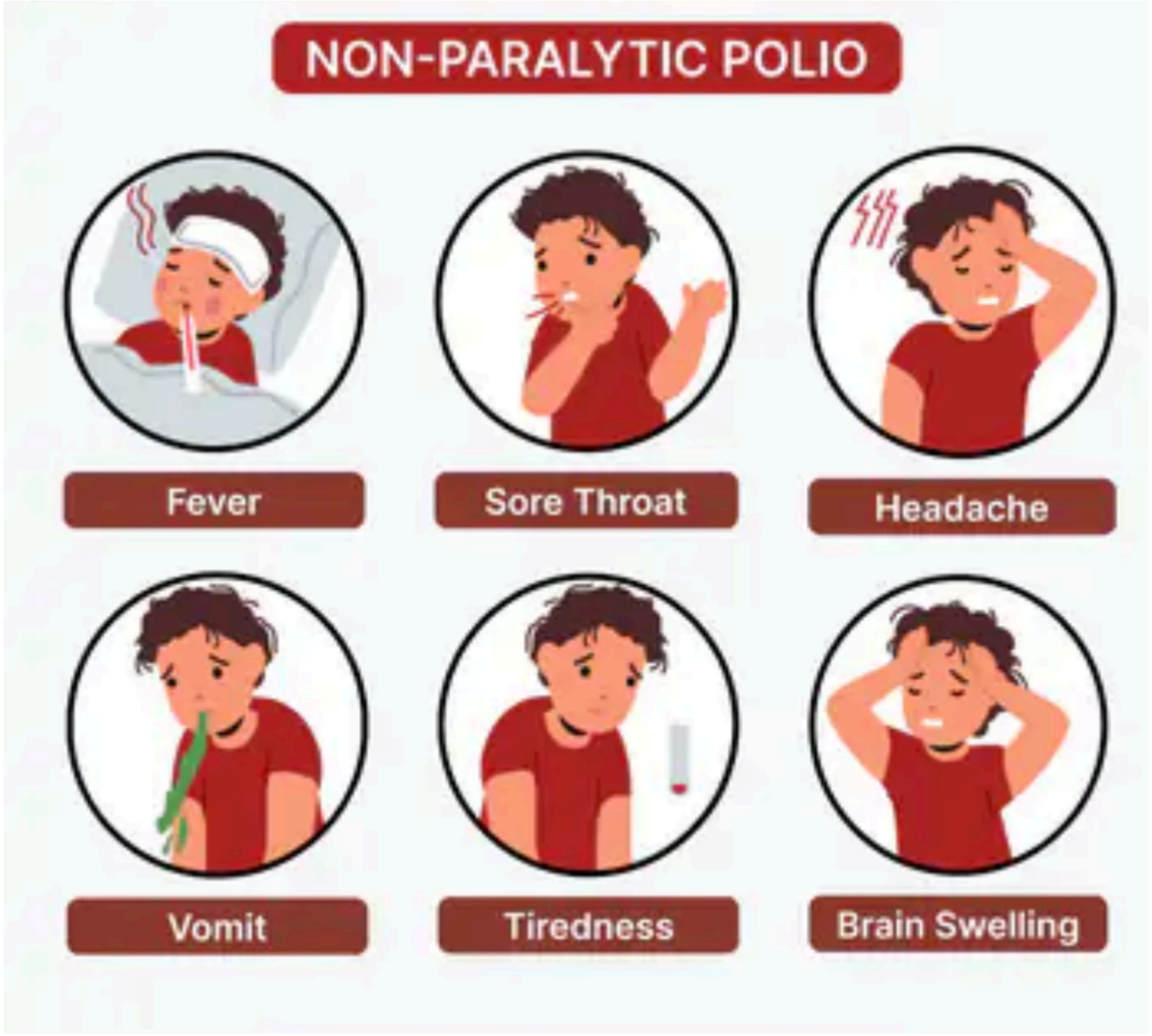
3. Non-paralytic poliomyelitis

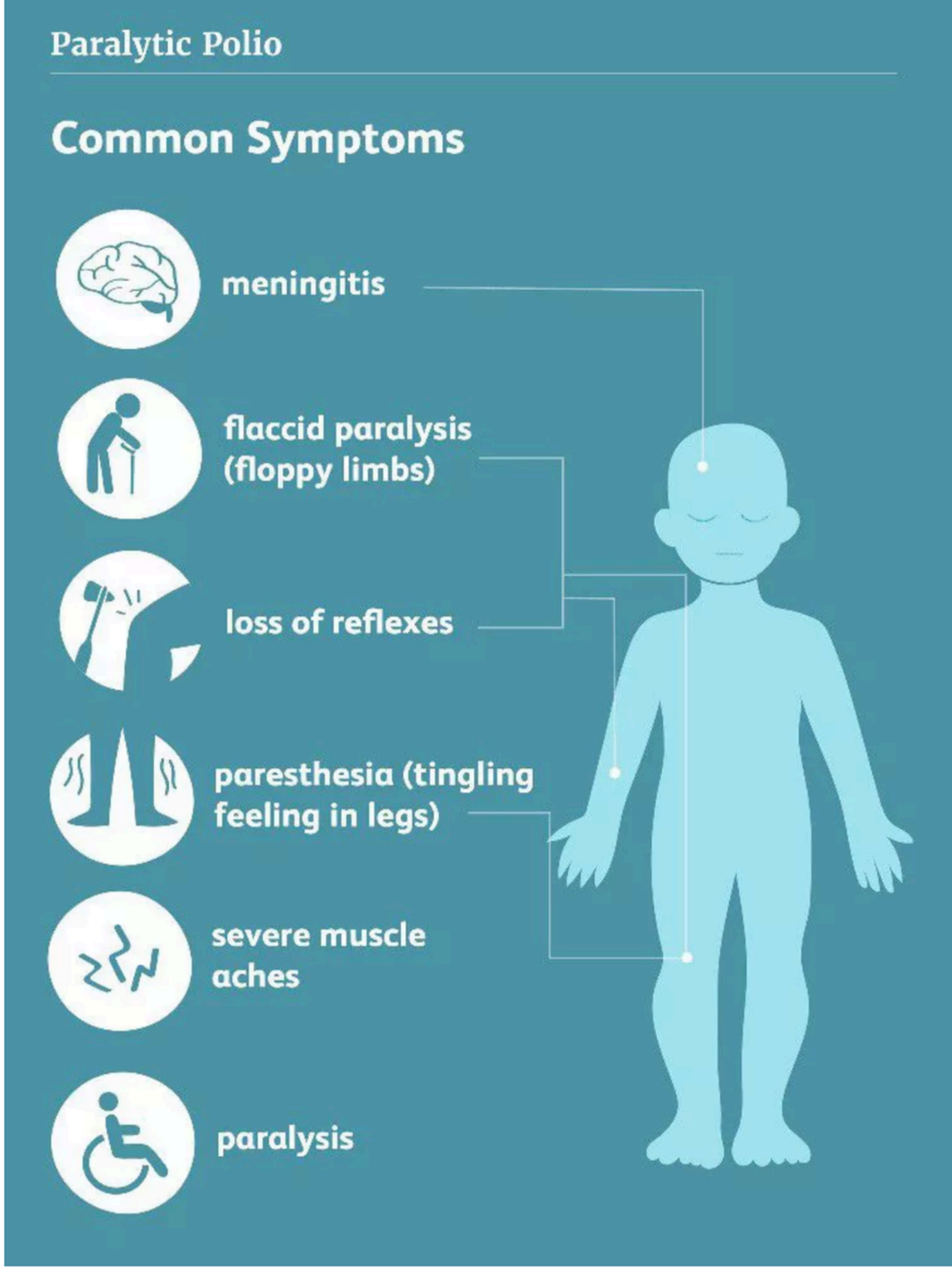
- Aseptic meningitis
- Neck stiffness
- Back pain

4. Paralytic poliomyelitis

- Asymmetric flaccid paralysis
- More in lower limbs
- No sensory loss
- Types:

1. Spinal
2. Bulbar
3. Bulbospinal


NON-PARALYTIC POLIO
Fever
Sore Throat
Headache
Vomit
Tiredness
Brain Swelling


Paralytic Polio
Common Symptoms
meningitis
flaccid paralysis (floppy limbs)
loss of reflexes
paresthesia (tingling feeling in legs)
severe muscle aches
paralysis

COMPLICATIONS

- Permanent paralysis
- Muscle atrophy
- Respiratory failure (bulbar involvement)
- Post-polio syndrome (late)

LABORATORY DIAGNOSIS

Specimens

- Stool (best)
- Throat swab
- CSF

Methods

- Viral culture
- PCR
- Serology (antibodies)

DIAGNOSTIC EVALUATION

Viral culture : Obtain specimen from csf, stool, and throat for viral culture in patients with suspected polimyelitis
infection

Serum antibody: Obtain acute and convalescent serum for antibody concentration against the 3 polio virus.

IG titer : A 4 fold increase in the immunoglobulin G antibody titers or a positive anti immunoglobulin M titer during the acute stage is diagnostic

PREVENTION

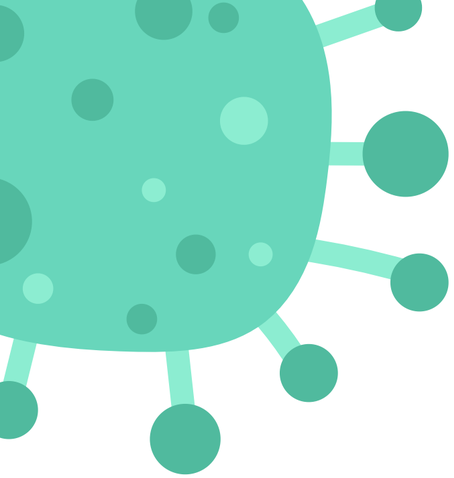
VACCINES

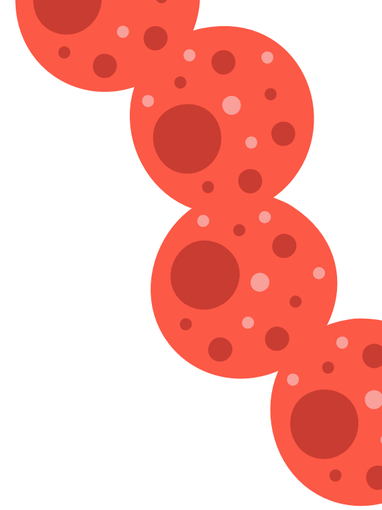
OPV (Oral Polio Vaccine)

- Live attenuated
- Given orally

IPV (Inactivated Polio Vaccine)

- Killed vaccine
- Given by injection





THANK YOU