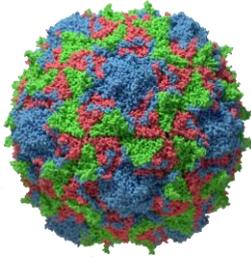


Poliomyelitis (Polio)

Name



Disease

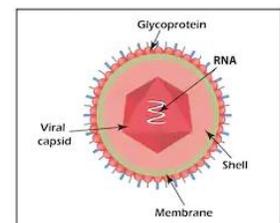
- Polio (or poliomyelitis) is the deadly disease caused by poliovirus
- Polio is an incurable disease once caught, but it can be prevented with vaccines
- Previously known as infantile paralysis because usually afflicts young children (5 and under), but adults can also contract it.
- Lives in an infected persons throat and intestines

How the Disease Spreads

- Polio spreads through contact with someone who has it
- Spreads through contact with secretions (sweat, saliva, bile) or fecal material from an infected person.
- Can also spread as a result of poor sanitation where contaminated human waste products infect others.
- Enters through the mouth then goes into the blood system

Poliovirus

- Poliovirus is a positive-stranded RNA virus
- Non-enveloped
- Single-stranded
- Positive-sense RNA virus
- Is icosahedral (has 20 equilateral triangular faces)
- Three wild-strain viruses responsible for polio: PV-1, PV-2, and PV-3



Binding

- Poliovirus infects human cells by binding to CD155 (Cluster of Differentiation 155) on the cell surface
- CD155 is also known as the poliovirus receptor or PVR
- Mutated CD155 can prevent the poliovirus from docking and binding with the CD155

- After it attaches to the host cell membrane, the viral nucleic acid can either enter via the formation of a pore in the plasma membrane (then the RNA is injected into the host cell cytoplasm), or it can enter via virus uptake by receptor-mediated endocytosis.
- Immediately after internalization of the particle, the viral RNA is released

Vaccines

- Inactivated poliovirus vaccine (IPV)
- Given as an injection in the leg or arm.
- Invented in 1955
- Produces high level immunity after 2-3 injections
- Prevents the poliovirus from spreading to the digestive, respiratory, and nervous system
- Cannot prevent the virus from entering the intestinal track
- Used in countries with good sanitation and the major form of spreading the viruses being through respiratory contagion.
- Oral poliovirus vaccine (OPV)
- Invented in 1961
- Used in countries without good sanitation
- Goes straight to the intestinal tract and builds up immunity there.
- 1 out of 2,500,000 doses of the oral vaccine can produce a case of polio.

Symptoms

- It is common to have a few early on symptoms
 - Symptoms are similar to the common flu: sore throat, fever, fatigue, nausea, headache, stomach pain.
 - Virus can multiply in specialized cells in the intestines and enter the bloodstream to invade the central nervous system, where it spreads along nerve fibres.
 - Can destroy nerve cells (motor neurons) when poliovirus multiplies in the nervous system
 - Nerve cells cannot regenerate - leads to affected muscles losing their function and becoming paralyzed.
 - Typically affects arms and legs.
 - In extreme cases, the trunk and muscles of the thorax and abdomen can become paralyzed
- Can also infect a person's spinal cord, resulting in quadriplegia (the paralysis of the body from at least the shoulders down)



History of the Virus/Disease (*where it first started affecting people*)

- First polio outbreaks appeared in Europe in the early 1800s
- First US outbreak in 1894 in Rutland County, Vermont
- First recorded outbreak in Canada was in 1910

- Polio epidemics continued usually in summer or fall
- In 1929 Philip Drinker invented an artificial respirator for patients who became paralyzed in the respiratory system.
- The iron lung decreased pressure, forcing air into the lungs, and increased pressure, forcing air out.



Links

https://go.gale.com/ps/retrieve.do?resultListType=RELATED_DOCUMENT&searchType=ts&userGroupName=42gass&inPS=true&contentSegment=&prodId=SCIC&docId=GALE|CV2644031762&it=r

[https://www.cdc.gov/polio/what-is-polio/index.htm#:~:text=Polio%2C%20or%20poliomyelitis%2C%20is%20a,move%20parts%20of%20the%20body\).](https://www.cdc.gov/polio/what-is-polio/index.htm#:~:text=Polio%2C%20or%20poliomyelitis%2C%20is%20a,move%20parts%20of%20the%20body).)

https://en.wikipedia.org/wiki/Poliovirus#Replication_cycle

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC152153/>

<https://en.wikipedia.org/wiki/CD155>

[https://www.who.int/biologicals/areas/vaccines/polio/en/#:~:text=When%20it%20multiplies%20in%20the,acute%20flaccid%20paralysis%20\(AFP\)](https://www.who.int/biologicals/areas/vaccines/polio/en/#:~:text=When%20it%20multiplies%20in%20the,acute%20flaccid%20paralysis%20(AFP))

https://www.historyofvaccines.org/timeline#EVT_100300