

Difference Between OPV and IPV

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Key Difference - OPV vs IPV

[Polio](#) was once a very common disease in the world, and it claimed the lives of many thousand young people and left millions of men and women permanently disabled. But with the introduction of the prophylactic polio [vaccine](#), the incidence of poliomyelitis has dropped down dramatically. Two main varieties of polio vaccine were introduced depending on their route of administration. **OPV or the oral polio vaccine contains live attenuated viral particles, and IPV contains inactivated viral particles.** This is the **key difference** between OPV and IPV.

What is OPV?

OPV or oral polio vaccine is a vaccine that is given orally to boost the [immunity](#) of an individual against the polio [virus](#). This vaccine contains live attenuated polio viral particles.

Live viruses are cultured inside living [bacterial](#) or other nonhuman cells. The products of viral replication are then obtained, and their [virulence](#) factors are neutralized along with their transmissibility using special techniques. Three varieties of OPV known as Sabin 1, 2 and three are produced in this manner.

Use of OPV has several advantages over the use of IPV in mass immunization. OPV can be conveniently administered especially to children because there is no need of injecting the vaccine via a needle. It is also known to induce a better mucosal immunity in the [intestines](#) against the virus which predominantly uses GI tract as its portal of entry into the human body. Therefore it prevents the shedding of viruses in the feces of the patient while preventing the spread of viral particles into the blood.

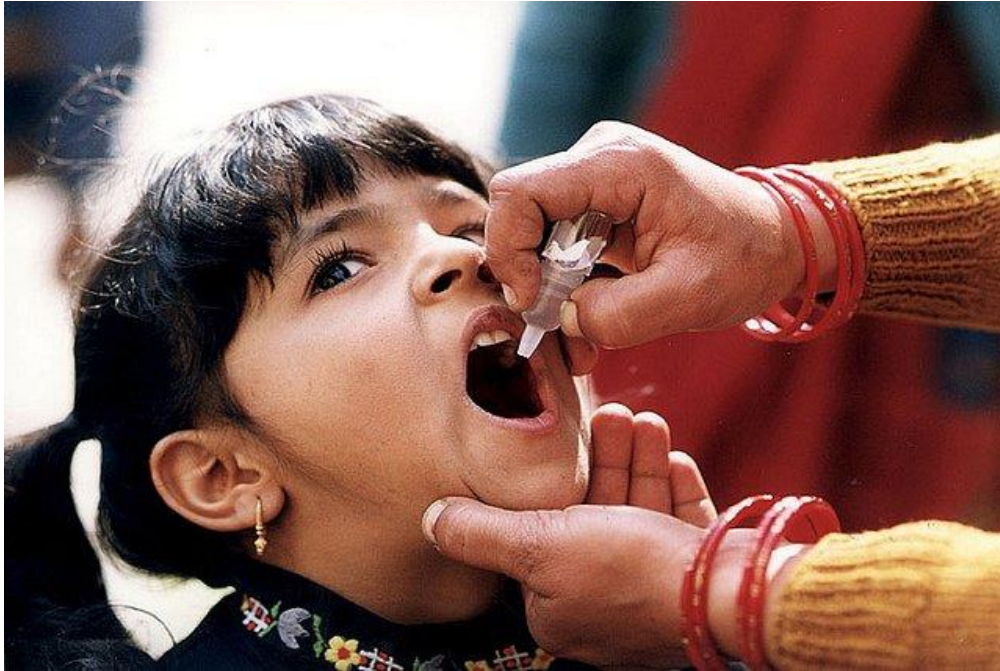


Figure 01: OPV or Oral Polio Vaccine

Many cases of vaccine-derived [paralysis](#) due to the reactivation of live attenuated organisms contained in the vaccine have been reported throughout the globe. This is a major concern regarding the use of OPV in the battle to eradicate polio from the world.

What is IPV?

IPV or inactivated polio vaccine contains inactivated polioviruses belonging to all the three strains. It is administered either intramuscularly or subcutaneously. Once administered, these viral particles stimulate the production of [antibodies](#) against them. Due to the presence of these antibodies, when a subsequent polio viral [infection](#) occurs in the future life, the infection will not spread to the CNS of the person. IPV is usually given as a single shot but can be given in combination with other vaccines also.



Figure 02: IPV or Inactivated Polio Vaccine

One of the major advantages of using IPV is there is no risk of developing vaccine-derived poliomyelitis. But the immunity induced by IPV is lower than the immunity that is induced by OPV. This is because IPV only produces antibodies that counter the hematogenous spread of the virus without strengthening the mucosal immunity in the intestine. Therefore, the virus can multiply within the GI tract.

What is the Similarity Between OPV and IPV?

- Both contain different strains of viruses and are used to enhance an individual's immunity against the polio virus.

What is the Difference Between OPV and IPV?

OPV vs IPV	
OPV contains live attenuated viral particles	IPV contains inactivated viral particles
Administration	
OPV is administered orally.	Subcutaneous or intramuscular routes are used in the administration of IPV.
Immunity	
OPV enhances the mucosal immunity of the patient	IPV stimulates the production of antibodies against the viral particles.

Strength	
A better immunity is provided by OPV.	Although IPV provides an excellent immunity against the polio virus, it is weaker than the immunity provided by OPV.
Impact on Poliomyelitis	
The live attenuated vaccines given in OPV can get reactivated causing vaccine-derived poliomyelitis.	IPV does not cause vaccine-induced poliomyelitis.

Summary - OPV vs IPV

Oral polio vaccine which is administered as oral drops contains live attenuated organisms and inactivated polio vaccine which is administered via the subcutaneous or intramuscular route contains inactivated/killed organisms. The status of the viral particles is the major difference between these two vaccines.

Reference:

1. Levinson, Warren . *Review of Medical Microbiology and Immunology (Lange Medical Books)*. 13th ed., McGraw Hill Companies, 2014.

Image Courtesy:

- 1.'Girl receiving oral polio vaccine' By CDC Global ([CC BY 2.0](#)) via [Flickr](#)
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