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# Yellow Fever

by: Harrison Gibbs and Emma Ward



## Background

**Importance:** Yellow Fever is a disease that is most common in Africa and South America that causes severe discomfort and has a high mortality rate, of the estimated over 200,000 cases of Yellow Fever, 30,000 cases end in death. Since it is so dangerous, it is important to know how to prevent and treat it if someone ever wanted to travel to either of those places. The disease is relatively easy to avoid, all someone really need to do is avoid mosquitoes either by wearing protective clothing or by avoiding high density mosquito areas. If one were get Yellow Fever, they would surely regret it, since the side effects include head and muscle aches, fever, vomiting blood, yellow skin and eyes, seizures and the possibilities of a coma or even death (University of Maryland Medical Center, 2015)!

**Classification:** Yellow Fever is a virus, or a non-living microorganism that damages the body, that takes in the resources that it needs to survive, normally killing cells in the process. A virus cannot reproduce by itself, so when it enters a body it finds cells to use as hosts.



**Pictured above: *Aedes aegypti*, a species of mosquito that commonly carries diseases**

**Historical:** The first outbreak of Yellow Fever was in 1699 in both Charleston, South Carolina and Philadelphia, Pennsylvania where the death tolls were high and life almost came to a complete standstill. In 1732, a Yellow Fever epidemic struck Charleston and people died so often that the bell ringing to signify someone's death was forbidden; a similar outbreak hit New York the same year. In 1899, the French abandon the Panama Canal due to a Yellow Fever and malaria outbreak. In 1900, the U.S. Army discovered that Yellow Fever was transmitted from mosquitoes to humans and was not a bacterium as previously thought. The last Yellow Fever epidemic was in 1905 in New Orleans, Louisiana. In 1936, Max Theiler developed the Yellow Fever vaccine, that is still in use today, winning him the Nobel Prize in 1951 (The College of Physicians of Philadelphia, 2015).

## Infection/Disease

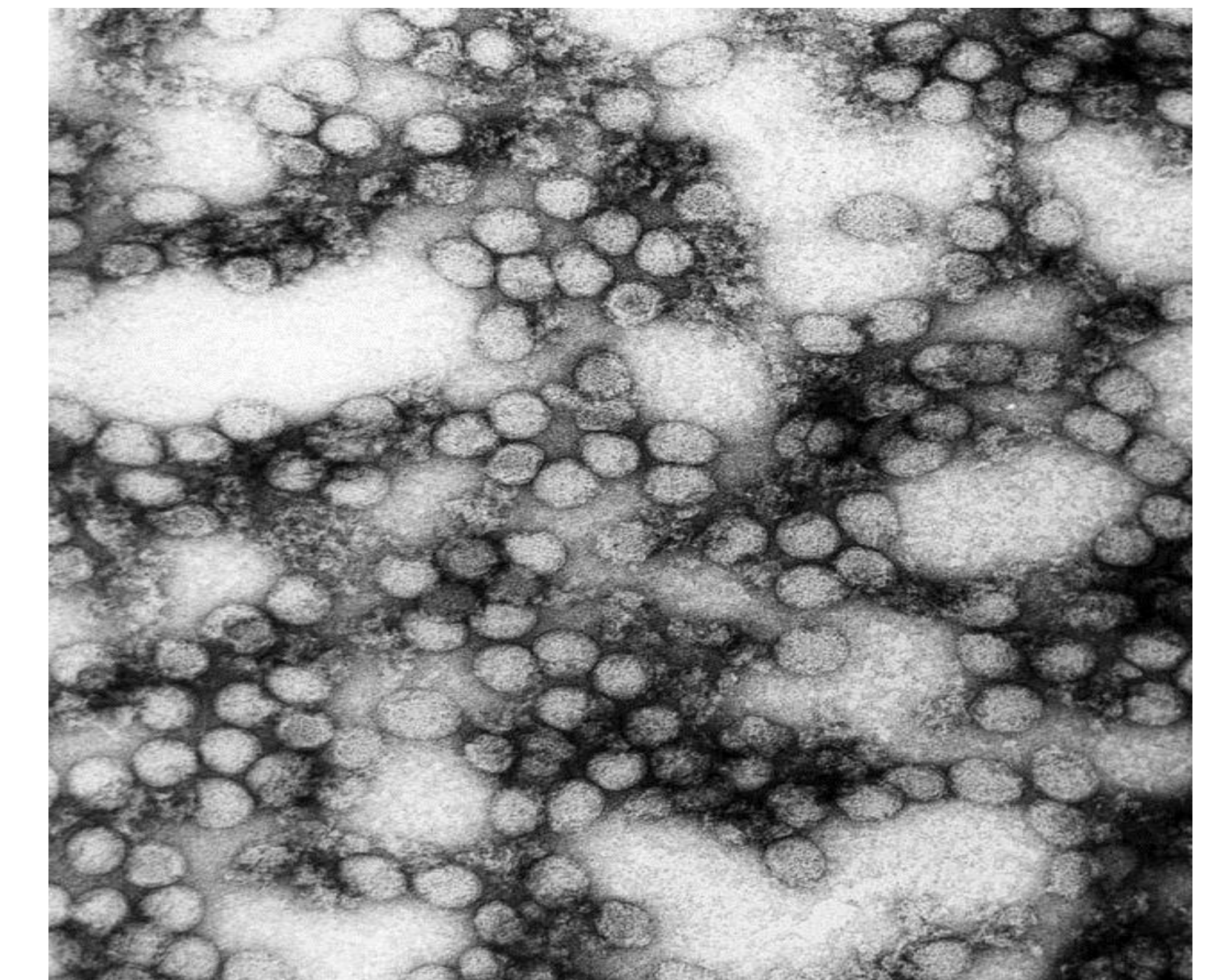
**Immune Response:** There are three parts of immune response, two are non-specific and one is specific. The first part of immune response that Yellow Fever has to get past is the outer barriers of the human body, including the skin, mouth, nose, etc. Yellow Fever is contracted through mosquito bites, making it not difficult for it to enter the body. Once a mosquito that is infected with Yellow Fever bites you, the Yellow Fever is past the first part of immune response. Once the Yellow Fever has infected the body it begins to use lymph nodes to reproduce, killing them in the process; they also begin to infect and kill dendritic cells, which cause the body's B cells, T cells and antibodies to not operate. Once this happens, the Yellow Fever virus gets past both the second and third lines of immune system defense.

**Progression:** Once the virus begins to spread through the body, the virus targets the liver cells and infects them, causing the liver and other organs to fail as well as causing the victim's eyes and skin to turn yellow. In most cases, people who get infected with Yellow Fever do not experience any symptoms. Those who do, normally experience fever, chills, severe headaches, back pain, general body aches, nausea and vomiting, fatigue, and weakness for about three-seven days. In more severe cases, once the initial symptoms end, victims may experience yellowing of the skin and the whites of your eyes, abdominal pain and vomiting (sometimes of blood), decreased urination, bleeding from your nose, mouth and eyes, slow heart rate, liver and kidney failure, brain dysfunction, including delirium, seizures and coma. There is no treatment or vaccine for Yellow Fever other than for symptom relief. The only thing doctors can do for a Yellow Fever patient is treat any of the symptoms above, whether it be by sleeping, taking medication, etc. (University of Maryland Medical Center 2015).

**Prognosis:** The quality of life while suffering from Yellow Fever, or Yellow Plague, is obviously not great. Though survival generally results in gaining immunity, the few weeks of illness can be rather tiring and they may result in a few months afterwards of fatigue and weakness, given that you survive. The quality of life would generally decline after entering the second more fatal phase of this disease, as symptoms would worsen and become more critical to a person's health. About 50% of severely affected people who do not receive treatment die. There is an estimated amount of 200,000 cases of Yellow Fever, which results in 30,000 deaths a year.

## Treatment

**Options:** There are currently no medical treatments for Yellow Fever; the only thing that is available for people infected with Yellow Fever is symptom relief. Patients can be treated to reduce the effects of symptoms, such as the severity of dehydration, but there is no true option for full treatment. Options are very limited and taking certain medications could possibly worsen your symptoms or the disease itself. Doctors can help reduce the pain and distress that the victims go through but cannot actually cure them of the disease. There is, however, a Yellow Fever vaccine which can prevent someone from being infected with Yellow Fever for up to 10 years at a time (CDC, 2015).



**Pictured above: TEM Micrograph of the Yellow Fever virus**

**Mechanisms:** Since there are no true treatments for Yellow Fever, there are no treatment mechanisms other than vaccination. The vaccine has been used for many years and works like most other vaccines; the recipient is injected with weakened Yellow Fever virus and the immune system learns how to fight them off. The vaccine is effective for 10 years and it is recommended that anyone planning to go to a place that risks Yellow Fever stays updated on vaccinations. An additional recommendation is for travelers only to receive the vaccine if traveling to an area where Yellow Fever is prevalent.

**Emerging:** There are no recent plans to make a Yellow Fever cure, but there are plans to create treatments that can provide victims of Yellow Fever some relief of symptoms. Doctors are continuing research on treatments for the disease.