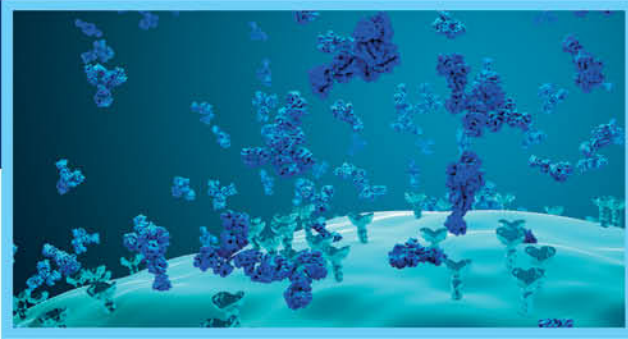


Wars Waged Under the Microscope



The War Against Smallpox



Louise Spilsbury

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The Enemy

Smallpox was one of the biggest killers in the history of human illnesses. This deadly disease was caused by a *Variola virus*—a tiny organism too small to be seen by the unaided human eye. In the 1900s, medical science used all the tools at its disposal to fight this enemy.

A Deadly Disease

While most people who had smallpox recovered, about three out of every ten who contracted, or got, the disease died. People who contracted smallpox developed terrible blisters that filled with a sticky substance called pus.

The blisters swelled and burst, causing the pus to seep out. The disease was deadly to many, and those who survived were often badly scarred. Many were even blinded.



Smallpox gets its name from the pus-filled blisters, also known as pocks, which form during the illness.

The Story of Smallpox

In the 1700s, smallpox was the cause of death of around 400,000 people in Europe each year. The reign of terror of this disease lasted into the 1900s when, in that century, smallpox killed at least 300 million people worldwide. That is more than the total number of people who were killed during both World Wars.

Thankfully, today smallpox is no longer a threat, but the path to defeating this once-deadly killer has been long and hard. As with all deadly diseases, destroying the enemy has involved years of scientific study. The defeat of smallpox has been a major human victory—it is the only human disease that scientists and doctors have ever been able to **eradicate**. There have been no naturally occurring cases of smallpox since the 1970s.



This photograph of a young girl from Bangladesh shows how devastating smallpox was. Her entire face and body are covered with the pus-filled blisters that were typical of the disease.

.....
"No man dared to count his children as his own until they had had the disease..."

**Comte de la Condamine (1701–1774),
mathematician and scientist**

.....

The Spread of Smallpox

No one knows how smallpox as a natural disease first began. One idea is that humans were infected by a *Variola*-like virus from rodents about 10,000 years ago or more.

A form of the smallpox virus may have passed from rodents to humans thousands of years ago, probably in Africa.



Conquering the World

The earliest physical evidence of smallpox that scientists have is scars from a **pox**-like rash on the **mummy** of Pharaoh Rameses V of Egypt, who died in 1157 BCE. Early cases of the disease spread around the world as populations grew and people traveled farther. **Traders** carried the disease from Egypt to India and, from there, it swept into China. By the 500s CE, it had reached Japan. Armies returning to Europe from overseas brought back smallpox in the 1000s and 1100s CE .

CASE STUDY: MASS DEVASTATION

Historians say that smallpox nearly wiped out the **Indigenous** populations in North, Central, and South America between 1500 CE and 1800 CE. When European settlers arrived in the Americas, they carried diseases such as smallpox. Indigenous peoples had never encountered those diseases before and so had no **immunity** against them.

In 1492, Italian explorer Christopher Columbus and his crewmen arrived on the shores of an island in the Bahamas that he named San Salvador. The local Taino people welcomed the foreign sailors. The first town that Columbus founded was on the island of Hispaniola, which is today shared between the Dominican Republic and Haiti. In 1492, the island had a population of at least 60,000 people. By 1548, there were fewer than 500 Taino left. Diseases, including smallpox, brought by the Europeans had caused widespread death.

Once smallpox took hold, it raged through Indigenous populations.



The Battle Begins

Throughout history, when an epidemic of smallpox traveled through an area, some people survived. Then, when the disease returned, these survivors did not catch it again—they had become **immune** to smallpox. By recognizing this, people were able to use that knowledge to develop the first weapons against the disease.

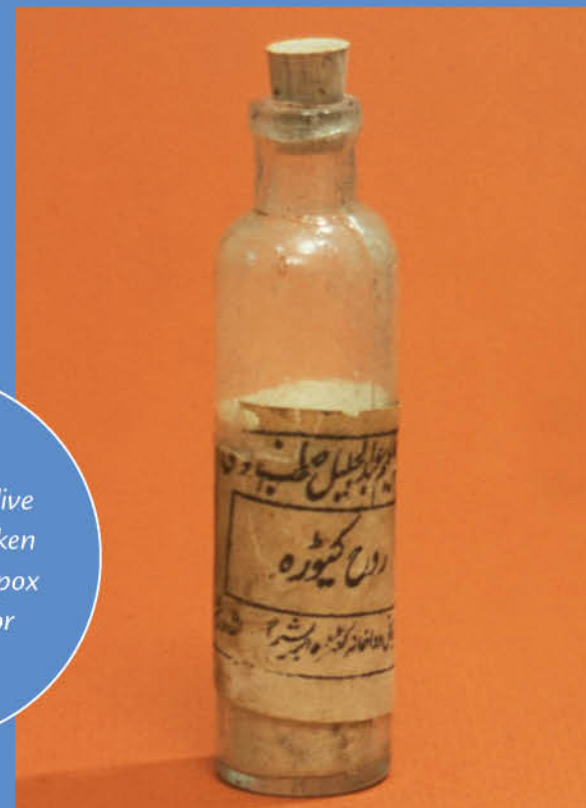
First Steps to Victory

About 1,000 years ago, people in China and India observed that getting and recovering from smallpox protected children against any future **outbreaks** of the disease. So, they decided to infect people with mild smallpox on purpose to try to protect them from getting the disease in the future. They began to crush crusts of smallpox scabs into a powder, which healthy people breathed in through the nose. Alternatively, they scratched the skin and inserted smallpox pus or powdered scab into the wound.

Trying to Control the Disease

This first attempt at protecting against smallpox reached Europe and America in the 1700s, where it became known as **variolation**, after the Latin name for smallpox virus—*Variola*. The disadvantage of variolation was that people who had been given mild infections became carriers of the disease and could infect other people. This sometimes led to epidemics. It was also difficult to control how bad an infection the variolation would give. After variolation, some people had full-blown smallpox and died.

This Indian bottle contained live smallpox virus taken from active smallpox lesions to use for variolation.



UNDER THE MICROSCOPE



Variolation was devised after observing the effects of disease. It was only centuries later that scientists learned how the body's **immune system** fights viruses. When white blood **cells** in the blood recognize virus particles, they make substances called **antibodies** that attack the viruses. After the antibodies have attacked a virus, they stay in the blood, ready to destroy the same viruses if they get into the body in the future.

Antibodies destroy a cell that is infected by a virus. They get rid of the invading virus and stop an infection from spreading.

