

# Edward Jenner: The Importance of Observation

Edward Jenner, born in England in 1749, is one of the most famous physicians in medical history. Jenner tested the hypothesis that infection with cowpox could protect a person from smallpox infection. All vaccines developed since Jenner's time stem from his work.

Cowpox is an uncommon illness in cattle, usually mild, that can be spread from a cow to a human via sores on the cow's udder. Smallpox, in contrast, was a deadly disease of humans. It killed about 30% of those it infected. Survivors often bore deep, pitted scars on their faces and other parts of the body affected by the blistering illness. Smallpox was a leading cause of blindness.

Jenner is said to have been interested in the observation of a dairymaid. She told him, "I shall never have smallpox, for I have had cowpox. I shall never have an ugly pockmarked face." And many other dairy workers commonly believed that infection with cowpox protected them from smallpox.

Given that the protective effect of cowpox infection was common local knowledge, why was Jenner's involvement important? Jenner decided to systematically test the observation, which then would form the basis of a practical application of the benefit of cowpox infection.

Jenner scratched some material from a cowpox sore on the hand of a milkmaid into the arm of eight-year-old James Phipps, the son of Jenner's gardener. Young Phipps felt poorly for several days, but made a full recovery.

A short time later, Jenner scratched some matter from a fresh human smallpox sore into Phipps's arm in an attempt to make him ill with smallpox. Phipps, however, did not contract smallpox. Jenner went on to test his idea on other humans and published a report of his findings.

We know now that the virus that causes cowpox belongs to the Orthopox family of viruses. Orthopox viruses also include variola viruses, the ones that cause smallpox.

Jenner's method of vaccination against smallpox grew in popularity and eventually spread around the globe. About 150 years after Jenner's death in 1823, smallpox would be making its last gasps. The World Health Organization eventually declared smallpox to be eradicated from the planet in 1980 after a massive surveillance and vaccination program.

An explanation of Jenner's scientific method is shown below:

- **Observation:** People who have had cowpox do not become ill with smallpox.
- **Hypothesis:** If a person has been intentionally infected with cowpox, then that person will be protected from becoming ill after a purposeful exposure to smallpox.
- **Test:** Infect a person with cowpox. Then try to infect the person with smallpox. (Note that Jenner did not use a control group in his experiment.)
- **Conclusion:** Infecting a person with cowpox protects from infection with smallpox.

Jenner repeated his experiment several times and got the same results. Other scientists did likewise and got the same results. Jenner is famous for having applied the scientific method to establishing the means of preventing smallpox.