

Father of Immunology

Edward Jenner developed the vaccine that ultimately vanquished smallpox



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Edward Jenner vaccinating a child against smallpox using cowpox serum. Artist's impression from *Le Petit Journal*, Paris, 1901.

> ON MAY 8, 1980, the World Health Assembly issued a remarkable statement. The world, at last, was free of smallpox—a disease that had decimated populations and caused terror for more than 10,000 years.

Much of the credit for this momentous accomplishment goes to Edward Jenner, an 18th-century country doctor from England who developed the smallpox vaccine. Jenner was the first to take a scientific approach to vaccination and the first to develop an attenuated, or live, vaccine—the kind now used to keep measles, mumps and tuberculosis at bay. Dubbed the “father

of immunology,” Jenner is credited with saving millions of lives.

And it all began with a dairymaid’s comment, overheard by Jenner when he was just 13.

The eighth of nine children, Edward Jenner was born in Gloucestershire, England, on May 17, 1749, to Rev. Stephen Jenner, the vicar of Berkeley, and wife Sarah. Sadly, Edward was orphaned at age 5 and so was raised by an older brother.

Early on, young Edward showed an interest in science and nature. At 13, he began working as an apprentice to a country surgeon, George Hardwicke.

Visiting a dairy farm with the doctor one day, Jenner heard a milkmaid say she was safe from smallpox and “would never have an ugly pockmarked face” because she had already had cowpox, a mild viral infection that sometimes spread from cows to the dairymaids who milk them. After getting cowpox, the dairymaids would feel a bit under the weather for a few days and get a few small pocks on their hands. Then they would recover—and they’d never get the dreaded smallpox.

It’s difficult to overstate just how awful smallpox was for people living at this time. The “speckled monster,” as it was known, had a fatality rate as high as 60 percent in adults and 80 percent in infants. In 18th-century Europe, it claimed an estimated 400,000 victims per year. Survivors often were blinded or disfigured by the disease’s telltale lesions.

Jenner made a mental note of this conversation with the milkmaid. Then he went on to complete his medical training and pursue a medical career at St. George’s Hospital in London. During these years he married Catherine Kingscote, started a family (the couple would have four children) and continued his wide-ranging research. He completed a seminal study on bird behavior, for instance, and developed a better method for preparing a medication used to induce vomiting.

But Jenner’s interest in smallpox never waned. Scientists had long known that survivors of smallpox were immune to the disease. To slow its spread, doctors practiced inoculation, or variolation: They inserted pus from a smallpox lesion under the skin of people who had never had it. Jenner himself had received this variolation

when he was a boy. While this practice proved effective for many, it also killed between 2 and 3 percent of the people who received it.

Jenner was determined to find a better solution. On May 14, 1796, Jenner performed the bold and now-famous experiment that changed the trajectory of history. He drew pus from the cowpox lesion of a dairymaid named Sarah Nelms, and infected 8-year-old James Phipps, the son of his gardener, through two small cuts in the boy's arm.

Young James felt ill for a few days. He ran a slight fever and lost his appetite. But he soon recovered. Two months later, to confirm whether the boy was now sufficiently protected

against smallpox, Jenner repeated the procedure with matter from a smallpox lesion. James had no side effects, and Jenner announced that the boy had been successfully vaccinated against the deadly virus.

Jenner wrote a paper about his experiment, but the Royal Society rejected it in 1797. The following year, Jenner published his own booklet, in which he called his procedure *vaccination* (the Latin word for cow is *vacca* and cowpox is *vaccinia*).

Jenner spent much of the rest of his life promoting the cause of vaccination. He added a one-room hut to his property (the "Temple of Vaccinia") where he vaccinated the poor for free, and he shared the vaccine with scientists

who brought vaccination to the United States and other parts of the world. Though he received many honors for his breakthrough, he never profited from it. Jenner died on Jan. 26, 1823, from a massive stroke at the age of 73.

Vaccination against smallpox became compulsory in England and Wales in 1853, and in 1967, the World Health Organization launched a global vaccination campaign. Just 13 years later, the WHO announced, "The world and all its people have won freedom from smallpox."

To date, smallpox is the only infectious disease that humans have vanquished. ●

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