SCIENCE DICTION

The Origin of the Word 'Vaccine'

This wonderful tool of immunization got its name from a cow virus.

by Howard Markel, on November 2, 2015

"Edward Jenner Advising a Farmer to Vaccinate His Family." Oil painting by an English painter, ca. 1910.
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The word vaccine, and vaccination, actually comes from the name for a pox virus—the cowpox virus, vaccinia, to be exact. But why did this wonderful tool of immunization, which constitutes one of the "greatest hits" in the entire history of medicine, get its name from a virus that attacks cows?

The Oxford English Dictionary credits the French for coining the term vaccine in 1800 and vaccination in 1803 (although there are cognates in Italian, vaccine, Portuguese, vacina, and Spanish, vacuna). According to an **article** in the British Medical Journal, however, the term was used as an adjective in 1799 by British general practitioner Dr. Edward Jenner (and the noun vaccination introduced by his friend Richard Dunning in 1800).

Indeed, when talking about vaccines of any kind, it is essential to start the discussion with the work of Jenner (1749 to 1823), who hailed from Gloucestershire, England. In the late 18th century, while making his rounds, Jenner made a stunning observation: Milkmaids infected with cowpox, which manifested itself as a series of pustules on the hands and forearms, were immune to the smallpox epidemics that regularly attacked the residents of his parish. (Many different animal species have their own poxvirus, hence smallpox—variola virus—for humans, cowpox for cows, and so on). Legend has it that Jenner first heard of this phenomenon in the late 1770s from a Bristol milkmaid who boasted, "I shall never have smallpox for I have had cowpox. I shall never have an ugly pockmarked face."

Jenner made history in 1796 when he gave a patient what became known as the first "vaccinia vaccine"—that is, a vaccine made from the cowpox virus. In a manner contemporary readers might find disgusting, the doctor took pus from the cowpox lesions on a milkmaid's hands and introduced that fluid into a cut he made in the arm of an 8-year-old boy named James Phipps.

Six weeks later, Jenner exposed the boy to smallpox, but Master Phipps did not develop the infection, then or on 20 subsequent exposures to the dreaded disease. Indeed, Phipps later married, had two children, and lived long enough to attend Jenner's funeral in 1823. (Phipps died at the age of 65.)

Between 1796 and 1798, Jenner collected 23 cases of people infected or inoculated with cowpox virus. In a 1798 report, **Inquiry into the Causes and Effects of the Variolae Vaccinae, A Disease Discovered in Some of the Western Counties of England**, which Jenner published at his own expense, he concluded "that the cowpox protects the human constitution from the infection of smallpox." It was a groundbreaking conclusion that set the fields of immunology, vaccine therapy, and preventive health in motion.

Before Jenner developed his method, many doctors immunized patients against smallpox by means of variolation (the controlled transfer of pus from one person's active smallpox lesion to another person's arm, usually subcutaneously with a lancet). The beauty of Jenner's newer method of vaccinating with the cowpox virus was that it was not only effective—it also had far fewer side effects and was much safer.

Jenner's vaccination soon became the major means of preventing smallpox around the world. In 1801 President Thomas Jefferson declared smallpox vaccination one of the nation's first public health priorities. A few years later, he instructed Meriwether Lewis and William Clark to take doses of smallpox vaccine on their expedition to the Pacific.

Almost a century after Jenner developed his technique, in 1885, the great Louis Pasteur of Paris tested what he called a "rabies vaccine," even though the parlance of the time was such that "vaccine" or "vaccination" specifically meant administering cowpox pus into a human being in order to prevent that person from contracting smallpox. In fact, Pasteur actually produced a rabies antitoxin, which served as an antidote once someone contracted rabies. Nevertheless, he appropriated the word vaccine, permanently stretching its meaning beyond its Latin word

associations with cows and cowpox virus.

In a way, then, it was the global influence of Louis Pasteur that led to the expansion of the term vaccine to include a long list of "elixirs" of sorts containing live, attenuated (that is, less virulent than the natural variety), or killed bacteria or viruses, which are typically given in the form of an injection, to produce immunity against a particular infectious disease.

As for smallpox, thanks to a massive vaccine campaign by the World Health Organization, the disease was eradicated from the planet in 1980.

This success inspires the following medical advice to everyone, but especially children: Make sure all your vaccinations are up to date!

*The image appearing with this article was added on November 3, 2015.

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