The history of vaccination

Jemima Hodkinson looks at Jenner, vaccines and Blosson the cow

In the library of St George’s, University of London, a large brown and white cowhide is proudly displayed inside a glass case. The hide belonged to Blossom – a rare-breed Gloucester cow who played an important part in the history of medicine.

Blossom’s hide was donated to St George’s by the family of Edward Jenner, the family doctor who developed vaccination as a method of protecting people from deadly diseases.

Jenner was born in 1749 in a village in Gloucestershire, where his father worked as the local vicar. He started his medical training at the age of 14 when he became the apprentice of a local surgeon, then moved to London to complete his education at St George’s. In 1772, he returned to his home town to work as a country doctor.

The speckled monster

Throughout Jenner’s life, epidemics of smallpox – nicknamed ‘the speckled monster’ – were common in Europe. The disease is caused by the variola virus, which can spread through close contact with an infected person or object. About two weeks after the virus infects a person a high fever takes hold, followed by a rash, which appears in the mouth before spreading across the whole body over the course of a day.

Over the next few weeks, the rash develops into pus-filled sores which crust over and form scabs. When the scabs fall off, they leave deep scars behind. An infected person is contagious from the day the rash appears until the last scab falls off, which is usually about three weeks. During the 18th and 19th centuries as many as 98 per cent of children who caught the disease died from it; those who survived suffered from disfiguring scars, and up to a third became blind.

Although there was no way of treating smallpox once the infection had taken hold, 18th-century doctors did attempt to protect individuals from infection. The most common method they used was called variolation. This involved taking material from a fresh human smallpox sore and inserting it under the skin of an uninfected person. The hope was that the person would go on to develop a less serious form of smallpox disease, then once fully recovered would have lasting immunity.

However, many people treated this way developed serious, life-threatening smallpox infections that could then be easily passed on to other people. The crude method of variolation also carried a risk of
transferring other blood-borne infections such as syphilis. Although many doctors were concerned about these risks, by the mid-18th century thousands of children were variolated each year – including an eight-year-old Edward Jenner. Luckily, he survived the procedure.

According to an unusual piece of countryside folklore, there was another method of protecting yourself. It was common knowledge among the dairy-farming communities of rural England – such as Jenner’s Gloucestershire home – that milkmaids who caught a disease called cowpox never suffered from the far more deadly smallpox. Indeed, the two viruses are closely related, although cowpox causes only a mild illness. Jenner was convinced that the relationship between the two diseases was more than an old wives’ tale.

**Testing on humans**

When a local milkmaid caught cowpox from a dairy cow called Blossom, Jenner decided to carry out a proper test of the theory. He enlisted a young boy called James Phipps as his subject, and rubbed some pus from one of the milkmaid’s cowpox sores into a scratch on the boy’s arm. As Jenner expected, the boy became unwell with cowpox, but recovered after a few days.

The next stage in the experiment was to infect the small boy again, this time with matter from a smallpox sore – the risky process of variolation. This time, Phipps did not become unwell. The boy’s immune response, developed during his cowpox infection, was also able to defeat the related smallpox virus. Jenner now had his first piece of evidence for a new, safe method of preventing smallpox infection. He wrote up his experiment and submitted it to the Royal Society in London, a group of influential scientists who published new theories and discoveries in their journal.

The faculty members of the Royal Society were not convinced. Demanding more evidence, they sent Jenner back to rural Gloucestershire to repeat his experiment on several more children. Jenner even infected his 11-month-old son with cowpox. Having bolstered his claims with this new evidence, he submitted his results to the Royal Society again in 1798 – this time they were accepted and published. The word for this now commonplace practice was coined: vaccination, from the Latin word ‘vacca’ for cow.

Jenner’s new technology had the potential to save thousands of lives, especially children’s. However, having won over the Royal Society, Jenner now had to convince the general public that such a strange practice could really protect individuals from this universally feared disease.

There was widespread disgust at the idea of transferring matter from a sick animal into a person. Public opinion was slow to change, but in 1840 Britain banned the old practice of variolation and in

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1853 – over 50 years after Jenner’s results were originally published – vaccination was made compulsory in the UK.

It was another 127 years before smallpox was eradicated all over the world, through widespread vaccination coverage – the first disease for which this had ever been achieved.

Jenner’s work was the basis for a whole new area of medical science: immunology, the study of the immune system. Research into vaccines gathered pace throughout the rest of the 19th and 20th centuries with advances in understanding of infectious disease. Today, vaccination is an essential part of modern healthcare, preventing many dangerous diseases around the world.

QUESTIONS FOR DISCUSSION

Measles, mumps and rubella (MMR) is one of the vaccines routinely given to children in the UK. In 1998, a scientific paper was published that led to some parents refusing to let their children have the vaccination. What happened, and why?

Smallpox was the first disease to be eradicated through vaccination. Has this been achieved for any other diseases? Which diseases might be eradicated in the future?

Blossom (and other cows) played an important role in Jenner’s experiments, just one example of the many ways that animals have been used in medical research. Find three examples of how animals are used in research today. Do you think this use is justified or not? Why?

REFERENCES

BBC History profile of Edward Jenner

Edward Jenner and the history of smallpox and vaccination

Times Higher Education: St George’s campus curiosities

ABOUT THIS RESOURCE

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