PERINATAL LESSONS FROM THE PAST

Dr Edward Jenner (1749–1823) of Berkeley, and vaccination against smallpox

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Edward Jenner was born on 17 May 1749, the eighth child of the Reverend Stephen Jenner, vicar of Berkeley in the county of Gloucestershire. Both his parents died when he was 5 and he was then looked after by his eldest brother. Educated at Wotton-under-Edge and Cirencester, at the age of 13 he was apprenticed for seven years to Daniel Ludlow, a surgeon of Sodbury near Bristol. In 1770 he travelled to London to become a house pupil of John Hunter and a student at St George's hospital. Three years later, resisting the suggestion that he practise in London, Jenner returned to Berkeley to become a country physician: perhaps because he was a keen naturalist.

Besides being both curious and observant, he kept meticulous notes and possessed a happy combination of common sense and scientific logic. Spurred on by John Hunter with whom he had developed a warm friendship and who wrote, 'Why think? Why not try the experiment?', Jenner studied such subjects as the temperature of hibernating hedgehogs, the life history of eels, and the migration of birds. His best known observations were on the cuckoo. This bird was known to lay its eggs in the nests of other birds, particularly the hedge-sparrow, and to depend on the foster parents to hatch and feed its chicks. Philosophers since the days of Aristotle had puzzled as to how the foster parent's own chicks came to be ejected from the nest and left to die. Jenner discovered that the cuckoo chick was itself responsible and demonstrated by dissection that the latter had a hollow on its back that enabled it to obtain a good purchase. In one instance he recorded observing two cuckoo hatchlings in one nest. He wrote: 'The contest was very remarkable. The combatants alternately appeared to have the advantage, as each carried the other several times to the top of the nest, and then sunk down again, oppressed by the weight of its burden; till at length, after various efforts, the strongest prevailed. After his findings had been presented to the Royal Society in 1788, he was elected FRS.

Jenner was a conscientious and successful doctor, a vigorous countryman, and adept at social gatherings. He took pride in his appearance, enjoyed good food, singing and playing the flute and the fiddle, and he wrote poetry about the countryside. In 1788 he married Catherine Kingscote and the following year their eldest son, Robert, was born. Hunter became his godfather. A daughter and second son followed. In 1792 Jenner was made MD by the University of St Andrews. This enabled him to practise as a physician in the fashionable spa of Cheltenham. He also helped to establish two local medical societies and presented papers on such matters as mitral stenosis and, importantly, on the association of angina pectoris with coronary artery disease. He was also interested in botany and in 1798 was elected a fellow of the Linnaean Society.

In the 18th century every 10th person in Europe died of smallpox and the survivors were often terribly scarred. Against this background Jenner, as an apprentice in 1768, first heard a dairy maid claim: 'I can't take the smallpox, for I have already had the cowpox'. During the following years he discussed the matter with Hunter and others, with little response. Indeed, his friends in the west country Convivial Medical Club threatened him with expulsion if he brought up the subject again. In 1796 Jenner put the theory to test and sent his findings to Sir Joseph Banks, President of the Royal Society. His manuscript was not accepted. Two years later, after further studies, Jenner published his 'Inquiry' privately. He began by describing a
number of people previously infected with cow
pox who had then failed to respond to inocula-
tion with smallpox or to catch the disease. Next
he described his crucial experiment:

'The more accurately to observe the
progress of the infection, I selected a
healthy boy (James Phipps), about eight
years old, for the purpose of inocula-
tion for the Cox Pox. The matter was taken
from a sore on the hand of a dairymaid
(Sarah Nelmes), who was infected by her
master's cows, and it was inserted, on the
14th of May, 1796, into the arm of the boy
by means of two superficial incisions,
barely penetrating the cutis, each about
half an inch long. On the seventh day he
complained of uneasiness in the axilla,
and on the ninth he became a little chilly,
lost his appetite, and had a slight head-
ache. During the whole of this day he was
perceptibly indisposed, and spent the
night with some degree of restlessness, but
on the day following he was perfectly well.
The appearance of the incisions in their
progress to a state of maturation were
much the same as when produced in a
similar manner by variolous matter. The
only difference which I perceived was, in
the state of the limpid fluid arising from
the action of the virus, which assumed
rather a darker hue, and in that of the
efflorescence spreading round the
incisions, which had more of an erysipela-
tous look than we commonly perceive
when variolous matter has been made use
of in the same manner; but the whole died
away (leaving on the inoculated parts
scabs and subsequent eschars) without
giving me or my patient the least trouble.

In order to ascertain whether the boy,
after feeling so slight an affection of the
system from the Cox-Pox virus, was secure
from the contagion of the Small-Pox, he
was inoculated on the 1st of July following
with variolous matter, immediately taken
from a pustule. Several slight punctures
and incisions were made on both his arms,
and the matter was carefully inserted, but
no disease followed. The same appearances
were observable on the arms as we com-
monly see when a patient has had variolous
matter applied, after having either the Cox-
Pox or the Small-Pox. Several months
afterwards, he was again inoculated with
variolous matter, but no sensible effect was
produced on the constitution.'1

Jenner went on to test the protective effect of
vaccination with lymph taken direct from sores
on cow's teats, and also of arm to arm vaccina-
tion. In his second edition (1800) he wrote:

'Wishing to see the effect of the disease on
an infant newly born, my nephew, Mr
Henry Jenner, at my request inserted the
vaccine virus into the arm of a child about
20 hours old. His report to me is that the
child went through the disease without
apparent illness, yet that it was found
effectually to resist the action of variolous
matter with which it was subsequently
inoculated'.

Jenner also noted that cowpox was not trans-
mitted to others sharing the same bed, and that
a young woman with several lesions on her
hand failed to transmit the disease to the infant
she was nursing. Almost in passing he was also
the first to describe an allergic reaction; it
occurred in a woman, Mary Barge, inoculated
with variolous matter in 1791 who had had
cowpox 31 years earlier.

The response to Jenner's report was mixed,
ranging from disinterest, ridicule, and opposi-
tion to gathering enthusiasm, especially
abroad. Within a few years many hundreds of
thousands of people had been vaccinated
around the world and the mortality from small-
pox dramatically reduced. Jenner was show-
ered with honours. Parliament awarded him
£30 000 and he was given the Freedom of the
City of London. He was received by George
III, the Tsar, and the King of Prussia, while
Napoleon made his famous comment 'Ah! c'est Jenner. Je ne puis pas refuser à Jenner'. In
1813 Oxford University made him a Doctor of
Physic. But he remained a modest and loved
country practitioner living at the Chantry in
Berkeley (now the Jenner Museum). Nearby
he built a cottage for James Phipps.

He had a strong faith, and also became a
free-mason and a magistrate. In 1815 his wife
and eldest son died, probably from tuberculo-
sis, and in 1823 at the age of 74 his own life
ended following a stroke. He was buried with
his family in Berkeley Church. So passed away
one of the greatest benefactors and scientists
known to mankind.

Addendum
Dr Michael Underwood, a London physician
and contemporary of Jenner, wrote: '... if (vac-
cination) were universally adopted, the small-
pox would in a few years become entirely
extinct'. However, vaccination was not made
compulsory in England until 1853, and
another 126 years were to pass before smallpox
was finally eradicated by the WHO vaccination
campaign of the 1970s.

1 Underwood EA, Campbell AMG. Edward Jenner: the man
and his work. Bristol: John Wright & Sons Ltd, 1966.
3 Jenner E. An inquiry into the causes and effects of the variolae
vacciniae, a disease discovered in some of the western countries of
England, particularly Gloucestershire and known by the name of
the cow-pox. London: Sampson Low, 1798.