

Professor Sir Kenneth Murray

Molecular biologist who helped to create a life-saving vaccine

Kenneth Murray was a leading figure in molecular biology, spearheading techniques in gene cloning which led to the creation of one of the first genetically engineered vaccines to counter viral hepatitis B. The infection damages the liver, can cause liver cancer, and is thought by the World Health Organisation to lead to as many as 600,000 deaths a year. In 1978 Murray co-founded a company, Biogen, in Geneva, where his work was commercialised. With the substantial income generated from his discovery, Murray initiated enterprises to further scientific education and research.

Kenneth Murray was born in 1930 in Yorkshire to Allen and Elizabeth Murray. The family moved to the Midlands and, after leaving school, Murray took up a series of positions in industry while continuing his studies part time. He then went on to Birmingham University where he studied chemistry as an undergraduate and undertook a PhD. While working towards his doctorate, under the supervision of Arthur Peacocke, Murray met Noreen Elizabeth Parker (obituary, June 6, 2011), an up-and-coming geneticist who, besides enjoying a successful academic career of her own, became one of his leading collaborators. They were married in 1958 and afterwards moved to America to do research at Stanford University, California, where Kenneth Murray worked on the protein components of chromosomes, called histones.

Returning to the UK in 1964, Murray joined the Medical Research Council in Cambridge where he worked on RNA (ribonucleic acid) sequencing under the eminent biochemist and Nobel laureate Fred Sanger at the laboratory of molecular biology. Murray moved again in 1967, this time to the University of Edinburgh — a hub for molecular biology — where he took up the post of senior lecturer,



becoming reader in 1973. Together with Noreen, Kenneth Murray was a key figure in developing techniques to produce "recombinant DNA" in which special enzymes are employed to cut up DNA from one organism and join it to DNA from another. Much of this work was done with DNA from a bacterial virus called *Bacteriophage lambda*.

Using these methods, Murray

He set up a trust to support pioneering research in his field

was able to insert DNA fragments from the hepatitis B virus into circular rings of DNA, called plasmids, and introduce these plasmids into *E.coli* cells. Inside the cells the plasmids replicate, and are passed on to daughter *E.coli* cells during cell division — the basis of gene cloning. Using this technique, Murray created plasmids containing the genes for hepatitis B antigens — structures produced by the virus which trigger an immune response in the body. When these plasmids were introduced into *E.coli* cells, the antigens were produced.

The approach was then applied to yeast cells in order to produce the antigens for use in

vaccines. This means of antigen production was a great improvement as previous vaccines were laboriously made using antigens taken from the serum of those suffering from hepatitis B. Not only did the new approach remove the hazards posed to researchers working with such virus-containing serum, but it also enabled the vaccine to be mass-produced.

In 1976 Murray was made professor at Edinburgh University and in 1978 he set up Biogen, now Biogen Idec, with other leading biologists — the company went on to license the hepatitis B vaccine. From 1979 he spent three years at the European Molecular Biology Laboratory in Germany before returning to Edinburgh where he became the Biogen Professor of Molecular Biology in 1984. Murray, together with his wife, also ran courses on the cloning of genes to bring the new technology to a wide audience.

Retiring in 1998, Murray devoted much of his time to the activities of the Darwin Trust of Edinburgh which he set up in 1983 as a result of the financial success of Biogen. Among its work, the trust is engaged in supporting students carrying out pioneering research, predominantly in molecular biology.

Murray's work received great acclaim: in 1979 he was elected a Fellow of the Royal Society and was made a Fellow of the Royal Society of Edinburgh in 1989, receiving its Royal Medal in 2000. Besides being awarded numerous prizes from the scientific community, Murray was knighted in 1993 for services to science.

His wife Noreen died in 2011. The Noreen and Kenneth Murray Library at the University of Edinburgh is named in honour of their achievements.

Professor Sir Kenneth Murray, FRS, molecular biologist, was born on December 30, 1930. He died on April 7, 2013, aged 82