US biochemist who shared the Nobel Prize for Physiology or Medicine in 1969 with German-born US biologist Max Delbrück (1906-1981) and Italian-born US physician Salvador Luria (1912-1991) for his work using bacteriophages - viruses that infect bacteria - to demonstrate that DNA, not protein, is the genetic material. His experiments showed that viral DNA is sufficient to transform bacteria.

Alfred Hershey was born on 4 December 1908 in Owosso, Michigan. He studied at Michigan State College obtaining a BS in chemistry in 1930 and remained there to do his PhD thesis on the chemistry of the Brucella virus, receiving his doctorate in 1934. From 1934 until 1950 he was engaged in teaching and research at the department of bacteriology at the Washington University School of Medicine in St Louis, Missouri. In 1950 he became a staff member of the Carnegie Institute, New York, and he was appointed director of the Genetics Research Unit there in 1962. He married Harriet Davidson in 1945 and they had one son.

In Missouri Hershey worked under US bacteriologist J J Bronfenbrenner, one of the first bacteriologists in the USA to study bacteriophages, and with Delbruck and Luria, he became a founding member of the American Phage Society in the early 1940s. His discovery in 1946 of the existence of the exchange of genetic material in phages was the first laboratory demonstration of genetic recombination in viruses.

Hershey is best known for his work with Martha Chase at the Carnegie Institute. In 1952 they conducted the Hershey-Chase experiment that confirmed the hypothesis put forward by Oswald Avery in 1944 that genes were made of DNA. Their experiment demonstrated that DNA is the genetic material by studying the T2 bacteriophage, a virus that infects the bacterium Escherichia coli (E. coli). In 1951 R Herriot had suggested that a bacteriophage acted like ‘a little hypodermic needle full of transforming principles’, which did not enter the cell itself but whose tail contacted the host and perhaps enzymatically cut a small hole through the outer membrane, allowing the nucleic acid of the virus head to flow into the cell.

Hershey and Chase confirmed Herriot's hypothesis by labelling the bacteriophage DNA with active phosphorus and the protein with radioactive sulphur. A sample of E. coli was infected with the radiolaabelled bacteriophage for a short incubation and the two were then separated by centrifugation. The bacteria were found to be full of radioactive phosphorus but devoid of radioactive sulphur. They were also fully competent to produce progeny virus. Their conclusion was that ‘a physical separation of the phage T2 into genetic and non-genetic parts is possible’ and they published their findings in their 1952 paper 'Independent functions of viral proteins and nucleic acid in growth of bacteriophage'. This convinced the other members of the Phage Society that DNA was the genetic component of viruses, and was also influential on Francis Crick and James Watson's work in Cambridge, England, on the structure of DNA. Hershey was awarded an honorary DSc by the University of Chicago in 1967 and an MD by Michigan State University in 1970. He received the 1958 Albert Lasker Award and the 1965 Kimber Genetics Award but it was not until 1969 that he was awarded the Nobel Prize. Hershey died in
APA

Chicago

Harvard

MLA