US microbiologist who produced the first successful vaccine against the paralytic disease poliomyelitis.

Salk was born in New York, the son of Polish-Jewish Immigrants on 28 October 1914. He graduated in surgery from the College of the City of New York in 1934, and then became a research fellow at the New York University College of Medicine, where he studied the chemistry of proteins. In 1939 he was awarded a doctorate in medicine and during the next three years worked at the Mount Sinai Hospital in New York, before joining the research staff of the Virus Research Unit in the University of Michigan, where he worked on influenza vaccines until 1944. The next two years were spent in consultation regarding the protection of the armed forces from epidemics. In 1946 he became an assistant professor in epidemiology at Michigan and the following year he was invited by the University of Pittsburgh to join a special medical research unit there to carry out a three-year programme on the causes and treatment of viral diseases. The development of the Salk vaccine against poliomyelitis was announced in 1955. He was appointed director of the Salk Institute for Biological Studies, San Diego, in 1962. He died on 23 June 1995.

The major obstacle to research on the preparation of vaccines in the 1940s was the difficulty of obtaining sufficient virus. Unlike bacteria, which may be grown in culture, viruses need living cells on which to grow. A breakthrough came when it was found that viruses could be grown in live chick embryos. John Enders improved on this technique with the use of mashed embryonic tissue, supplied with nutrients, and with the addition of penicillin to keep down the growth of bacteria.

Once the method of preparing sufficient quantities of virus was available, Salk set about finding a way of treating the polio virus so that it was unable to cause the disease but was still able to produce an antibody reaction in the human body. He collected samples of spinal cord from many polio victims and grew the virus in the new live-cell culture medium. He studied the reaction of the virus to various chemicals and found that there were three distinct types of virus that cause the disease. Salk experimented with formaldehyde (methanal) to render the virus inactive. By 1952 he had produced a vaccine effective against the three common strains of polio virus in the USA; he tested it on monkeys, which are also susceptible to polio, and found that it worked. Next he tried the vaccine on children who had recovered from polio and were immune to the disease, and he found an increase in the antibody content of their blood. Afterwards, he tried it on his family and children who had not had polio, and again antibodies were formed in the blood.

Salk needed a large-scale clinical trial, however, because a large number of people would need to receive the preventive vaccine if any useful results were to be obtained. The vaccine had to be prepared on a commercial scale and licences were issued to five companies, who were instructed in the technique of vaccine production and were responsible for their own quality control, because Salk's laboratory could not cope with the volume of work that testing would involve. In 1955, in a big publicity campaign, some vaccine was prepared without adequate precautions and about 200 cases of polio,
with 11 deaths, resulted from the clinical trials. Salk recommended that the vaccine should be tested by the public health service in future and more stringent control prevented further disasters.

Salk was the first to make use of Enders's method of growing viruses to prepare a vaccine against poliomyelitis. It saved many people from the crippling and often fatal effects of the disease and prompted Albert Sabin to prepare a polio vaccine that can be administered orally rather than by injection.

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