

Lesson 4 – On the Shoulders of Heroes: Toward a World without Polio

Many scientists work to understand a topic at the same time. They are often working to answer different questions about the same topic. But, sometimes they are working on the same question, such as how to make a vaccine. Even then, they often take different approaches. The story of overcoming polio is a good example. The individuals and teams below all contributed to the world's progress toward defeating polio.

JOHN HAVEN EMERSON

John Haven Emerson was an inventor at heart. He never graduated from high school, but he got 35 patents for inventions. He liked to invent respiratory equipment. He is famous for some of his inventions. For example, he improved the iron lung used to treat polio patients who could not breathe on their own. His version was introduced in 1931. It was made at his company in Cambridge, Massachusetts, called the J. H. Emerson Company. It was lighter, quieter, simpler, and more reliable than other versions available at the time.

HILARY KOPROWSKI

Hilary Koprowski became a medical doctor in 1939 at Warsaw University in Poland. He studied polio virus in the late 1940s at a company called Lederle Laboratories. The labs were in Pearl River, New York. He believed that a polio vaccine made with live virus and given by mouth would be the best kind. He tested the vaccine on himself in 1948. It was tested in mentally disabled children living at a group home in New York in 1950. The caretakers were afraid the children would get polio because they lived together. Other scientists were upset that he tested a live polio virus vaccine in people. In 1958, his vaccine was tested in millions of people in the Belgian Congo. It was safe, and it worked.

ISABEL MORGAN AND DAVID BODIAN

David Bodian studied at the University of Chicago. He earned two degrees. His first was a doctoral degree (Ph.D.) awarded in 1934. Then he became a medical doctor in 1937. In 1938, he moved to Baltimore, MD to study polio virus at Johns Hopkins. Bodian developed an animal model for studying polio infections. In the early 1940s, he figured out that polio virus enters the body through the mouth. It then reproduces in cells of the small intestine. Most of the new viruses leave the body through feces. But some enter the blood. When this happens, the virus can infect nerve cells causing paralysis.

Isabel Morgan earned her doctoral degree (Ph.D.) at the University of Pennsylvania in 1938. She moved to the Rockefeller Institute to do polio virus research. In 1944, she went to Johns Hopkins to work with David Bodian. Together, they developed a killed, or “inactivated” polio vaccine during the late 1940s. The vaccine worked in monkeys. But because they grew the vaccine virus in nerve cells, they were concerned about its safety. So, they never tested it in people.

JOHN PAUL

John Paul became a medical doctor in 1919 at Johns Hopkins University. He began work at Yale University in 1928. He and a colleague started the Yale Poliomyelitis Study Unit in 1931. The group studied polio outbreaks in Connecticut. They figured out that the same types of polio virus making people ill were also found in sewage. The same types could also be found in flies that fed on the sewage. This work was important to figuring out how polio virus spread through communities. Their work confirmed that three types of polio virus exist. In the 1940s and 1950s, Paul found that polio infection could protect a person for the rest of their life. His work determined the time between exposure to the virus and illness. And, he studied the spread of polio from one person to another.

FREDERICK ROBBINS, THOMAS WELLER, AND JOHN ENDERS

John Enders earned his doctoral degree (Ph.D.) in 1930 at Harvard Medical School. Thomas Weller and Frederick Robbins were medical school roommates. Both earned their medical degrees from Harvard in 1940. Weller and Robbins worked in Enders' lab. Between 1948 and 1949, they grew polio virus in cells in the lab. This was an important first because before that scientists had to grow the virus in animals. Growing the virus in cells, not animals, was important for other scientists who used the technique to develop vaccines. The team received the Nobel Prize for their work with cell culture in 1954.

ALBERT SABIN

Albert Sabin became a medical doctor in 1931 at New York University. In 1939, he moved to Cincinnati, Ohio to study polio virus. At the time, scientists knew polio virus could grow in cells of the nervous system. But, Sabin found that polio virus also grew in the small intestine. This finding led him to develop a polio vaccine that could be given by mouth. After testing the vaccine on himself, he tested it on prisoners from 1955 to 1957. Then, he tested it in Russia and other countries from 1957 to 1959. His polio vaccine was safe, and it worked.

JONAS SALK

Jonas Salk became a medical doctor in 1939 at New York University. He moved to the University of Pittsburgh in 1947. While in Pittsburgh, Dr. Salk worked to develop a polio vaccine. In the early 1950s, he tested a vaccine made of inactivated, or "killed" polio virus. The vaccine was given as a shot. First, he tested it on himself, his family, and his lab partner. In 1954, his vaccine was tested in 1 million children. The children were six to nine years old. They were called "Polio Pioneers." When the successful results were announced in 1955, Dr. Salk became an instant hero.