Jonas Salk was an American physician and medical researcher who developed the first safe and effective vaccine for polio.

The history of vaccination for prevention of disease dates back to Edward Jenner who discovered a vaccine for the prevention of smallpox in the late eighteenth century. It wasn’t until the middle of the twentieth century however, that a vaccine for poliomyelitis was manufactured. A healthy child who contracted polio could be paralysed in one day – for life. A crippling disease that killed 5-10% of those infected, polio defied treatment or prevention until a certain Jewish American realized that something could be done to restrain this scourge. Jonas Salk was an American physician and medical researcher who developed the first safe and effective vaccine for polio. The fact that most clinicians today are not familiar with this illness is testament to the pioneering effort of Salk that has led to the elimination of this dreaded disease in most countries of the world.

Early life and medical school
Jonas Salk was born in New York City on October 28, 1914. His parents were Jewish immigrants who had not received extensive formal education. His father was a garment designer. As a child he was not interested in science. His initial ambition was to study law and to be elected to Congress and try to make just laws. He did not pursue this course because, in his words, “My mother didn't think I'd make a very good lawyer. And I believe that her reasons were that I couldn't really win an argument with her.”

A loss for the legal profession turned out to be a huge gain for medicine and public health. After graduating from high school, Salk attended the City College of New York, where he earned a bachelor's degree in science. He went on to earn his M.D. from New York University in 1939.

His interest in research and the spirit of inquiry was fostered while still a medical student. He narrates an important formative incident in medical school thus, “At the end of my first year of medical school, the professor of chemistry, Dr. R. Keith Cannon, tapped me on the shoulder and asked me to come to see him. I was quite sure that he was going to tell me that I was failing and give me some bad news. Instead of which, he offered me an opportunity to drop out for a year and work with him in chemistry, during which time I could have my first experience in research.”

It was a difficult decision to make, because he would have to leave his class, be alone, and in a sense be exceptional for that year, and then return to another class. Not much was accomplished during that year, but it was important because it started off a process and set him on the path of investigative research and innovation. It was a risk that paid off. “Risks, I like to say, always pay off. You learn what to do, or what not to do.” He later said, “.

After medical school, Salk interned at Mount Sinai Hospital for two years and then earned a fellowship to University of Michigan, where he studied flu viruses with Dr. Thomas Francis Jr. who was Salk’s mentor in the field of Virology.

Development of the Polio vaccine
Polio was a medical oddity that baffled researchers for years. It was first recorded in 1835 and grew steadily more prevalent. Every year, about 15,000-20,000 people were paralysed and about a 1000 died in the United States alone, before the vaccine. The statistics in India were even more dismal. It took a long time to learn that the virus was transmitted by fecal matter. It entered the victim orally, established itself in the

It’s important to recognize that sometimes at a turning point, what’s important is to let go of the way you were going, or the way you are, to explore a new direction.
intestines, and then travelled to the brain or spinal cord.

Less fortunate victims were left with respiratory paralysis, severe crippling limb paralysis and death. Salk set about research into a vaccine for this crippling illness in 1947, but the seed of inquiry had been sown already, while still a medical student.

Salk describes the initial process that led to his interest in polio vaccination in this way. “You never have an idea of what you might accomplish. The first moment that a question occurred to me that did influence my future career, occurred in my second year at medical school.

We were told in one lecture that it was possible to immunize against diphtheria and tetanus by the use of chemically treated toxins, or toxoids. And in the following lecture, we were told that for immunization against a virus disease, you have to experience the infection, and that you could not induce immunity with the so-called "killed" or inactivated, chemically treated virus preparation. Well, somehow, that struck me. What struck me was that both statements couldn't be true. And, I asked why this was so. There was no satisfactory answer.”

It was the pursuit of the answer to this question that led him to his life mission. The path that led to his research on polio however, was not straight or smooth. In fact, he was turned down by a couple of institutes that he had applied to after medical school.

“My entering the field that led to work in vaccines came about as a result of my being denied an opportunity to work at another institution.”

In 1947, Salk took a position at University of Pittsburgh, where he began conducting research on polio, also known as infantile paralysis. By 1951, Salk had determined that there were three distinct types of polio viruses (type 1, 2 and 3) and was able to develop a "killed virus" vaccine for the disease. The vaccine used polio viruses that had been grown in a laboratory and then destroyed. Jonas Salk published the results in the Journal of the American Medical Association the following year and a nationwide testing was made. It was during this time that worst polio eruption happened in America.

Preliminary testing of the polio vaccine began in 1952. The testing expanded over the next two years, making it one of the largest clinical trials in medical history. Roughly 2 million children were given the vaccine during the test phase. It was Salk’s former mentor Thomas Francis Jr. who helped and directed the mass vaccination of schoolchildren. When the vaccine was approved for general use in 1955, Salk became a sort of folk-hero in the USA. He became world-famous overnight, but his discovery was the result of many years of painstaking research. In its first few years, the vaccine had a remarkable impact on the number of new cases of polio reported. There were more than 57,000 cases in the United States in 1952, according to the College of Physicians of Philadelphia. A decade later, that number fell to less than a thousand. A live virus vaccine was also developed by Albert Sabin around this time and it became widely used as it was less expensive and easier to administer.

Salk could have potentially made 7 billion U.S. dollars if he had patented his vaccine. He famously did not. When questioned about patenting, Salk responded. “There is no patent. Could you patent the sun?”

**Later Years**

Salk launched his own
research organization known as the Salk Centre for Biological Studies in 1963. There he and other scientists focused their efforts on such diseases as multiple sclerosis and cancer. Salk served as the centre’s director until 1975. Salk studied AIDS and HIV later in his career.

In addition to his research, Salk also wrote several books on philosophical topics. His works include *Man Unfolding* (1972) and *The Survival of the Wisest* (1973), which he co-wrote with son Jonathan. Jonas Salk died of heart failure on June 23, 1995, at his home in La Jolla, California.

Salk was not primarily a scientist. He was first and foremost, a man in love with humanity who used rigorous scientific principles to express this interest in a practical manner.

In Salk’s own words a few years before his death, "As a child I was not interested in science. I was merely interested in things human, the human side of nature, if you like, and I continue to be interested in that."

He had an interesting attitude towards research and experimentation. He said, “Not infrequently, I go into the laboratory, and people would say something didn't work. And I say, 'Great, we've made a great discovery!' If you thought it was going to work, and it didn’t work, that tells you as much as if it did.

Now, some people might look at something and let it go by, because they don't recognize the pattern and the significance. It's the sensitivity to pattern recognition that seems to me to be of great importance. It's a matter of being able to find meaning, whether it's positive or negative, in whatever you encounter. It's like a journey. It's like finding the paths that will allow you to go forward, or that path that has a block that tells you to start over again or do something else.”

This spirit of enquiry coupled with a practical humanism expressed in his groundbreaking vaccine ensured that Salk earned his place in medical history. He will always be remembered as the man who stopped polio.

Sources:
Interview of Jonas Salk in http://achievement.org

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