



Heartland Science

Ohio's Legacy of Discovery & Innovation

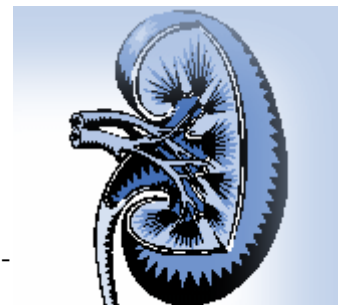


Medicine, Health & Science

From the Heimlich Maneuver
to the Speed of Light

Artificial Kidney Machine Inventor

Dr. Willem J. Kolff invented the kidney dialysis, or artificial kidney, machine. The first membrane oxygenator for clinical use was developed based on the Kolff's artificial kidney model. He also supported the evolution of the artificial heart, an investigated intra-aortic balloon pumping and how to best preserve an organ for transplantation.



During his childhood in the Netherlands, Kolff chose zoo keeping as his career of choice. His father, a doctor and director of a tuberculosis sanitarium, continually experienced the death of his patients. The young Kolff felt that watching so many of his patients die would be too challenging. Ultimately his father won out, and Kolff pursued medicine. Some believe that it was this dread of watching patients die that led Kolff to eventually focus on artificial organ development.

In 1938, Kolff earned his medical degree from the University of Leiden in Holland. Later that year, he watched one of his own patients die of kidney disease. He was frustrated at the lack of options he had for treating the young boy, and tried to explore options for purifying his patient's blood.

Kolff began working on a process in which toxins in tainted blood move through small pores in cellophane into a fluid rinse, and then back to a patient's circulatory system. Over several years, Kolff built four different artificial kidney machines. These experiments with kidney machines met with failure as he was only allowed to try his invention on patients who were already close to death. The advent of World War II made it difficult for Kolff to gather the materials he needed to further his experiments.

Then, in 1950, Dr. Kolff joined the staff of the Cleveland Clinic Foundation. He believed that he would find more support and funds in the U.S., where the idea of an artificial kidney was more accepted. Kolff spent the bulk of his first years at the Cleveland Clinic working out improvements for his kidney machine. He was able to increase clinical use of the kidney and played a major role in starting a kidney transplant program.

Kolff also started the first Department of Artificial Organs in the world at the Cleveland Clinic. Kolff's work has had a major impact on the quality of life of people around the world. His device has saved hundreds of thousands of lives, and each day, about 55,000 people are being kept alive by dialysis.

Did You Know?

The process of dialysis replicates the work of normal, healthy kidneys by removing waste, excess water, and salt so these do not build up to an unhealthy level in the body. In addition dialysis (and healthy kidneys) maintain safe levels of chemicals in the blood, such as potassium, sodium, and bicarbonate, and also helps maintain a healthy blood pressure.

Find out more...

- **Willem Kolff Foundation**
(www.willemkolffstichting.nl/en/)
- **National Kidney Foundation**
(www.kidney.org)
- **NKF's Kidney Learning System**
(www.kidney.org/klis)