

# **HISTORY OF ARTIFICIAL HE ART**

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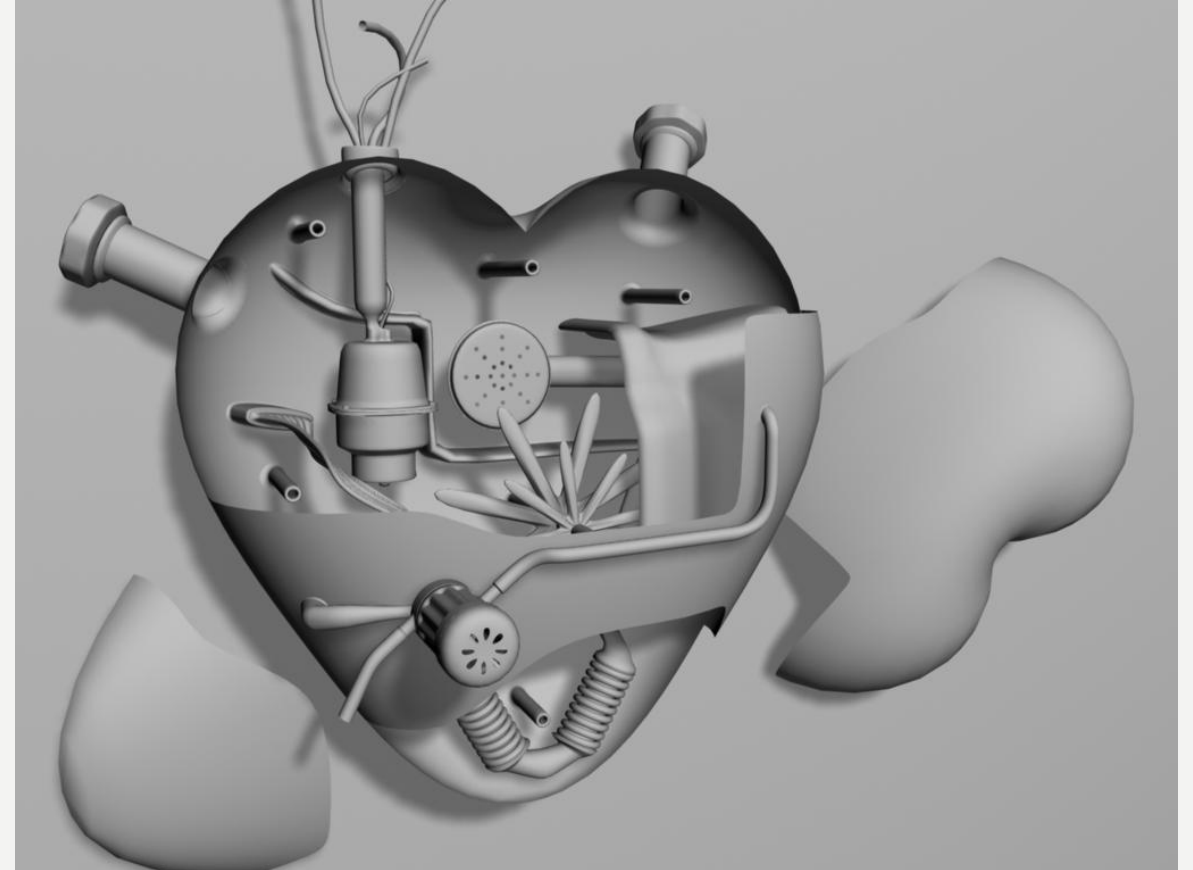
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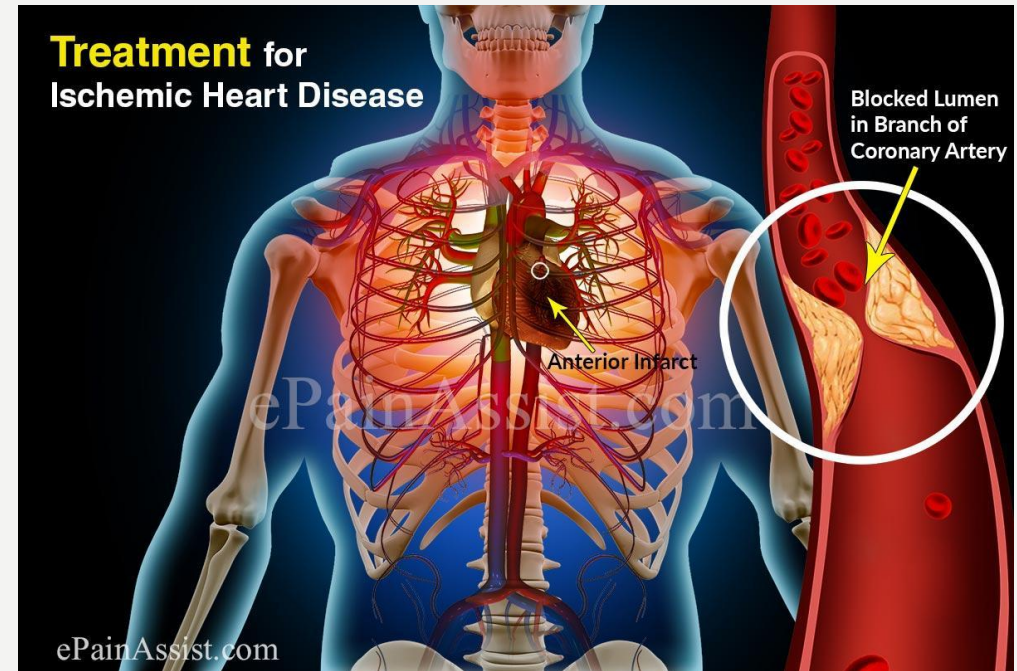
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# INTRODUCTION

During the second half of the twentieth century Ischemic heart disease became the leading cause of death in wealthy, industrialized nations. Moreover, more than half of the deaths in the United States were caused by cardiovascular diseases. Many of these deaths could have been prevented by aggressive management and surgical procedures, including heart transplant operations. The shortage of donor hearts, however, led to hope that a totally implantable mechanical device could overcome the shortage and avoid the problem of immunological rejection, but early attempts to implant permanent artificial hearts were criticized as premature human experiments.



# KOLFF'S MODEL HEART

Artificial hearts actually date back to 1957, when Willem Kolff, inventor of the artificial kidney, and Tetsuzo Akutsu implanted an experimental heart into animals. Kolff's model heart kept a dog alive for 36 hours.



# LVAD (LEFT VENTRICULAR ASSIST DEVICE)

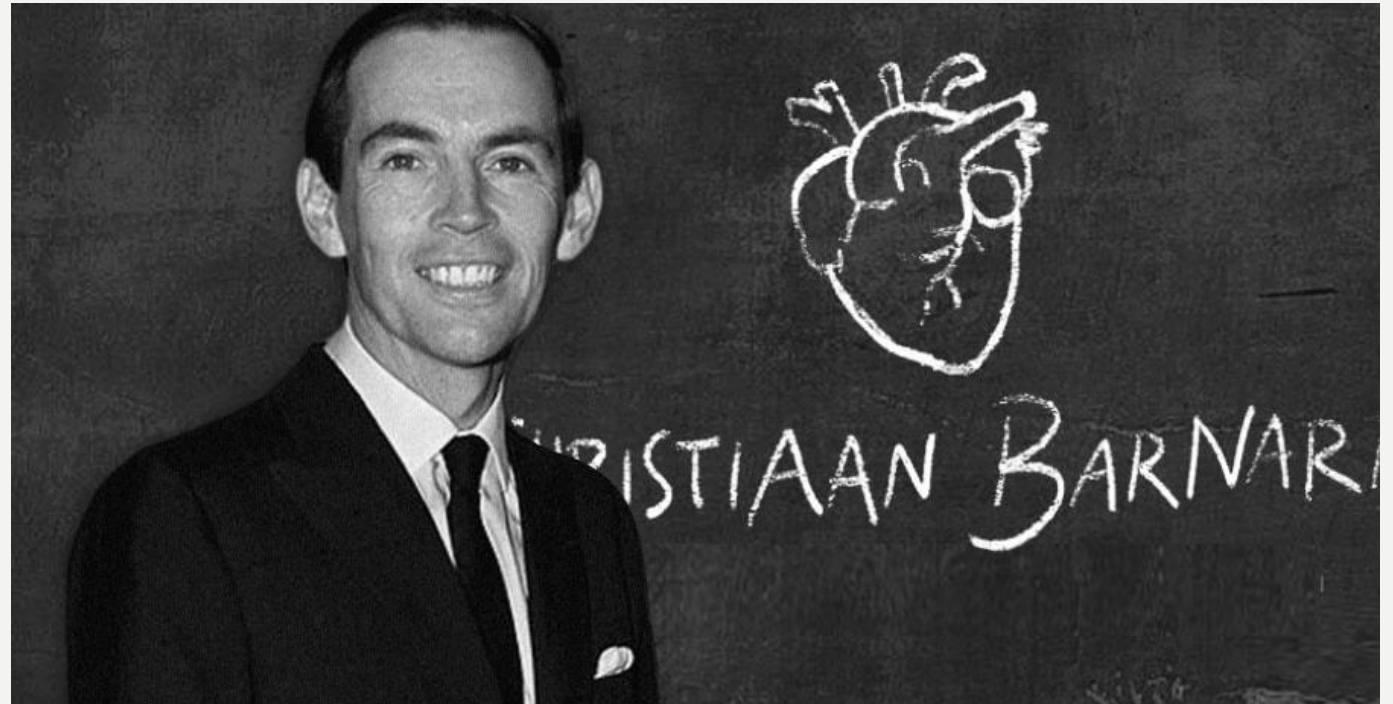


DeBakey began working on an artificial heart and related devices in 1960. He invented a simple blood pump, the LVAD, that could assist the heart while a patient waited for a transplant. In 1966 DeBakey performed the first human implantation of an LVAD.



# THE FIRST HEART TRANSPLANT

One of the most dramatic events in twentieth-century surgery occurred in 1967, when Christiaan Barnard, a South African surgeon, performed the first human heart transplant. The patient died on the 18th day after the operation.



«Even a transplanted heart is capable  
of love.»

Christian Barnard



patient Louis Washkansky and donor Denise Darval

# BABOON HEART AND HUMAN BABY



Attempts to use animal organs, such as Leonard Bailey's 1984 transplantation of a baboon's heart into a newborn, who was identified as Baby Fae, ended in failure. Therefore, the shortage of donor organs provided a great impetus to the development of an artificial heart.



# DENTON A. COOLEY



On April 4, 1969, Denton A. Cooley performed the first human implantation of a total artificial heart when he used a device developed by Domingo Liotta to sustain the life of Haskell Karp. Karp lived with the artificial heart in his chest for 65 hours but died shortly after receiving a heart transplant. DeBakey claimed that the heart Cooley used was identical to one under development in his laboratory and that Cooley had used it without permission. Because the device had been used with only limited success in calves, DeBakey considered human implantation premature and unwise.

In 1981 Cooley performed another controversial operation, the implantation of a total artificial heart developed by Tetsuzo Akutsu. The 36-year-old patient was sustained on the artificial heart for 55 hours until a donor heart was available for transplantation.



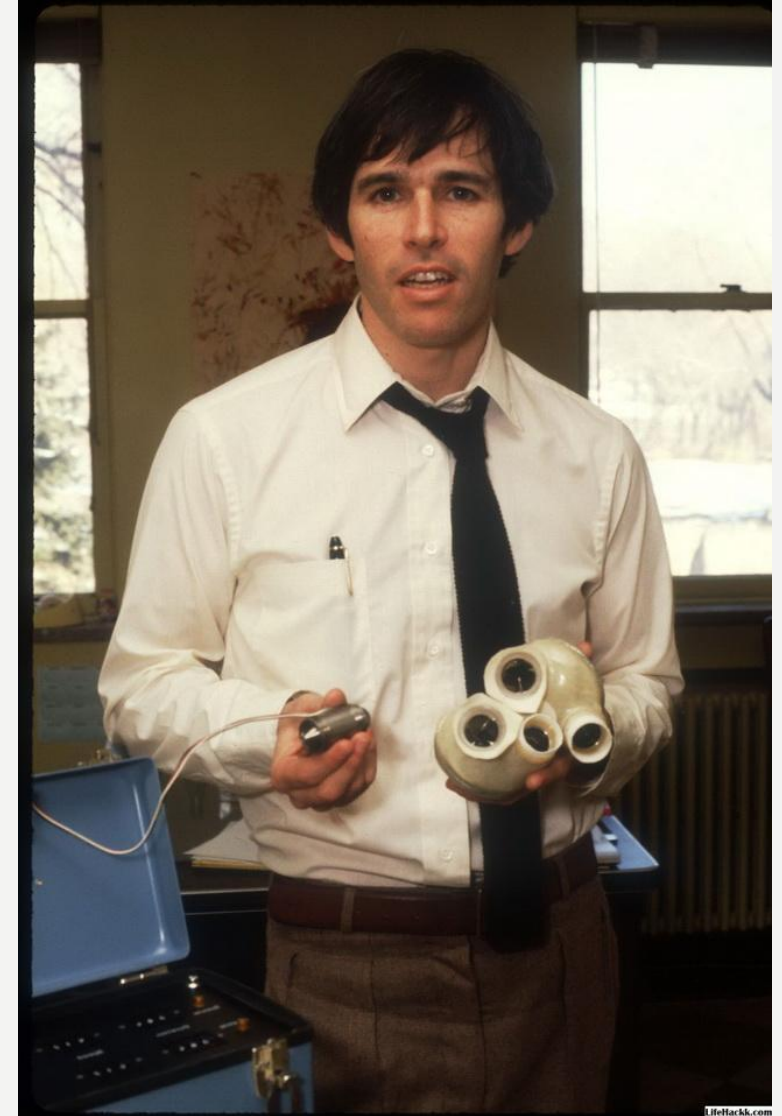
IT HAS BEEN  
BEATING FOR  
112 DAYS...



Robert Jarvik, a physician and biomedical engineer, approached DeBakey about testing a similar device, known as the Jarvik-7, but DeBakey refused because he did not think that the device was ready for human use. December 2, 1982 William DeVries, in cooperation with Jarvik, implanted the Jarvik-7 heart into the chest of Barney Clark, a 61-year-old Seattle dentist dying of heart failure. DeVries and Jarvik intended to use their artificial heart as a permanent replacement for the diseased heart. Clark, who survived for 112 days on the artificial heart, was honored by members of the implant team as a "true pioneer".

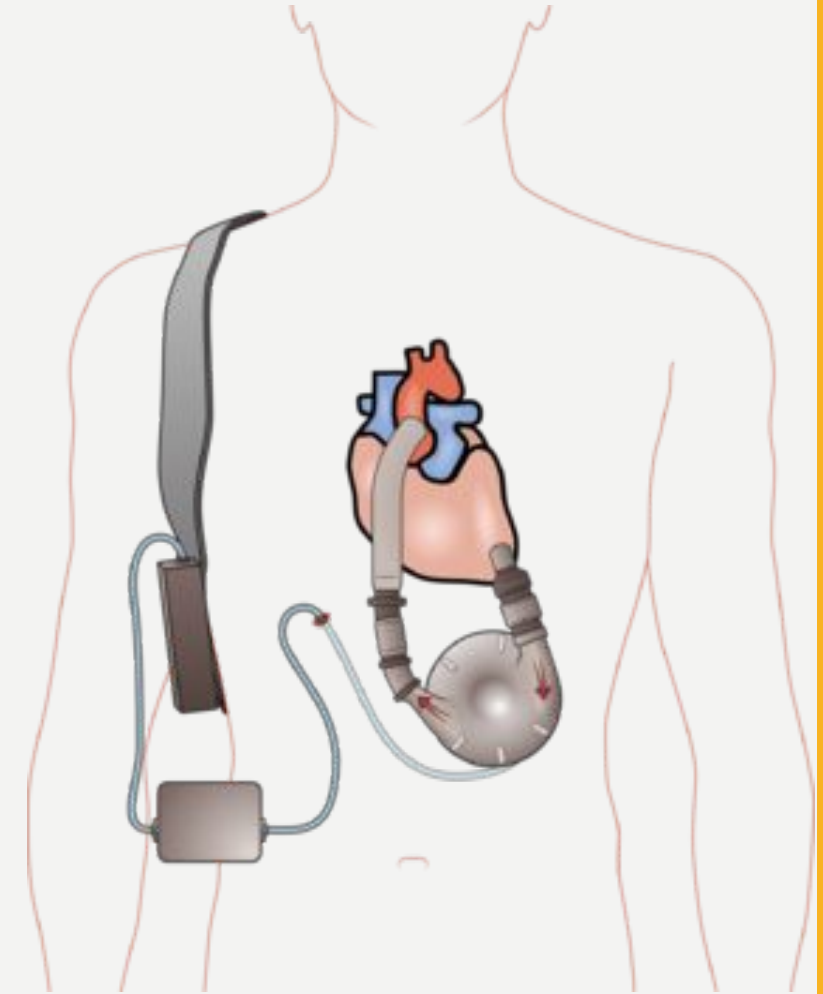
# 620 DAYS WITH AN ARTIFICIAL HEART

Five similar implants were performed through 1985. The longest survivor was William Schroeder, who was supported by the Jarvik-7 for 620 days.



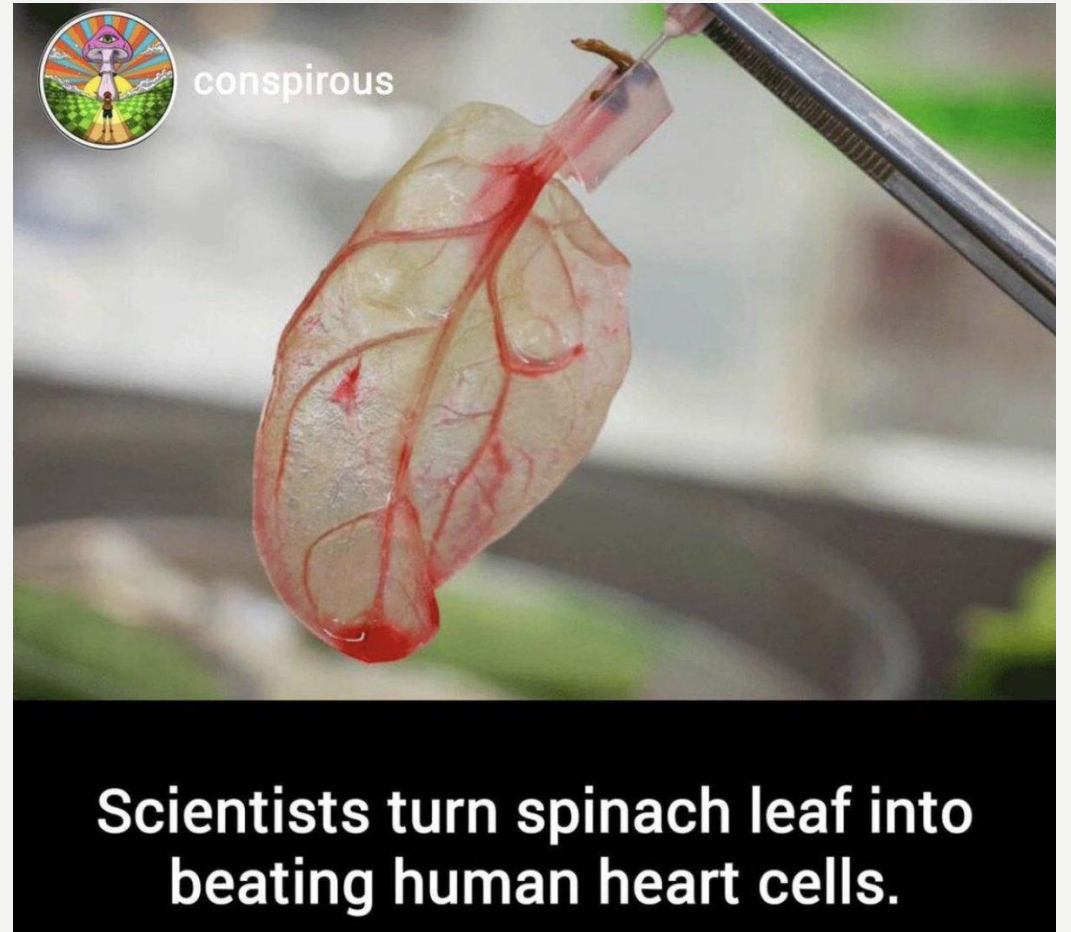
# VAD (VENTRICULAR ASSIST DEVICE)

The DeBakey Ventricular Assist Device (VAD), a miniaturized pump approximately one-tenth the size of the older devices, caused less damage to blood cells, required less than eight watts of power, and could be recharged through the skin.



# AT THE PRESENT

In addition to human heart transplants and mechanical hearts, some scientists think that animal tissues and organs or combinations of living cells with artificial materials will eventually be used to assist or replace ailing hearts. Scientists are now trying to grow heart muscle tissue, heart valves, and blood vessels in the laboratory; this approach is known as **tissue engineering**.



*THANK YOU FOR YOUR ATTENTION!*

*And don't forget: «Good health is above!»*

