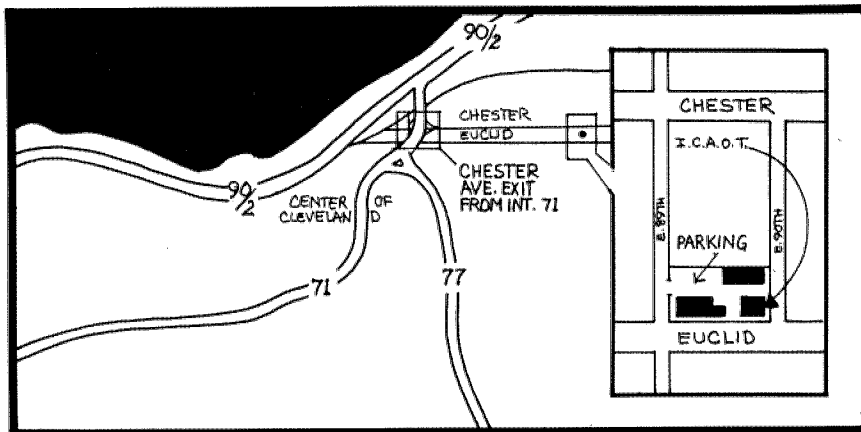


Museum Hours:
 1-4 p.m., Saturday and Sunday
 or
 by appointment for groups



**INTERNATIONAL CENTER FOR
 ARTIFICIAL ORGANS AND TRANSPLANTATION**
 8937 Euclid Avenue Cleveland, Ohio 44106
 Telephone: (216) 229-1800

The International Center For
**ARTIFICIAL ORGANS
 AND
 TRANSPLANTATION**



THE JARVIK-7:
 first total artificial heart permanently
 implanted in a human (1982)

Artificial Organs and Transplantation

Modern Technology for Prolongation and Improvement of the Quality of Life.

Millions of people already benefit from:

- Artificial Kidneys
- Implanted Heart Pacemakers
- Implanted Artificial Joints
- Plastic Surgical Implants
- Synthetic Blood Vessels
- Artificial Heart Valves

Machines for blood oxygenation and for assisted circulation have made possible open heart surgery and heart transplants.

The International Center For Artificial Organs and Transplantation

operates and maintains an information and education center and a museum for education of the professional and lay public in the historical development, current state of the art, and future development of artificial organs and organ transplantation.

Located in Cleveland, Ohio, USA, in recognition of the city's pioneering role in the development of artificial organ technology, the Center is operated under the trusteeship of the International Society for Artificial Organs.

Information

With the support of Mr. Charles E. Spahr, retired Chairman of the Board of The Standard Oil Company (Ohio) and founding Trustee of the International Center, the Charles E. Spahr Information Center was established for purposes of reference and dissemination of information.

Information on the history and development of artificial organs and organ transplantation is collected by and made available to professionals and students through the Center's library and its publications. Current publications include bibliographies and historical reviews on select subjects.



*Charles E. Spahr
Trustee*

Education

A unique course, jointly offered by the International Center and the Cleveland Health Education Museum, introduces junior and senior high school students and adult groups to advances in medical replacement technology.

The 40-minute course features multimedia learning experiences and opportunities to touch and work artificial organ prototypes and to see models developed by pioneer scientists in the field of biomedical engineering.

On an advanced level, international symposia for professionals address special topics and a Distinguished Scholars Program invites selected individuals to conduct research through the International Center.



Students visiting International Center.

Museum

The International Center has assembled a collection of more than 2,000 pieces of historical medical hardware mainly from the United States, Europe, and Japan.

Exhibits cover the areas of circulatory assist (blood vessels and heart), pulmonary assist (lungs), renal assist (kidneys), plasmapheresis, organ preservation, organ transplant, and prosthetic implant.

Temporary exhibits are provided for lectures, meetings, and symposia.

Transplantation and Implantation Gallery

In 1902, Dr. Alexis Carrell of France published his classic work on the surgical union of blood vessels. Continuing work in the U.S., he described techniques for transplantation, vascular suture, and blood transfusion. His work on tissue culture and organ transplantation provides the basis for present day and future accomplishments.

History of Transplantation



Charles Lindbergh, Dr. Alexis Carrell, and Prof. Albert Fischer, left to right, working together on an "artificial heart" at the International Cytology congress at Copenhagen in 1936. Wide World Photos

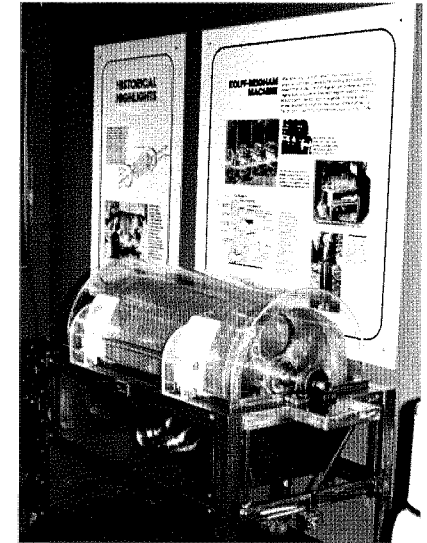
- 1900 Technique for vascular suture
Experimental transplant of various organs
Skin transplants
- 1950 Human kidney transplant
- 1963 Human liver transplant
- 1965 Human lung transplant
- 1967 Human heart transplant
- 1970 Human heart grafts
Human pancreas transplant
Human liver grafts
Brain transplant
- 1980 Heart-lung transplant

Presently, the most effective method for procurement of cadaveric organs for transplantation is premortem cooling, followed by rapid organ removal after death and maintenance of artificial circulation until transplantation into the recipient. Specially designed transport units permit such organs obtained for transplantation to be transferred to recipients across town or cross country.

Kidney Gallery and Plasmapheresis

Dialysis is the transfer of chemically dissolved substances from one solution to another by diffusion through semipermeable membrane. Such a process is used to duplicate the kidney function of separating toxins and water from the blood. Hemodialysis is performed outside the body with diffusion through a synthetic membrane. Peritoneal dialysis is performed through the natural membrane which lines the abdominal cavity.

Plasmapheresis is the separation of plasma components from the cellular components of blood. Although the primary use of this procedure has been the collection of normal plasma for transfusion, it is now also employed in therapeutic treatment of certain diseases.



Kolff-Brigham Kidney Machine (1948).

Cardiovascular Gallery

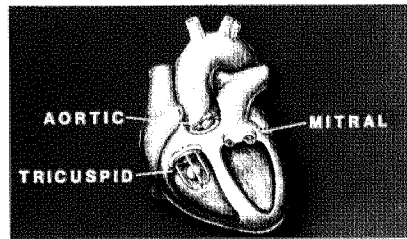
Physiological research in the 18th and early 19th centuries suggested the possibility of maintaining life in organs through the artificial circulation of oxygenated blood. In the 20th century, the full potential of such a process was realized when circulation was first maintained outside the body during cardiac surgery in 1953.

The "heart-lung machine" is a device which substitutes for the natural heart and lungs during cardiac surgery. The lung substitute, an **oxygenator**, performs the lungs' function of removing carbon dioxide from the blood and adding oxygen. The heart substitute, a **blood pump**, performs the heart's function of moving the blood.

A version of the heart-lung machine is used to maintain isolated organs for transplantation.

Artificial Heart Valves

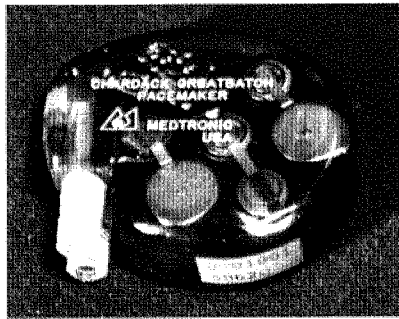
have been developed to replace natural valves which, when diseased, impede the proper flow of blood into and out of the heart.



Artificial Heart Valves

History of Heart Pacemakers

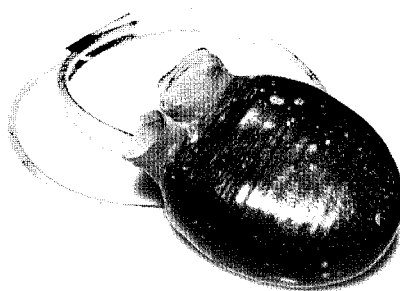
- 1900s Electrical stimulation shown to remedy several heart diseases
- 1952 Stimulation of human heart with an external **pacemaker**
- 1958 First implant of electronic stimulator on surface of heart
- 1959 Development of technique for long-term stimulation of electrode in right ventricle



Early Rechargeable Pacemaker Cell (1972-73).

Artificial Heart Gallery

Left Heart Assist Devices provide temporary circulatory support in cases where heart function is severely depressed following open-heart surgery. These pneumatic devices draw blood from the heart's left ventricle or atrium and pump it into the aorta. A new generation of devices is being developed and tested for long-term implantation in cases of chronic heart failure. These totally implantable devices have compact internal electric, electro-hydraulic, or thermal engines.



The single chamber of a pneumatically powered artificial heart for a dog was designed by Dr. Willem Kolff at the Cleveland Clinic Foundation in 1959-60.

The first successful **artificial heart** was implanted into a dog by Dr. Willem Kolff at the Cleveland Clinic in 1957. The dog lived for 90 minutes. Since then, surgeons, researchers, and designers have developed many temporary and permanent prototypes of an artificial human heart. International Center exhibits illustrate this historical development. The **Jarvik-7**, pictured on the cover, was the first total artificial heart permanently implanted in a human.



Visitors to Hillcrest Hospital's "Heart Fair" discuss the development and function of the artificial heart with Dr. Eric Olsen, International Center Director of Education Programs.

INTERNATIONAL CENTER STAFF

Helen E. Kambic, M.S.
Director of Museum Exhibits

Eric K. Olsen, Ph.D.
Director of Education Programs