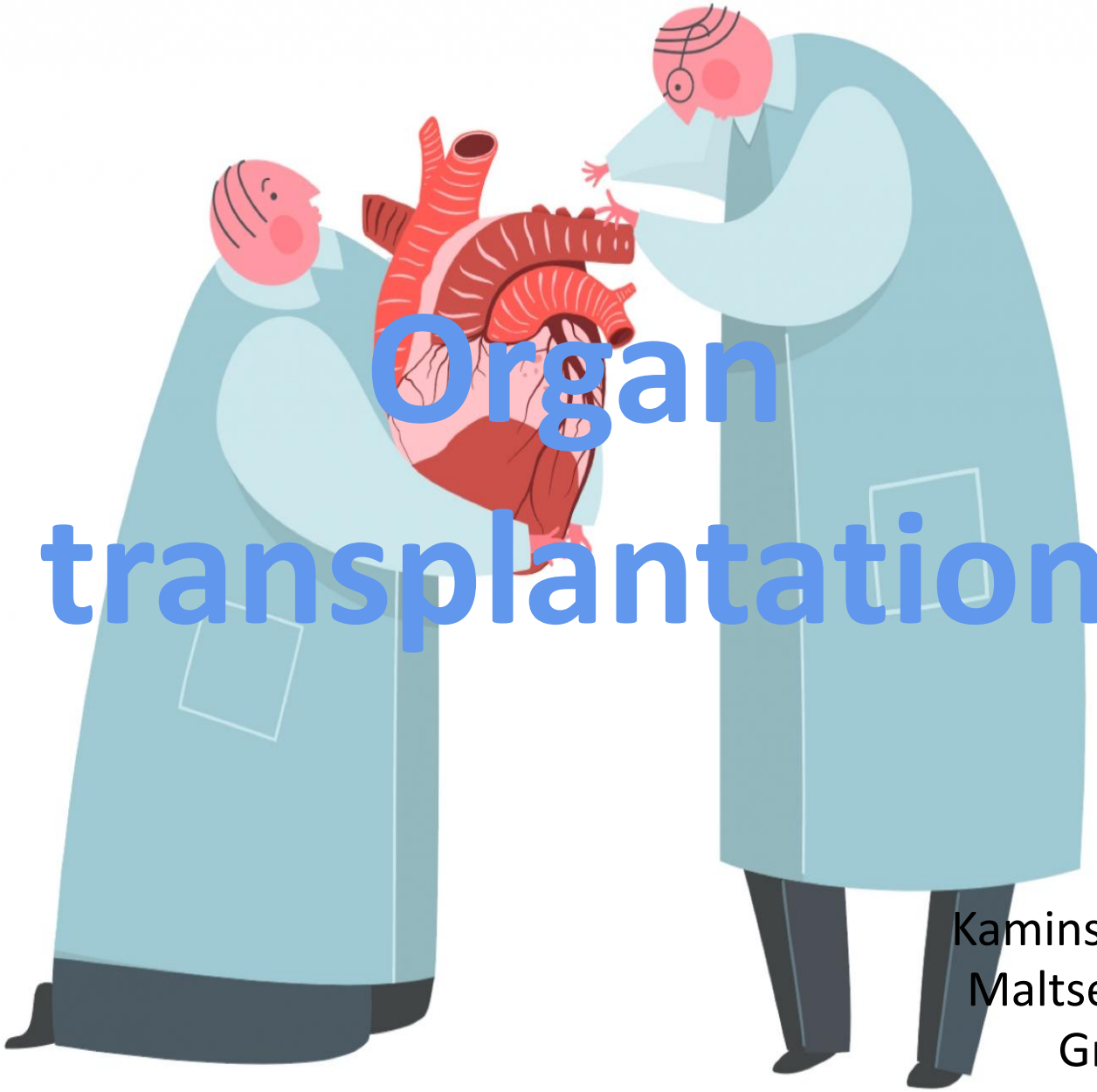

Organ transplantation

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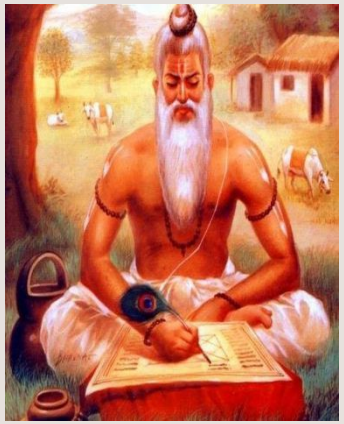
Organ transplantation is a medical procedure in which an organ is removed from one body and placed in the body of a recipient, to replace a damaged or missing organ. Organs and tissues that are transplanted within the same person's body are called autografts. Transplants that are recently performed between two subjects of the same species are called allografts. Allografts can either be from a living or cadaveric source.

History

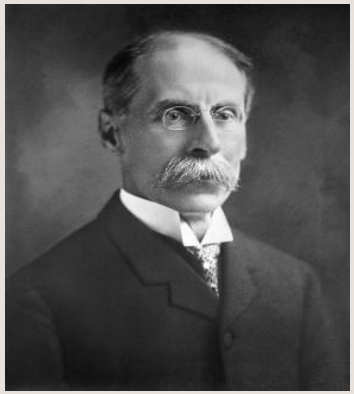
The first reasonable account is of the Indian surgeon Sushruta. Centuries later, the Italian surgeon Gasparo Tagliacozzi performed successful skin autografts. The first successful human corneal transplant, a keratoplastic operation, was performed by Eduard Zirm at Olomouc Eye Clinic, now Czech Republic, in 1905.

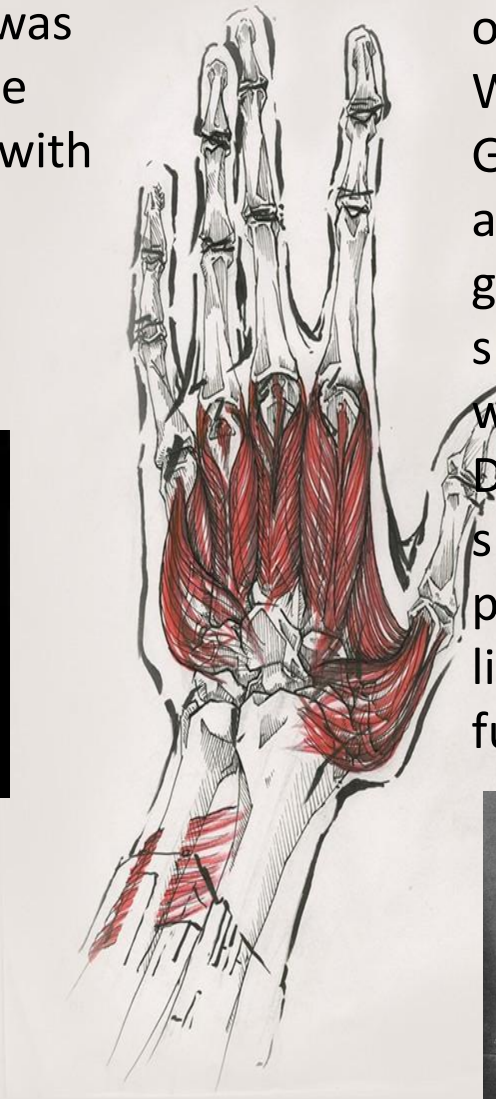


The first transplant in the modern sense – the implantation of organ tissue in order to replace an organ function – was a thyroid transplant in 1883. It was performed by the Swiss surgeon and later Nobel laureate Theodor Kocher.

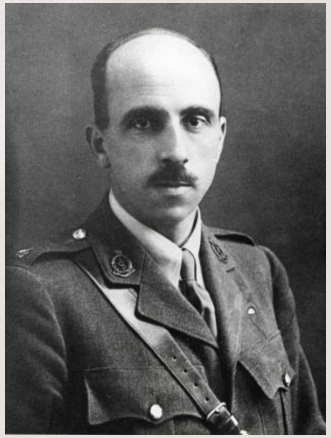
History

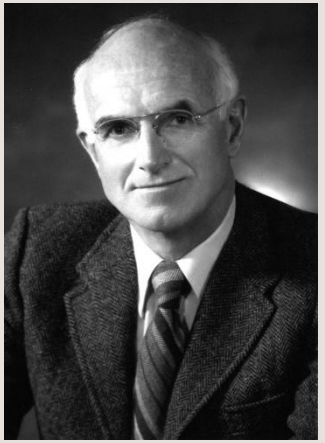
Pioneering work in the surgical technique of transplantation was made in the early 1900s by the French surgeon Alexis Carrel, with Charles Guthrie, with the transplantation of arteries or veins.





Major steps in skin transplantation occurred during the First World War, notably in the work of Harold Gillies at Aldershot. Among his advances was the tubed pedicle graft. In 1954, the first ever successful transplant of any organ was done the surgery was done by Dr. Joseph Murray. In 1962, the first successful replantation surgery was performed – re-attaching a severed limb and restoring (limited) function and feeling.

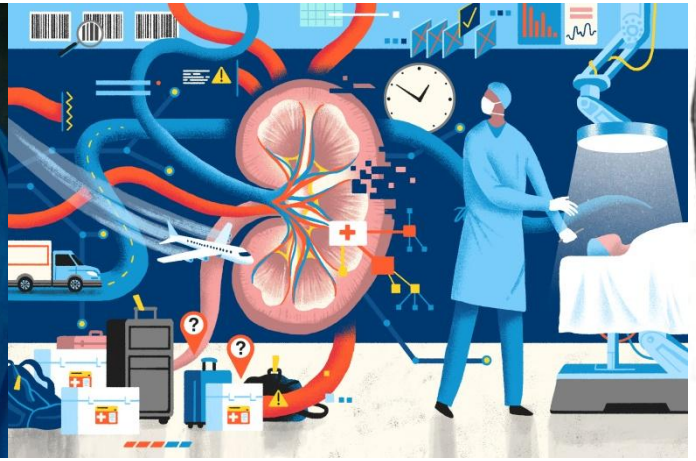


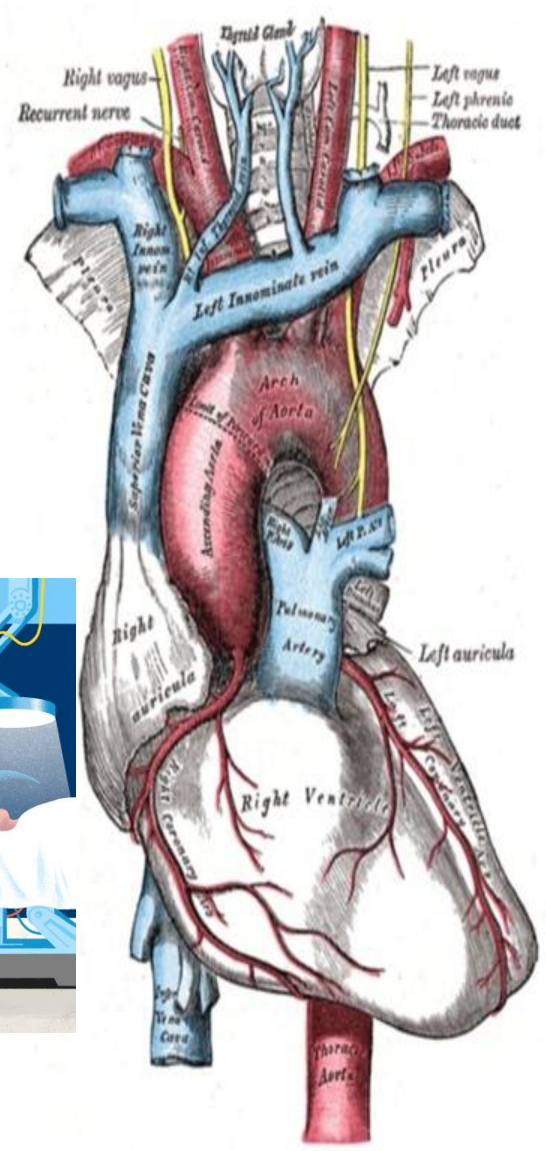


History

The first attempted human deceased-donor transplant was performed by the Ukrainian surgeon Yurii Voronoy in the 1930s. There was a successful deceased-donor lung transplant into an emphysema and lung cancer sufferer in June 1963 by James Hardy. In 1968 surgical pioneer Denton Cooley performed 17 transplants, including the first heart-lung transplant.

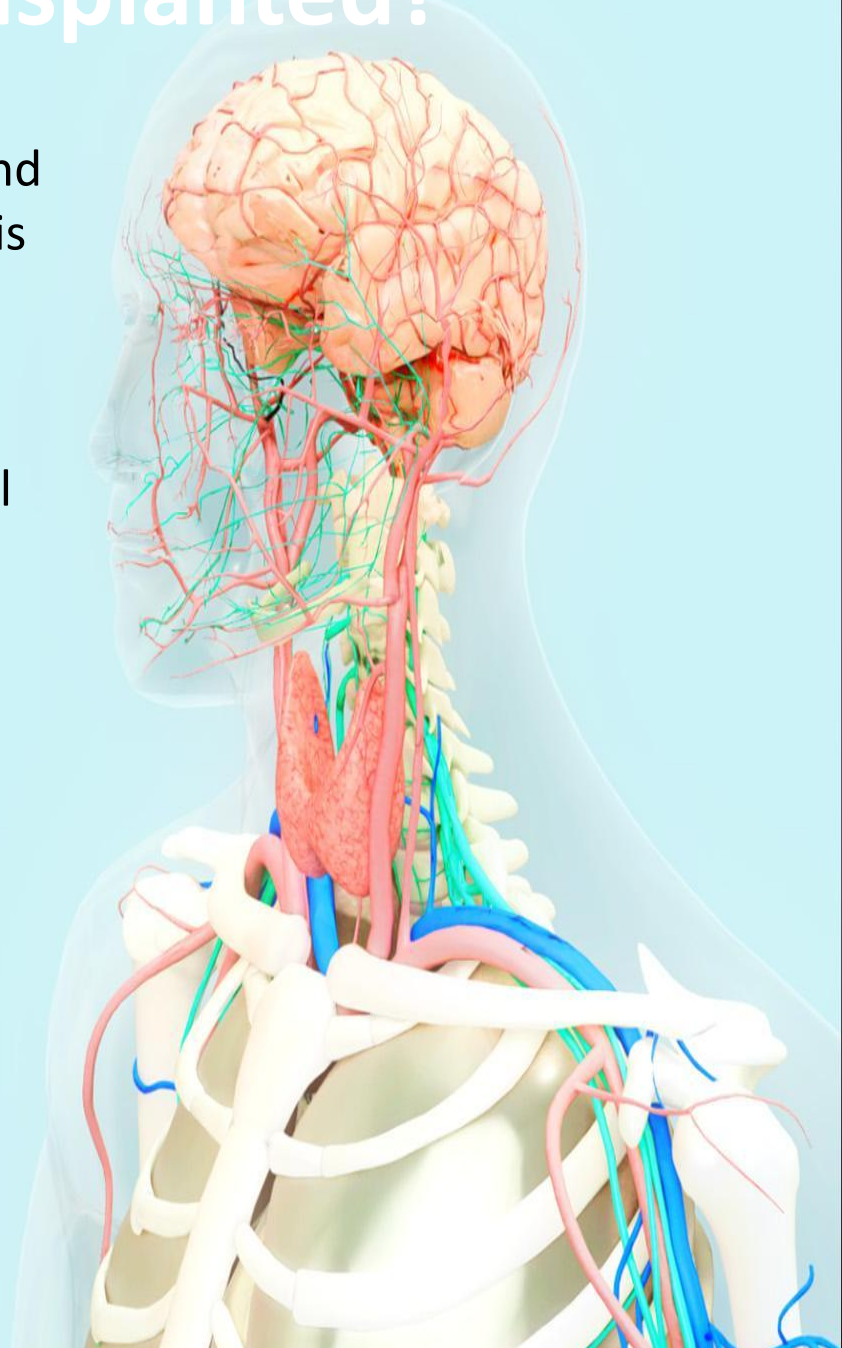
Science and technology have advanced a long way since the first transplant. Limb transplants have become the newest frontier in medical transplants. Transplants are not always used to just save lives but many times transplants are done to make the quality of life better for the recipient. About 25 human organs can now be transplanted and the list is growing daily.





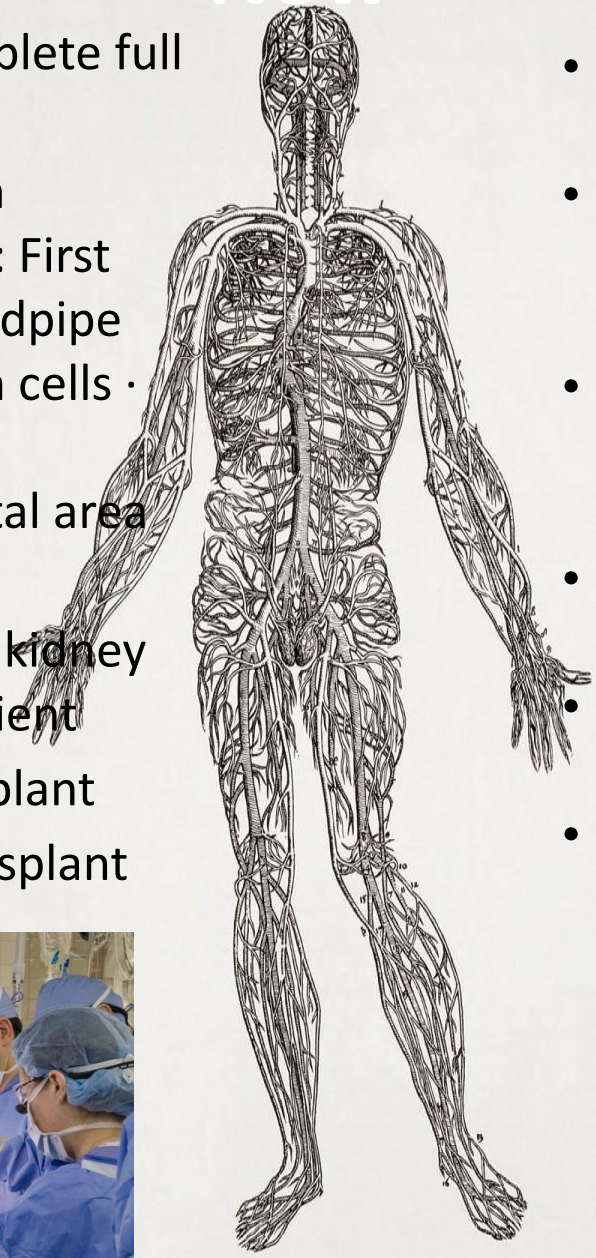
What is being transplanted?

Organs that can be transplanted are the heart, kidneys, eyes, liver, lungs, pancreas, intestine, and thymus. Worldwide, the kidney transplantation is by far the most frequently carried out transplantation, followed by the liver transplantation and then the heart transplantation. The cornea and musculoskeletal grafts are the most commonly transplanted tissues; these outnumber organ transplants by more than tenfold.



Now

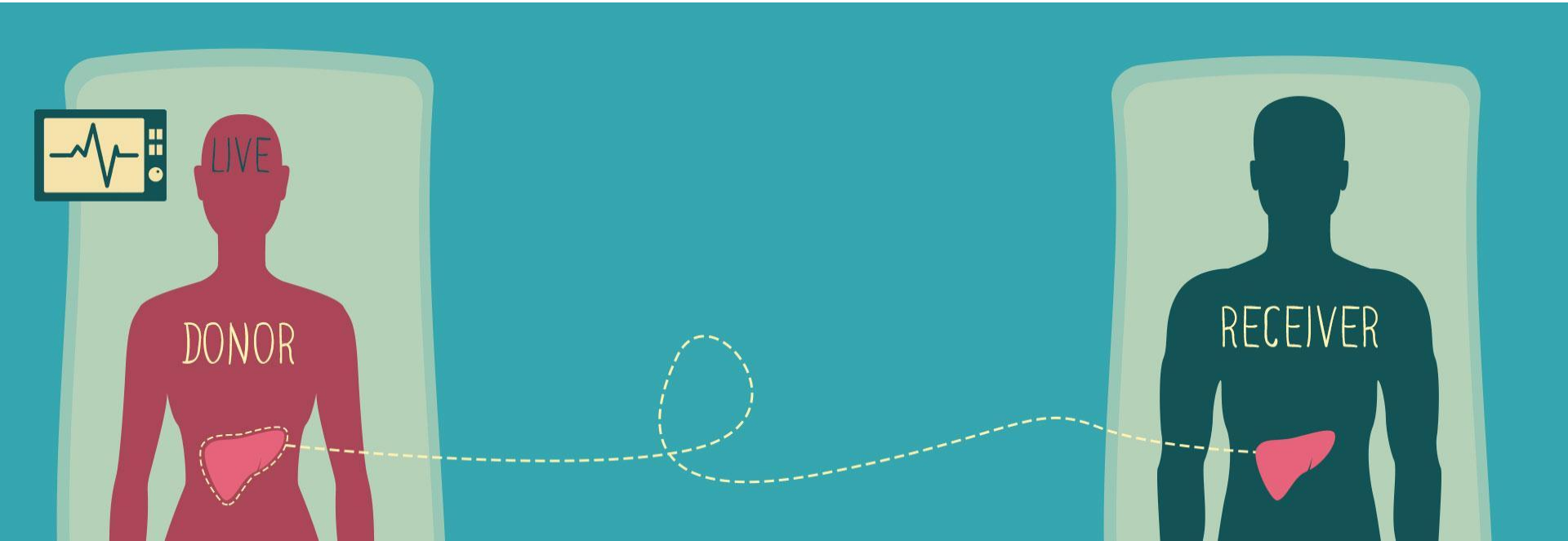
- 2008: First successful complete full double arm
- 2008: First baby born from transplanted ovary. · 2008: First transplant of a human windpipe using a patient's own stem cells · 2008: First successful transplantation of near total area (80%) of face
- 2009: Worlds' first robotic kidney transplant in an obese patient
- 2010: First full facial transplant
- 2011: First double leg transplant



- 2012: First Robotic Alloparathyroid transplant
- 2013: First successful entire face transplantation as an urgent life-saving
- 2014: First successful uterine transplant resulting in live birth
- 2014: First successful penis transplant
- 2014: First neonatal organ transplant
- 2018: Skin gun invented, which takes a small amount of healthy skin to be grown in a lab, then is sprayed onto burnt skin.

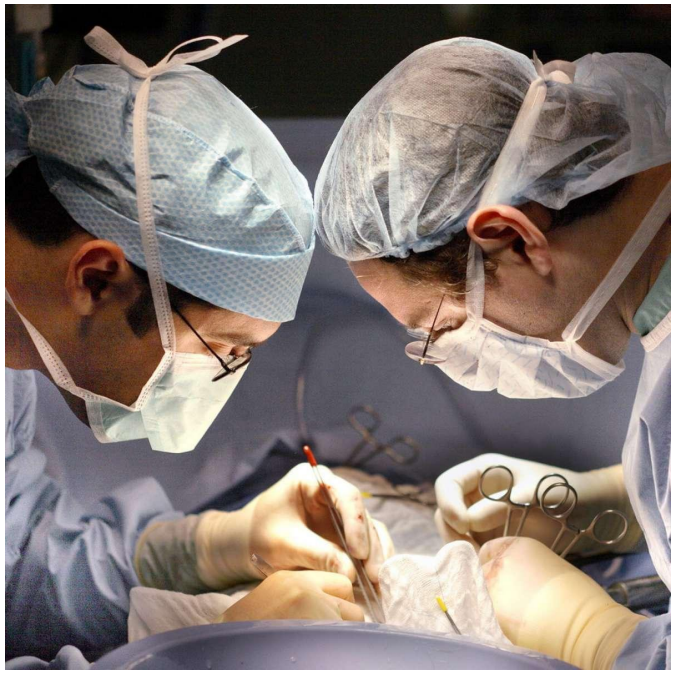
Stage 1: Donor selection

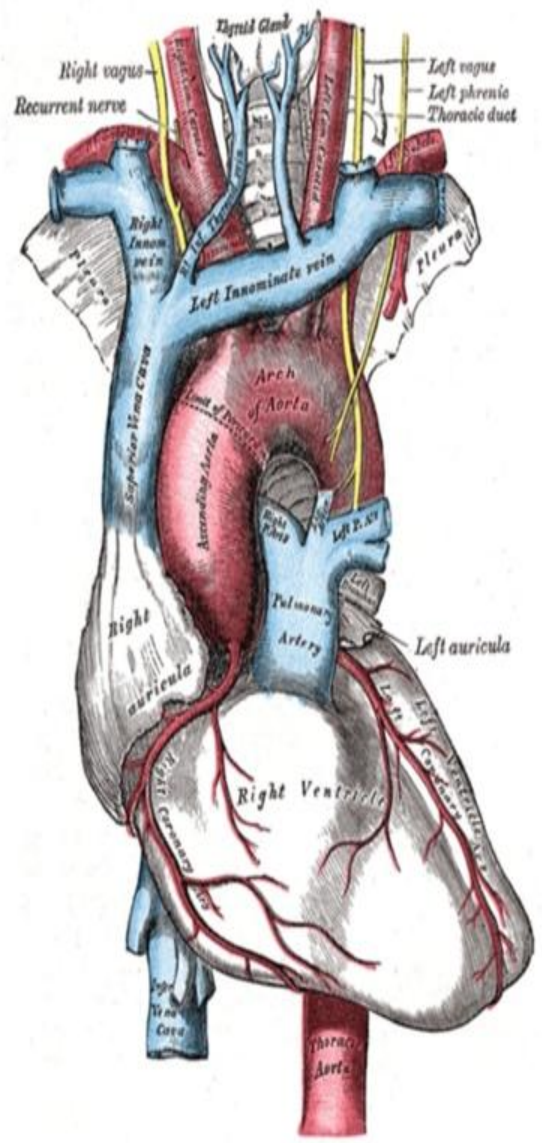
Organ transplantation is a serious and lengthy procedure which is performed in a number of stages. The first stage is matching donors and recipients. This might be quite stressful, because a patient usually stays on a list for a long time before the appropriate donor is found. In the USA, there is a special computer network which connects all the transplant centers. Having evaluated patient's health and social status, a transplant center puts him or her on a list. The procedures of matching are unique for every donor and patient. Such things as "tissue match, blood type, length of time on the waiting list, immune status and the distance between the potential recipient and the donor" and many other are taken into account.



Stage 2: Operation

Depending on what organ is going to be transplanted, each transplantation process is different. In general, once the patient is accepted, he or she will have to undergo conditioning treatment. This means that the person will be treated with chemo and radiation therapy which have many side effects. This is needed to minimize the risks of later organ rejection. After the organ has been transplanted, the recovery stage begins.





Stage 3: Rehabilitation

Post-transplantation medication consists of anti-rejection medicines, also called immunosuppressant. They are needed to stop body from rejecting the organ. In addition, the patient will also take some medication against any possible infection. Such medication is given to the patient during one year after transplantation.

The main problem of transplantation

One of the biggest problems is organ rejection, when the immune system starts to reject foreign tissue. This process starts even if people's MHA's are very similar. To prevent rejection, the patients have to take immunosuppressant. In addition, the patients undergo biopsies regularly, so that doctors can see if the organ is functioning properly and change medication if necessary. The emerging field of regenerative medicine promises to solve the problem of organ transplant rejection by regrowing organs in the lab, using person's own cells (stem cells or healthy cells extracted from the donor site).


Thanks for attention!