BioPrinting

So far scientists and researchers have successfully printed:

- Kidney cells
- Sheets of cardiac tissue that beat like a real heart
- The foundations of a human liver
- Organs that are either flat, such as skin
- Vascular, such as blood vessels
- And hollow, such as the bladder.

How It works

- The patient's Cells are mixed with a liquefied material that provides oxygen and other nutrients that help keep the cells alive outside of the human body. The mixture is placed in a printer and structured using the patients' medical scans
- Materials for 3D printing usually consist of alginate or fibrin polymers that have been integrated with cellular molecules, which support the physical attachment of the cells.

History

- In 1984, Charles Hull invented the first form of 3D printing; stereolithography.

- 1992 The first 3D printer (a Stereolithographic Apparatus (SLA)) is built by the company 3D Systems.
- 1999 he first lab-grown organ is implanted in a human using a 3D printed synthetic scaffold coated in the patient's cells.

- 2002 A miniature kidney is printed. It is functional, and able to filter blood and produce urine in an animal.

- 2014 Printing skin has never been more possible. Printing skin combines bioprinting and the knowledge/ skills of cells to print skin. This could be life changing news, especially helping victims of burns.

Pros

- Very low risk of organ rejection because it will be made form the patients' own DNA
- Eliminate the extreme use of drugs needed after a regular transplant
- Will rid the organ donor list
- Will be able to treat anyone because the organ will be made for that individual

Obstacles

- Regarding the complex organs will require further research which will need years of research and experiments
- Bioprinting is conducted in an artificial environment, using natural and artificial material. The lack of certain qualities will disrupt the morphology and differentiation. These conditions need to be reached or the printed organ would not accurately mimic the

conditions and will not adapt the corresponding structure and function

Ethical issues

- Debates are made on the idea of 'enhanced' organs involving non-human cells
- Who will control the ability to produce them? Who will ensure the quality of the resulting organs?
- In addition, some religious and conservative groups see organ printing as an immoral nature.

Organovo

- Organovo is an early-stage medical laboratory and research center for medical research and therapeutic applications. (Study the use of stem cells and Bioprinting)
- Organovo was established in 2007 and is headquartered in San Diego, California.
- was the first company to commercialize 3D bioprinting technology