

# Growing organs?

Business



“ Printing’s the future.” a quote from Shane Ross on the show, Grey’s Anatomy. The new process of printing 3D organs is a machine that uses a computer-created digital model to create real world objects. Medical researchers all over the world have been using them to reproduce human cells to make organs and human tissue. Producing full human organs has proven to be a lot harder than anyone imagined.

Even if you are going to grow them yourself. There are plenty of different options when it comes to needing a new organ and none include the old-fashioned icebox transplant. According to an article in the New York Times dated July 10, 2010, by David Jolly; Carmat, a medical start-up backed by European Aeronautic Defense and Space Company, is in it’s final stages of preclinical testing of its total artificial hearts for patients with end-stage heart failure. The device, which is made of both synthetic and animal tissue, is powered by two tiny electric motors. Placing it in a diseased heart after it is removed, it uses information found from little sensors to copy the activity of the real heart. Although it’s has taken over 15 years to produce, this is only the beginning.

Another article found research on a newer product about printing human body parts. It isn’t technically a 3D printer like the ones you can buy in the store though. This printer was made specifically for printing with human DNA. According to an article the Quartz website dated February 15, 2016, by Mike Murphy, researchers at the Wake Forest University in North Carolina say that they have created a 3D printer that makes human organs, bones and tissue, that could theoretically be implanted in a human body. The

group's work was published in the scientific journal, Nature Biotechnology Today.

The printer has made ears, jawbones and muscles. They were printed and transplanted on mice. Each piece that was printed has a series of tissues to accommodate the blood vessels so that the organs can receive oxygen and the nutrients the cells are needing. There was a printer that made a heart that saved a nine month old baby, according to the 3D print website written by Scott J. Grunewald dated March 18, 2016.

In China, doctors used a 3D printer to reconstruct a nine month old baby's heart because he had a heart defect so not enough blood was being pumped through fast enough. The printed heart was used to see exactly where the incision needed to be made and where they needed to fix the heart. There are hundreds of more stories on this topic and how printed organs are being used to plan tough surgeries. Other doctors are growing organs using only cells as well. "Cartilage is trending because of me," another quote from the show Grey's Anatomy. The character, Callie Torres, grew cartilage by collecting samples of DNA of her patient.

The show is a great resource because it follows actual medical research and achievements in the medical community. An article from the Discover magazine written by Steve Volk dated January 22, 2015, a boy named Luke Massella was born with spina bifida. Spina bifida also causes the spine and brain to have growing defects along with improperly growing bladders that can cause problems with the kidneys. Luke's doctor grew a brand new bladder so it would grow properly. He grew it by taking collagen, the same

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tissue that is in the cartilage of a nose, and shape it to fit his old bladder. The bladder he grew was white until he “painted” Luke’s cells on the outside to give it its natural color.

So in 2001, Luke became one of the first seven girls and boys in the nation with a brand new bladder, grown from their own cells. Seven years later, he was the captain of his high school’s wrestling team. An article I found written by Mark Prigg dated July 15, 2015, on the Daily Mail website says that researchers at the University of California, Berkeley, have created a tiny heart using stem cells that actually beat. They used biochemical and biophysical cues to prompt stem cells to differentiate and re-organize into micron-scale cardiac tissue, including microchambers. Lab grown organs are more advanced than organ transplants but if you’re going to get an organ transplant this is the way to go. A new invention, called ‘the heart in a box,’ is a machine that will keep the organ beating properly for a long time even after the body of that organ has died.

“Heart in a box. Hot diggity,” Richard Webber from Grey’s Anatomy.

According to the Daily Mail website, an article written by Khaleda Rahman dated August 30, 2015, was about the “heart in a box.” A man named Lee Hall was on ‘borrowed time’ after the mechanical heart that had been keeping him alive for five years was starting to fail. His life was saved when a donor was found. The heart was being kept alive by a new technology that allows the organ to stay alive outside of the body.

The machine is a remarkable breakthrough because it keeps the heart beating between the surgeries so there is very little chance of a rejection. It

can also keep the heart alive and viable for twice as long, up to eight hours, compared to the icebox. Andre Simon, director of transplantation at Royal Brompton and NHS (National Health Service) Foundation Trust, said the Organ Care System means many more lives can be saved. He also believes the technology could save 100 more lives across the country. If a patient is brain dead blood is still flowing through the body so the heart is still alive but if the patient dies the heart may be resuscitated by pumping warm oxygenated blood through the heart.

A donor heart can be kept alive with the machines for up to eight hours versus the three or four hours with an icebox. Therefore a heart can be picked up from farther away and increasing chances of survival of every patient in need. The machine can also keep other organs alive as well but the main focus right now is on hearts. Medical researchers have found tremendous ways to save lives when it comes to the need a new organ. Grey's Anatomy has followed every single one from using a 3D printer to save an organ, making a 3D printer that could potentially make organs by scratch inserting human cells in to get the needed product, growing organs in a lab while using a graft or mold to place the cells in the right spot to grow or putting an organ in a machine to keep it viable even longer than an icebox ever could. All of these options give patients new hope on survival. Maybe even to live just one more day.