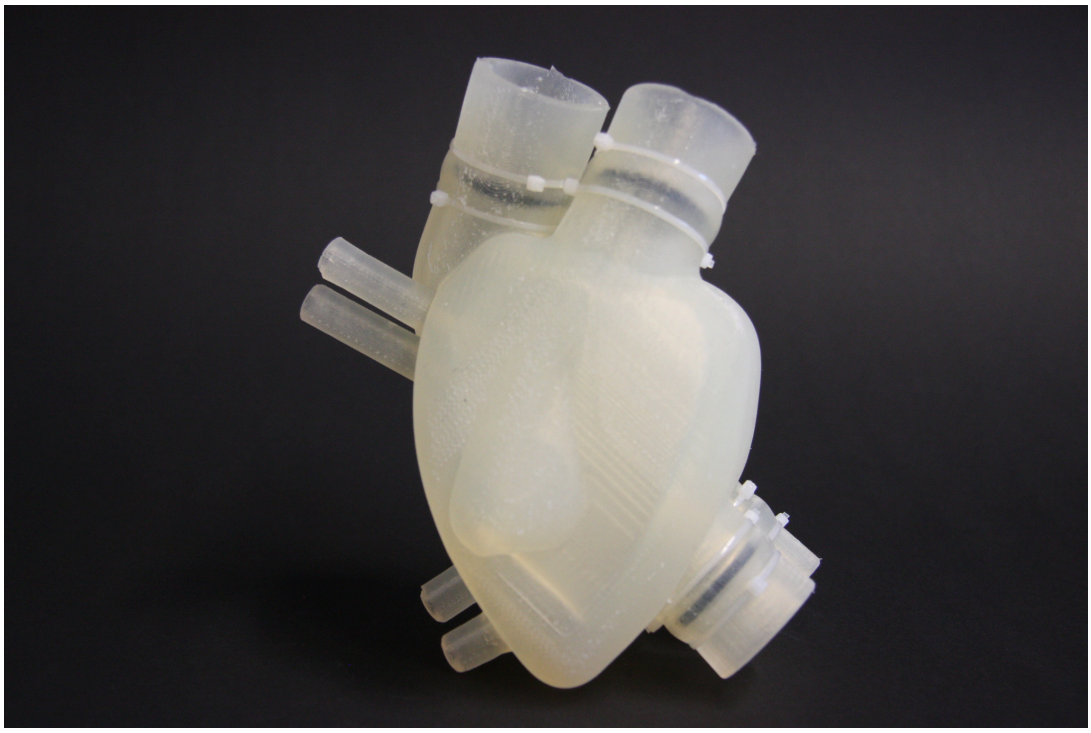
PHARMAMAG

The Possibility of 3-D Printed Organs



By Bianca Dudley on October 27

The reality behind today's organ donation and transplantation system is upsetting. Plagued with corruption and fraud, the modern system has many faults that have sprouted great controversy over the years. Some of these faults include strict donation requirements that limit the amount of available donors; many wasted organs due to the limited viability of the organs; and the monopolized procurement of organs that has led to mistakes in screening and caused death and disease. In response to these faults, people have started looking for other options to combat the growing crisis. Among these are doctors who have been developing a new process of procuring organs through 3D printing.

3D-printed organs were first used in 2006 by doctors who attempted to implant kidneys into three young children. The surgery was successful, and since then, the conversation about the future of

printed organs has grown louder. The process of printing organs is complicated and tedious. First, doctors extract small amounts of a patient's tissue and grow new cells outside the body in a bioreactor. Inside this machine, the cells thrive in an environment mimicking the human body. The doctors then mix the cells with bioink to glue them together allowing them to continue to grow and metabolize. When the cells are ready, doctors use the solution to print the organ with characteristics that match the genetic makeup of the patient. This intricate process limits the risk of the body rejecting the organ and eliminates the need for a donor.

Because 3D-printed organs are still somewhat innovative, many challenges arise when discussing the implantation part of the process. While printing organs is seemingly more efficient, making sure each organ functions properly is extremely difficult. Each organ must be able to circulate blood throughout the body; if this function is not achieved, the organ will fail and could kill the recipient. Another challenge that this industry is facing is that modern technology is too limited to create optimal printings. Though this idea has been around for many years, technology has yet to catch up with the demand. However, even with these challenges, there are many advantages to 3D-printed organs. The most substantial is that it takes significantly less time to produce the organs. Currently, it can take months or even years to receive a viable organ. With 3D printing, it takes between four to six weeks. This contrast is very important when it comes to the ever-growing number of people waiting to receive an organ. This process is also much more cost-friendly to recipients. Printed organs can cost anywhere from a few thousand dollars to $100,000 while a kidney transplant costs about $440,000 as of 2020 (National Institutes of Health).

With innovations being made daily, the future of 3D-printed organs seems closer than ever before. The low cost, short period, and low mortality rate give hope to the industry and popularize the usage of this technology. Scientists are optimistic that these organs will be fully employed within the next decade and that these innovations will be able to save many lives.

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