



The Future of Organ Transplants: Could 3D-Printed Organs Solve the Donor Shortage?

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Introduction

Luke Massella was born with a gap in his spine, a malfunctioning bladder, and faulty kidneys. Faced with the choice of having to undergo dialysis (blood purification through a machine) for the rest of his life, Luke Massella underwent surgery to receive the first 3D printed organ in 2004 at the age of 10. This surgery enabled Massella to live a 'normal' life, which can also be made possible for other patients. 3D printed organs have become increasingly vital in today's world, as the donor shortage has left many without hope of receiving a life saving transplant. This makes it essential to explore the possibilities of 3D printed organs and their role in reshaping the medical world.

What are 3D Printed Organs?

Essentially, 3D printed organs are cells that are reproduced to mimic the functions of a specific organ in the human body. This is evidenced when an article by Cellink states, "A 3D printed organ, in this context, is a collection of living cells printed in a three-dimensional geometry to replicate the functionality of an organ found in our bodies" (Cellink, 2024). The tissue or organ is created using bioink, a polymer used to make live tissues while 3D printing. These 3D organs can have a variety of uses, including transplantation, disease modeling, and testing.

Real-World Impact

The use of 3D printed organs in the human body remains uncertain due to the complexity of human organs and the high cost of 3D printing. However, with ongoing advancements in research, this possibility becomes increasingly attainable. In an interview with CSO Itedale Namro Redwan, PhD, in 2024, Redwan stated that he believes clinical trials may begin in 15 to 20 years. This is because simple organs can be produced more quickly than more complex organs. Therefore, we cannot fully print 3D organs due to obstacles, including the complexities of our organs and the lack of suitable biomaterials to create the bioink necessary for reproducing the desired organs/tissues.

Conclusion

While 3D printed organs offer a practical route when organ donors are unavailable, this may not always be the case due to the complexities of organs and the high cost of producing such organs. However, 3D printing simple organs that can be regularly used in transplantation is right around the corner due to rapidly advancing technology and research. Due to the shortage of organ donors, 3D printed organs have emerged as a promising and increasingly valuable alternative. This makes it necessary for us to stay informed about this new and rapidly advancing technology.

References

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