How to Heal a Broken Heart: 3D Printing as the Future of Cardiology

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Abstract

Everyday people die while waiting for hearts on the organ donor list. Even if one of these patients is lucky enough to get a compatible heart, surgeries to repair heart failure don't provide an absolute fix. Hearts transplants are only able to create a prolonged state of cautious living with a stranger's heart. This heart will never be as compatible as a heart derived from the patient's cells, nor perform like one. We propose that through current advancements in 3D printers and bio-printing these problems can be significantly alleviated if not totally eradicated and hospitals across the globe should begin involving themselves in such technology.

In this article we examine science's current technical background and explanations for rapid proto-typing and 3D bio-printing, analyze medical procedure descriptions and how 3D printing can enhance the current medical standard, compare and contrast financial evidence for the time and cost benefits of 3D printing in medicine and its future market, evaluate current research on the capabilities of 3D printing in cardiology, what scientists are working on now, and determining the future of 3D printed hearts, while at the same time discussing and disproving limitations and ethical arguments against 3D printing.

3D printing contains many complex technical settings and capabilities that have allowed it to revolutionize current complex heart surgeries and improve upon classic surgical solutions through functions like the generation of 3D printed heart models. Scientists have made significant progress towards the successful bio-printing of human heart cells with the goal of printing fully functional hearts within the next decade.

The results display 3D printing as a viable future of cardiology with the potential to successfully print fully functional patient-derived human hearts. These 3D printed hearts would solve the problem of the organ donor waiting list, complications with incompatible hearts, and the need for additional reparative surgeries while simultaneously improving the efficiency and cost of current cardiac procedures.

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Biographies

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