SmallSEOTools

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3D Bioprinting has emerged as a promising approach for tissue regeneration. Medical professionals and engineers, 3D print prosthetic hands and surgical tools. Bioprinting has begun to transform the field of tissue engineering and medicines.

The origination of bioprinting lies back into the early 1980s when Charles Hull, an American engineer, built the first 3D printer. The idea was to deposit the successive layers of an acrylic-based photopolymer and simultaneously cross-link using UV light, thus creating a solid 3D object. This 3D printer was capable of printing solid model objects by computer-aided design (CAD).

The ultimate goal of bioprinting is to replicate functioning tissues and materials such as organs and transplant them into human bodies. It utilizes 3D printing techniques to combine cells, growth factors, and biomaterials to fabricate biomedical parts that maximally imitate natural tissue characteristics. It involves layer by layer deposition of bio-inks, consisting of living cells, biomaterials, or active biomolecules, to create tissue-like structures that can be used later in the fields of tissue engineering and medicines.

Bioprinters have three major components: the hardware used, type of bio-ink, and the material it is printed on(biomaterial). There are different technologies for 3D bioprinting, three of them being inkjet, laser-assisted, and extrusion printers. Inkjet printers are usually used in bioprinting for fast and large-scale products. Laser printers provide high-resolution printing; however, these printers are pretty expensive. Extrusion printers print cells layer-by-layer to create 3D constructs. Though the technology initially had limited applications, it is now widely used in dentistry, prosthetics, and products involving biological components, including human tissues.

Although, scientists are still far from 3D printing organs as it is unfeasible to connect printed structures to the vascular systems that carry life-sustaining blood and lymph throughout our bodies. They have been successful in printing non-vascularized tissue like certain types of cartilage. They can also produce ceramic and metal scaffolds that support bone tissue by using different types of bioprintable materials such as gels and certain nanomaterials. Several promising animal studies suggest that the field is getting closer to its ultimate goal of transplantable organs. Although the research is going on at a steady pace, scientists at Tel Aviv University have managed to build a 3D-printed heart that contains cells, blood vessels, ventricles, used cells and other biological materials. In the United Kingdom, a team from Swansea University developed a bioprinting process to create an artificial bone matrix using durable and regenerative biomaterial.

Bioprinting is a novel technology that is providing promising results in the field of tissue engineering and medicines. The choice of each bio-ink component and its concentration can lead to specific biological and mechanical characteristics for the optimal formulation to mimic the native tissue. Scientists are trying to find ways to reach the ideal bio-ink for every tissue type to aid researchers with the same goal. It would be a revolutionary phase if scientists successfully manage to print a working 3D-printed organ that can be transplanted to a human body as that would decrease or may even eliminate a large number of patients waiting for organs. Bioprinting is a way for signing into a new era where almost all the real organs can be imitated using this not so extra-ordinary yet innovative technology.

Sources	Similarity
3D bioprinting - Wikipedia Three dimensional (3D) bioprinting is the utilization of 3D printing–like techniques to combine cells, growth factors, and biomaterials to fabricate biomedical parts that maximally imitate natural tissue characteristics. Generally, 3D bioprinting utilizes the layer-by-layer method to deposit materials known as bioinks to create tissue-like structures that are later used in medical and tissue ... https://en.wikipedia.org/wiki/3D_bioprinting	13%
3D printing of body parts is coming fast – but regulations are ... Mar 13, 2020 — But they have been successful in printing non-vascularized tissue like certain types of cartilage. They have also been able to produce ceramic ... https://nairobilawmonthly.com/index.php/2020/03/13/3d-printing-of-body-parts-is-coming-fast-but-regulations-are-not-ready/	5%