SmallSEOTools

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In recent years, 3D Bioprinting has emerged as a promising approach for tissue regeneration. Medical professionals and engineers are now able to 3D print prosthetic hands and surgical tools. Bioprinting has begun to transform the field of tissue engineering and medicines.
The origins of bioprinting can be traced to the early 1980s, when Charles Hull, an American engineer, built the first 3D printer. The idea was to deposit 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 fashioned using 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 in the fields of tissue engineering and medicine.
Bioprinters have three major components: the hardware used, the 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 carried out 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.
Nonetheless, 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. And while perfection is yet to be achieved, scientists at Tel Aviv University have already managed to build a 3D-printed heart that contains cells, blood vessels, ventricles, used cells and other biological materials. In the United Kingdom too, a team from Swansea University have 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 optimal formulation to mimic the native tissue. Scientists are trying to find ways to reach the ideal bio-ink for every tissue type. It would be revolutionary if scientists successfully manage to print a working 3D-printed organ that can be transplanted to a human body, as that would decrease the number of patients waiting for organs, possibly even eliminating such wait. Bioprinting is a means to venture into a new era, where almost all real organs may be imitated using this not so extraordinary, yet innovative, technology.

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