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Editorial

Editorial: Bioartificial Organ Manufacturing Technologies

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EDITORIAL

Technologies for the development of bioartificial organs are a set of supporting techniques which can be used to manufacture human organs based on bionic principles. Important progress has been made in creating diverse methods for the manufacture of organs over the past ten years. According to the degree of automation, organ manufacturing technologies can be divided into three main groups: fully automated, semi-automated, hand worked (or handmade) each has the advantages and disadvantages for bioartificial organ manufacturing. The use of combined three-dimensional multi-nozzle printing techniques to mechanically assemble personal cells together with other biomaterials to produce exclusive organ replacements for damaged or failed human organs is one of the most exciting bioartificial organ processing technologies.

Despite developments in interventional, pharmacological, and surgical treatments, organ failure remains the leading cause of mortality all over the planet. Since then, bioartificial organ development has become a long-term hope beyond man's memory. Throughout history, through replacement or reconstruction of damaged or failed organs, people have tried several ways to extend life. Actually, orthotopic organ transplantation is the most successful way to do this, but problems such as donor scarcity, high costs, immune rejection and ethical conflicts are extremely limited.

Some advanced material processing technologies, such as multi-nozzle rapid prototyping (MNRP), additive combined molding (or additive combined molds), decellularized matrix regeneration, electrophoresis, and cell magnetic adsorption, have emerged with rapid advancements in science and technology, making the area of bioartificial organ production more and more attractive. The ability to incorporate heterogeneous cell types and different materials to recapitulate native organ geometries, constituents and functions is a common feature of advanced organ processing technologies. One of the key challenges of bioartificial organ manufacturing technology is how to assemble heterogeneous living cells with predesigned structures, like hierarchical vascular, neural and lymphatic networks, thus ensuring that the corresponding functionality is realized.

In general, an artificial organ is a system that may be inserted or incorporated into a human body that interacts with living tissue to replace a real organ, replicate or enhance a particular function or function, such that the patient can return to normal life as quickly as possible. According to the materials used, artificial organs can be divided into three main classes:

- Mechanical, made of inanimate polymers (i.e., plastics)
- Biomechanical, made of partially living cells and inanimate polymers
- Biological (i.e., bioartificial), made of living cells, biodegradable polymers

Normally, the previous two classes can only bypass and rebuild the failed organs in the human body partly and briefly, while the biological class can recover faulty or failed organs entirely and indefinitely. Only biological (or bioartificial) organ processing developments are reviewed in this report.

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