Review Article

IT Medical Team
https://www.itmedicalteam.pl/

Translational Biomedicine
2172-0479

2023
Vol. 14 No. 3: 111

# Using Tissue Culture and Biotechnology in Manufacturing Coronary Stents to Reduce Late Complications

**Joh Camm N***

Klinikum Nurnberg Hospital, Germany

**Corresponding author:** N John Camm

njohncamm@gmail.com

Klinikum Nurnberg Hospital, Germany

**Citation:** Camm NJ (2023) Using Tissue Culture and Biotechnology in Manufacturing Coronary Stents to Reduce Late Complications. Transl Biomed, Vol. 14 No. 3: 111.

## Abstract

The use of tissue culture and biotechnology in manufacturing coronary stents has shown potential in reducing late complications. The development of biodegradable stents that can be absorbed into the body has minimized the risks associated with long-term complications such as restenosis and thrombosis. Tissue engineering techniques have also enabled the production of stents that mimic the structure and function of the natural vessel, promoting tissue regeneration and reducing inflammation. The incorporation of drug-eluting systems in stents has improved the efficacy of drug delivery to the targeted site, leading to reduced complications. These innovative technologies hold great promise for improving the outcomes of patients with coronary artery disease.

**Received:** 01-May-2023, Manuscript No. Iptb-23-13526; **Editor assigned:** 03-May-2023, Pre-QC No. Iptb-23-13526 (PQ); **Reviewed:** 16-May-2023, QC No. Iptb-23-13526; **Revised:** 20-May-2023, Manuscript No. Iptb-23-13526 (R); **Published:** 27-May-2023, DOI: 10.36648/2172- 0479.14.3.286

## Introduction

Coronary stents have been a crucial medical advancement in the treatment of coronary artery disease, but they have also presented a new set of challenges [1]. The late complications associated with stent implantation, such as restenosis and thrombosis; continue to be a major concern. Biotechnology and tissue culture offer promising solutions to reduce these complications and improve the efficacy of coronary stent implantation.

## Tissue Culture and Biotechnology in Stent Manufacturing

Tissue culture is the process of growing cells in a controlled environment. In the case of stent manufacturing, tissue culture is used to grow cells on stent surfaces, which can then be implanted into the body. The goal is to create a more natural environment for cells to grow; reducing the likelihood of complications associated with stent implantation [2]. One of the primary benefits of tissue culture is the ability to manipulate cell behavior. Researchers can use various factors, such as growth factors, to stimulate cell proliferation and differentiation. In the context of stent manufacturing, tissue culture can be used to promote the growth of cells that are beneficial for stent integration and to prevent the growth of cells that are detrimental, such as smooth muscle cells that can lead to restenosis. Biotechnology also plays a critical role in stent manufacturing. Advances in biotechnology have enabled the development of stents that are coated with drugs or other substances that promote healing and prevent complications. Drug-eluting stents, for example, release medication over time to prevent restenosis and thrombosis [3]. The drugs used in drug-eluting stents are typically delivered using biodegradable polymers that gradually break down in the body, releasing the medication over time.

## Challenges and Future Directions

While tissue culture and biotechnology offer promising solutions for reducing late complications associated with stent implantation, there are still challenges that need to be addressed. One of the primary challenges is the need for better understanding of how cells interact with stents in vivo. Researchers need to develop better models that can accurately predict how cells will behave once stents are implanted. Another challenge is the need for better materials [4]. The materials used in stent manufacturing need to be biocompatible, biodegradable, and able to withstand the harsh conditions of the cardiovascular system. There is also a need for materials that can be easily manipulated to achieve the desired properties, such as drug release profiles. Despite these challenges, the future of tissue culture and biotechnology in stent manufacturing looks promising. Advances in stem cell research, for example, hold the potential to create cells that are better suited for stent integration [5-6]. Researchers are also exploring

the use of nanotechnology to improve stent coatings and drug delivery systems. Conclusion Coronary stents have been a critical advancement in the treatment of coronary artery disease, but they have also presented new challenges. Late complications associated with stent implantation, such as restenosis and thrombosis; continue to be a major concern. Tissue culture and biotechnology offer promising solutions to reduce these complications and improve the efficacy of stent implantation [7-8]. While there are still challenges to be addressed, the future of tissue culture and biotechnology in stent manufacturing looks promising.

## References

1 Zhao Y, Wang H (2019) Tissue-engineered stents for cardiovascular diseases: emerging research and applications. Expert Rev Med Devices. 16: 765-773.

2 Kim HK, Kim KY, Kim TK, Lee JY (2019) Biodegradable metals for cardiovascular stents: from clinical concerns to recent Zn-alloys. J Mater Chem B. 7: 5973-5982.

3 Giacoppo D, Gargiulo G, Capodanno D (2020) Contemporary Coronary Stents A Review. JACC Cardiovasc Interv.13: 135-148.

4 Kastrati A, Mehilli J, Pache J, Kaiser C, Valgimigli M et al. (2007) Analysis of 14 trials comparing sirolimus-eluting stents with bare-metal stents. N Engl J Med. 356: 1030-1039.

5 Yoon YH, Shin SW, Yang WJ., Yoon JH, Kim JH et al. (2012) Biodegradable magnesium stents for coronary artery stenosis. Clin Exp Pharmacol Physiol. 39: 725-729.

6 Babapulle MN, Eisenberg MJ (2002) Coated stents for the prevention of restenosis Part II. Circulation. 106: 2859-2866.

7 Lanza R, Langer R (2019) Tissue engineering: challenges and opportunities. Adv Mater Lett. 31: 1902923.

8 Maritan SM, Pauletti GM, Simões CM (2018) Drug delivery systems: new technologies and therapeutic opportunities. Med Chem. 14: 322-334.

9 Kootala S, Dandamudi R, Nagireddy NK (2019) Nanotechnology-based drug delivery systems for cardiovascular disease: a review. J Nanobiotechnology. 17: 1-15.