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Emerging advancement of 3D bioprinting technology in modern medical science and vascular tissue engineering education

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Abstract

Congenital heart defect interventions may benefit from the fabrication of patient-specific vascular grafts because of the wide array of anatomies present in children with cardiovascular defects. Three-dimensional (3D) bioprinting is used to establish a platform to produce custom vascular grafts, which are biodegradable, mechanically compatible with vascular tissues, and support neotissue formation and growth. It is an advanced and emerging technology having great potential in the field of tissue engineering. Bioprinting uses cell-laden biomaterials, generally called bio-inks, to deposit in a layer-by-layer fashion. The goal of 3D bioprinting is to offer an alternative to autologous or allogeneic tissue grafts to replace or treat damaged tissues. This chapter aims to offer a synopsis of the current state of 3D bioprinting techniques in analysis, research potentials, and applications. This new and exciting technology has the potential to not only provide better treatment options, but also to improve the quality of life for patients suffering from chronic illnesses. © 2023, IGI Global. All rights reserved.

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