Accepted Manuscript

Biomaterials-based 3D Cell Printing for Next-Generation Therapeutics and Diagnostics

Jinah Jang, Ju Young Park, Ge Gao, Dong-Woo Cho

PII:	S0142-9612(17)30757-3
DOI:	10.1016/j.biomaterials.2017.11.030
Reference:	JBMT 18368
To appear in:	*Biomaterials*
Received Date:	31 August 2017
Revised Date:	30 October 2017
Accepted Date:	21 November 2017

Please cite this article as: Jinah Jang, Ju Young Park, Ge Gao, Dong-Woo Cho, Biomaterials-based 3D Cell Printing for Next-Generation Therapeutics and Diagnostics, *Biomaterials* (2017), doi: 10.1016/j.biomaterials.2017.11.030

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

Biomaterials-based 3D Cell Printing for Next-Generation Therapeutics and Diagnostics

Jinah Jang†, Ju Young Park†, Ge Gao, Dong-Woo Cho

† J.J. and J.Y.P. were contributed equally to this work.

Prof. J. Jang

Department of Creative IT Engineering, Pohang University of Science and Technology (POSTECH), 77 Cheongam-ro, Nam-gu, Pohang, Kyungbuk, 37673, Korea.

Dr. J. Y. Park, G. Gao, and Prof. D.-W. Cho

Department of Mechanical Engineering, Pohang University of Science and Technology (POSTECH), 77 Cheongam-ro, Nam-gu, Pohang, Kyungbuk, 37673, Korea

E-mail: D.-W.C (dwcho@postech.ac.kr)

Abstract

Building human tissues via 3D cell printing technology has received particular attention due to its process flexibility and versatility. This technology enables the recapitulation of unique features of human tissues and the all-in-one manufacturing process through the design of smart and advanced biomaterials and proper polymerization techniques. For the optimal engineering of tissues, a higher-order assembly of physiological components, including cells, biomaterials, and biomolecules, should meet the critical requirements for tissue morphogenesis and vascularization. The convergence of 3D cell printing with a microfluidic approach has led to a significant leap in the vascularization of engineering tissues. In addition, recent cutting-edge technology in stem cells and genetic engineering can potentially be adapted to the 3D tissue fabrication technique, and it has great potential to shift the paradigm of disease modeling and the study of unknown disease mechanisms required for precision medicine. This review gives an overview of recent developments in 3D cell printing and bioinks and provides technical requirements for engineering human tissues. Finally, we propose suggestions on the development of next-generation therapeutics and diagnostics.

Keywords: 3D printing; biomaterials; tissue engineering; regenerative medicine; *in vitro* tissue model; personalized medicine

ACCEPTED MANUSCRIPT

Download English Version:

https://daneshyari.com/en/article/6484714

Download Persian Version:

https://daneshyari.com/article/6484714

Daneshyari.com