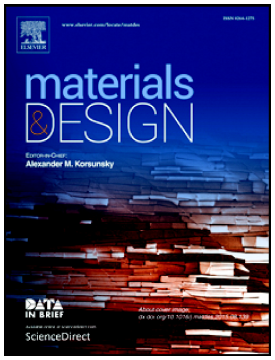
Accepted Manuscript



Review of 3D printable hydrogels and constructs

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PII:	S0264-1275(18)30638-5
DOI:	doi:10.1016/j.matdes.2018.08.023
Reference:	JMADE 7321
To appear in:	*Materials & Design*
Received date:	31 March 2018
Revised date:	9 August 2018
Accepted date:	10 August 2018

Please cite this article as: Huijun Li, Cavin Tan, Lin Li , Review of 3D printable hydrogels and constructs. Jmade (2018), doi:10.1016/j.matdes.2018.08.023

Review of 3D printable hydrogels and constructs

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Abstract

Three dimensional (3D) bioprinting technologies with appropriate bioinks are potentially able to fabricate artificial tissues or organs with precise control. A bioink is a mixture of biomaterial and living cells, which is a biomaterial for bioprinting. Hydrogels are the most appealing candidates of biomaterials because they have many similar features of the natural extracellular matrix and could also provide a highly hydrated environment for cell proliferation. In this field of bio-fabrication, particularly in bioprinting, the lack of suitable hydrogels remains a major challenge. Thus, choosing appropriate hydrogels for bioprinting is the key to print self-supporting 3D constructs. Most importantly, the considerations regarding the bioinks and the obtained constructs should be made clear. This review aims to provide the specific considerations regarding the important properties of a potential bioink and the generated 3D construct, including rheological, interfacial, structural, biological, and degradation properties, which are crucial for printing of complex and functional 3D structures. Among all of the above considerations, interfacial bonding is one of the important considerations of successfully obtaining a 3D structure. Unfortunately, it is rarely mentioned in the prior literature. This review also points out, for the first time, the characterization of a potential bioink from a rheological point of view. To provide readers with an understanding of the background, the review

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