Introducing the *Journal of 3D Printing in Medicine*

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Introduction

Welcome to the first issue of the *Journal of 3D Printing in Medicine*, published by Future Medicine [1]. In launching this new journal it is our goal to bring together the diverse disciplines working in the field of 3D printing as it relates to medicine and in large healthcare. 3D printing, or additive manufacturing, has been in existence for several years, and is currently being used in diverse fields ranging from the aerospace and automotive industries to architecture. However, in recent years medical applications have come to the fore, and are predicted to make up 21% of an US\$8.9 billion industry within the next 10 years [2].

The *Journal of 3D Printing in Medicine* will embrace all areas of 3D printing related to human health, and will therefore encompass everything from medical devices, implants, prosthetics and surgical planning and guides, to tissue engineering and regenerative medicine, as well as advanced pharmaceutical fabrication. In addition, the journal welcomes commentary, discussion and methodology articles, with the aim of providing our readers with expert analysis and perspectives from global leaders in the field.

Interacting with the community

In addition to our new journal, we also look forward to engaging with the clinical and healthcare professionals via our community website 3DMedNet [3]. 3DMedNet is a free online information and networking hub covering all aspects of 3D printing in medicine. By allowing members to quickly access user-generated news, discussion and opinion, share their own content and insights, and access key journal articles, 3DMedNet enables knowledge sharing, connection and collaboration.

In the first issue

This first issue of the journal reflects the diverse content typical of Future Medicine publications, including review articles, original research, methodology, and additional content such as expert editorials and interviews.

Two Editorial Board members, Professor David Williams (Loughborough University, UK), and Professor Michael Gelinsky (Technische Universität Dresden, Germany), have both contributed Editorials discussing current directions in 3D printing and bioprinting research, and where future efforts should be focused [4,5].

Original research contributions include a Methodology article, ‘Dual *in situ* crosslinking of polymer bioinks for 3D tissue biofabrication’ from Editorial Board members Dr Daniel Thomas, Dr Zita Jessop and Associate Editor Professor Iain Whitaker, with colleague Dr Ayesha Al-Sabah. In this article the authors describe their experience producing a 3D bioprinted ear structure from a hybrid gelatin and alginate bioink hydrogel, using dual *in situ* crosslinking [6]. The authors found that the method produced a high-resolution bioprinted structure capable of maintaining live cells for 3 weeks of culture, which therefore has implications for the field of reconstructive surgery.

In their Short Communication article ‘*In situ* functionalization of scaffolds during extrusion-based 3D plotting using a piezoelectric nanoliter pipette’, Gelinsky *et al.* discuss the use of additive manufacturing for the production of medical implants and biomaterial scaffolds, specifically combining macroscopic scaffold fabrication by strand deposition and high-resolution dosing of

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liquids using the ‘BioScaffolder 2.1’ 3D plotter with an integrated piezoelectric nanoliter pipette [7]. This research presents exciting possibilities for the future of tissue engineering.

Finally in this section, Dr Michael Davies *et al.* (Liverpool John Moores University, UK) present their research ‘On drug–base incompatibilities during extrudate manufacture and fused deposition 3D printing’ [8]. In this study the authors aimed to determine the manufacturability and characteristics of 3D printed, drug-loaded implants to treat alcohol misuse. In this case the drug was disulfiram and polylactic acid was used as the base material. Analysis following the process indicated drug–base interactions, which therefore has implications for their future research in this area.

Two review articles also feature in this issue, including a discussion on current bioinks for biofabrication, along with future prospects in this area, from Prendergast *et al.* (BioBots, PA, USA) [9]; and a look at the role of IT infrastructure in the future of 3D bioprinting from Editorial Board member Dr Jorge Vicente Lopes da Silva *et al.* (Renato Archer Information Technology Center – CTI, Brazil) [10].

The issue also includes additional content, including an interview with Dr Pankaj Chandak, Specialist Registrar in Transplant Surgery at Guy’s, St Thomas’ and Great Ormond Street Hospitals, and Royal College of Surgeons of England Research Fellow at King’s College London, UK [11].

Conclusion

3D printing is set to play a crucial role in the future of healthcare. It is our hope that our new journal will provide a vital resource to the community as the field develops. We hope you enjoy the content of this first issue, and look forward to receiving your feedback.

Financial & competing interests disclosure

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References

- 1 Journal of 3D Printing in Medicine. www.futuremedicine.com/loi/3dp
- 2 Schubert C, van Langeveld MC, Donoso LA. Innovations in 3D printing: a 3D overview from optics to organs. *Br. J. Ophthalmol.* 98(2), 159–161 (2014).
- 3 3DMedNet. www.3dmednet.com
- 4 Williams DJ. Translation of 3D bioprinting into medical practice: learning from related fields to focus our efforts. *J. 3D Print. Med.* 1(1), 3–4 (2017).
- 5 Gelinsky M. Current research directions in 3D printing in medicine. *J. 3D Print. Med.* 1(1), 5–7 (2017).
- 6 Thomas DJ, Jessop ZM, Al-Sabah A, Whitaker IS. Dual *in situ* crosslinking of polymer bioinks for 3D tissue biofabrication. *J. 3D Print. Med.* 1(1), 19–23 (2017).
- 7 Giron S, Lode A, Gelinsky M. *In situ* functionalization of scaffolds during extrusion based 3D plotting using a piezoelectric nanoliter pipette. *J. 3D Print. Med.* 1(1), 25–29 (2017).
- 8 Davies M, Costley E, Ren J, Gibbons P, Kondor A, Naderi M. On drug–base incompatibilities during extrudate manufacture and fused deposition 3D printing. *J. 3D Print. Med.* 1(1), 31–47 (2017).
- 9 Prendergast M, Solorzano R, Cabrera D. Bioinks for biofabrication: current state and future perspectives. *J. 3D Print. Med.* 1(1), 49–62 (2017).
- 10 Dernowsek JA, Rezende JA, da Silva JVL. Role of information technology in the future of 3D bioprinting. *J. 3D Print. Med.* 1(1), 63–74 (2017).
- 11 Chandak P. Using 3D printing for complex pediatric transplantation: an interview with Pankaj Chandak. *J. 3D Print. Med.* 1(1), 9–12 (2017).