

Biofabrication – Chances, Challenges and Current Limitations

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Abstract

Biofabrication is a young field of research that aims at the automated generation of hierarchical tissue-like structures from cells and materials through automated procedures in Bioprinting or Bioassembly [1]. This approach has the potential to overcome a number of classical challenges in relating to organization, personalized shape and mechanical integrity of generated constructs.

Despite some remarkable early successes, the lack of variety in materials that can be formulated together with cells for Bioprinting, so called Bioinks [2], has for long been one major drawback for the field [3]. However, recent years have seen tremendous progress, and current changes rather lie in the transformation of the now existing fabrication power to structures with biological function. This contribution will give an introduction to the field, critically review the current status, including examples of our recent work, and also concern some of the current challenges.

References

- [1] J. Groll, et al.: Biofabrication: Reappraising the definition of an evolving field. *Biofabrication*, 8, 013001 (2016)
- [2] J. Groll, et al.: A Definition of Bioinks and their Distinction from Biomaterial Inks. *Biofabrication*, 11, 013001 (2019)
- [3] T. Jüngst, et al.: Strategies and Molecular Design Criteria for 3D Printable Hydrogels. *Chemical Reviews*, 116 (3), 1496 (2016)

Biography

Jürgen Groll's research interest comprises applied polymer chemistry, nanobiotechnology, immuno-modulatory and regenerative materials and biofabrication. He coordinated the large-scale integrated European project HydroZONES (contract no 309962; 2012 – 2017) and was awarded an ERC consolidator grant (Design2Heal, contract no° 617989). Currently he acts as founding spokesman of the Collaborative research Center TRR 225 "From the fundamentals of biofabrication towards functional tissue models" (<http://trr225biofab.de/>), an integrated funding scheme of the German Research Foundation that is running between the Universities of Würzburg, Bayreuth and Erlangen-Nürnberg, comprising 18 research projects and 36 PhD students that are supervised by 36 PIs. He has published over 170 papers in peer-reviewed scientific journals. For his work, he received a number of awards, such as the Henkel Innovation Award (2007), the Bayer Early Excellence in Science Award (2009), the Reimund-Stadler Award of the German Chemical Society (2010) and the Unilever Prize of the Polymer Networks Group (2014). He currently serves as editorial board member of the journal *biofabrication* and as board member of the international society for biofabrication.

