

Biofabrication to control cell fate

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Organs are complex systems, comprised of different tissues, proteins, and cells, which communicate to orchestrate a myriad of functions in our bodies. Technologies are needed to replicate these structures towards the development of new therapies for tissue and organ repair, as well as for in vitro 3D models to better understand the morphogenetic biological processes that drive organogenesis. To construct tissues and organs, biofabrication strategies are being developed to impart spatiotemporal control over cell-cell and cell-extracellular matrix communication, often through control over cell and material deposition and placement. Here, we present some of our most recent advancements in biofabrication that enabled the control of cell activity, moving towards enhanced tissue regeneration as well as the possibility to create more complex 3D in vitro models to study biological processes.

References

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- [2] Hendrikson WJ, Rouwkema J, Clementi F, van Blitterswijk CA, Fare' S, Moroni L. Towards 4D printed scaffolds for tissue engineering: exploiting 3D shape memory polymers to deliver time-controlled stimulus on cultured cells.

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Figures

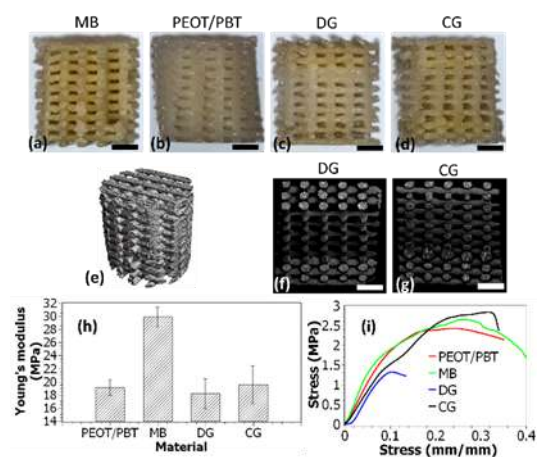


Figure 1: Representative scaffold images: stereomicroscope (a-d), μ CT (e), BSE-SEM (f-g); calculated moduli (h), and stress-strain curves (i).