Bioprinted Brain-on-Chips for Neural Disease Modeling

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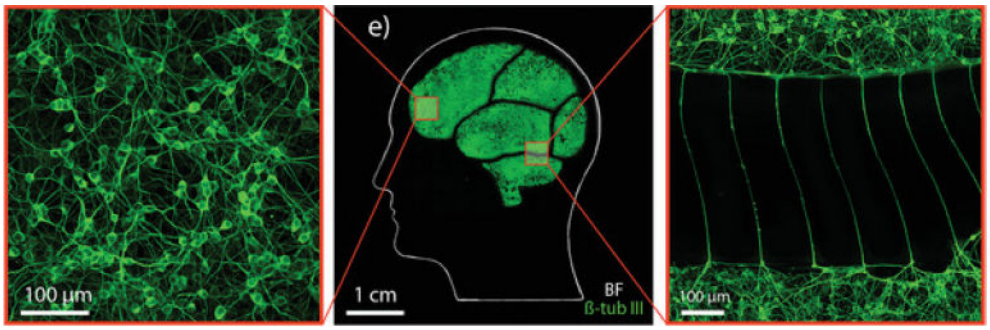
Kajtez J, Buchmann S, Vasudevan S, Birtele M, Rocchetti S, Pless CJ, Heiskanen A, Barker RA, Martínez-Serrano A, Parmar M, Lind JU, Emnéus J. 3D-Printed Soft Lithography for Complex Compartmentalized Microfluidic Neural Devices. Adv. Sci. 2020,7, 2001150.

Overview

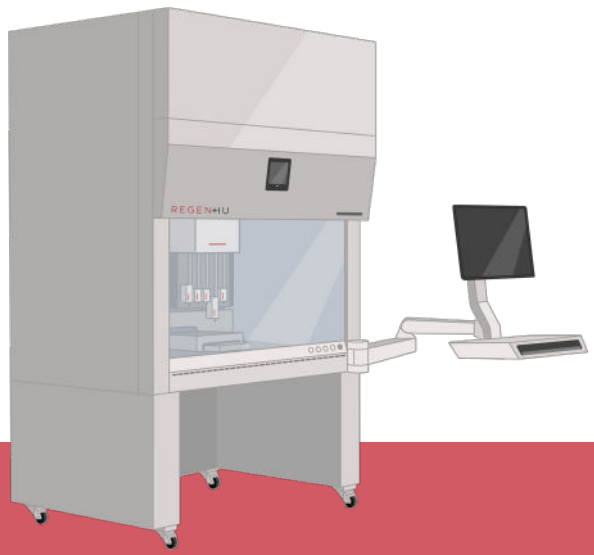
Compartmentalized microfluidic platforms are highly valuable tools in neuroscience research; however, current fabrication approaches are limited in terms of reproducibility, biocompatibility (due to residual polymers), and the realization of intricate architecture.

To overcome these constraints, in this study, a 3D printing approach was applied to fabricate compartmentalized neural devices. These devices were used to model the nigrostriatal pathway in vitro, opening new possibilities for studies on related diseases such as Parkinson's.



Results

- Preserved human neural stem cell viability and differentiation capability
- Retained function for stem cell-derived neurons and astrocytes for at least 40 days



REGENHU's bioprinting technology enables:

Flexibility and reliability
Overcome current limitations in terms of complexity, standardization, and biocompatibility

Accuracy
Microscale control to mimic the unidirectionality of the nigrostriatal pathway

Interested to know more ?

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