Press release

Towards 3D bioprinted liver tissue constructs: NEOLIVER

Kugelmeiers Ltd. joins European consortium to develop Automated Generation of Dense, Functional and Perfusable Bioprinted Liver Constructs for Transplantation

European Union (EU) Horizon Europe and Swiss State Secretariat for Education, Research, and Innovation co-funded NEOLIVER Consortium (total €10M award) is set to develop world's first autologous bioprinted liver designed for clinical use. Coordinated by University of Utrecht, twelve consortium members will develop technologies to establish an automated manufacturing line, vascularize the bioprinted liver constructs by a novel strategy and validate them pre-clinically.

Liver disease is a major global health challenge, responsible for approximately 2 million deaths annually. NEOLIVER's innovative approach aims to alleviate the burden of liver disease by providing a scalable and personalized solution which could in the future be utilized for liver transplantation. The consortium combines two bioprinting approaches to create dense, functional, and vascularized liver constructs using patient-derived organoids and supporting cells.

NEOLIVER will tackle key technological challenges and barriers in whole organ engineering by merging two bioprinting technologies and exploring five innovation routes:

1. Cell Sources: NEOLIVER expands and standardizes the production of organoids and supporting cells from multiple donors.
2. Bioprinting Tools: NEOLIVER utilizes LIFT technology for precise and high-speed bioprinting of liver constructs.
3. Vascularization: The consortium integrates bioprinted vessels and native donor vessels to create fully vascularized liver constructs.
4. Automated Manufacturing: NEOLIVER implements a GMP-conform automated manufacturing capability for large-scale production.
5. Clinical Validation: Functionality of bioprinted liver constructs will be validated preclinically and plan for first-in-human trials will be prepared.

NEOLIVER is built upon excellent results of ORANTRANS EU-funded project, which developed the key technologies and concepts, and which successfully transplanted small liver constructs into mice. NEOLIVER pushes the boundaries of tissue engineering further by automating the bioprinting process and producing a larger functional tissue. According to Professor Spee:

"The combined NEOLIVER consortium expertise will enable us to develop and deploy a larger tissue to demonstrate its potential for future clinical use in addressing the donor organs shortage in the future. If successful, the NEOLIVER approach will be scalable to other organ systems, leveraging organoid technology—a cornerstone of regenerative medicine".

Dr. Ali Mirsaidi, Head of Scientific Services & Product Innovation at Kugelmeiers said:

"We are absolutely enthused about the opportunity on hand here. Joining this esteemed group of Consortium partners enables us to play a purposeful role in advancing large-scale manufacturing of functional organ constructs, all with the ultimate objective of helping millions of patients in need. By supporting the translation of cellular insights into cutting-edge 3D cell culture solutions, our Sphericalplate 5D is a reliable platform for generation of millions of uniform-sized spheroids - driving automation and translational applications. We're proud to play our part in the advancement of regenerative and personalized medicine!"

Additional information

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