Website address:
https://www.gesundheitsindustrie-bw.de/en/article/press-release/neue-forschungsgruppe-konstruktion-von-gewebe-im-labor

New research group: construction of tissue in laboratory

An interdisciplinary research group combining mechanical engineering and biotechnology has taken up its work at the Institute for Molecular Systems Engineering and Advanced Materials (IMSEAM) of Heidelberg University. The team under the direction of Dr Kai Melde will pursue an innovative approach to biofabrication – 3D cell culture using ultrasound. Tools are being developed that can be used as an alternative to or enhancement for 3D printing. The rapid fabrication of specific tissues in the laboratory is expected to help gain new insights on tissue development and support developing new medications and studying their modes of action. The Foundation Carl-Zeiss-Stiftung (CZS) provides funding for the research through the CZS Nexus programme totalling 1.5 million euros over five years.

With his research group and the project titled "Holographic biofabrication – tissue engineering with sound", Dr Melde wishes to explore the formation of complex sound fields and their interaction with particles and cells. The work is based on the acoustic hologram technology he developed that allows projecting complex sound pressure images with simple tools. Ultrasound waves can arrange living cells into any desired 3D shape gently, quickly and without contact. "We want to find out how these cell assemblies can be further developed into functional tissues as well as how sound fields affect the maturation of cellular tissue," states Dr Melde.

Kai Melde studied mechatronics at Dresden University of Technology and then worked as technical staff at the Palo Alto Research Center in California (USA). In 2019, he received his doctorate in mechanical engineering from the Karlsruhe Institute of Technology. The doctoral thesis was conducted in cooperation with the Max Planck Institute for Intelligent Systems, where he first worked as a research engineer and then pursued postdoctoral research. In 2022, Dr Melde moved to the Max Planck Institute for Medical Research in Heidelberg. Since October 2023, he has been setting up the research group funded by the Nexus programme at the IMSEAM of Heidelberg University.

The goal of the Carl-Zeiss-Stiftung is to create an open environment for scientific breakthroughs by supporting not only basic but also application-oriented research in the STEM disciplines, i.e. science, technology, engineering, and mathematics.

Press release

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Source: Heidelberg University

Further information

- University of Heidelberg
- Carl-Zeiss-Stiftung