Website address:
https://www.gesundheitsindustrie-bw.de/en/article/press-release/bmbf-funds-heidelberg-junior-research-group-3d-bioprinting-project

BMBF funds Heidelberg Junior Research Group for 3D Bioprinting Project

Junior Professor Dr Daniela Duarte Campos has been awarded a substantial grant from the Federal Ministry of Education and Research (BMBF). She and her junior research group are investigating bioprinting for tissue and organ engineering at the Center for Molecular Biology of Heidelberg University and at the "3D Matter Made to Order" Cluster of Excellence, a collaboration between Ruperto Carola and Karlsruhe Institute of Technology (KIT).

Through the BMBF's "NanoMatFutur" funding competition, her research project on three-dimensional "printing" of the human cornea has been awarded financial support of approximately 2.2 million euros. The long-term goal of the project is to circumvent risky transplantations and establish a conservative method of clinical treatment for irreversibly damaged corneas.

In her research, Prof. Duarte Campos is developing bio-based techniques and materials for use in so-called tissue and organ engineering. In this process, endogenous tissue is cultivated in the laboratory and then transplanted into the human body where it replaces damaged structures. An example from medical practice is tissue grown to replace destroyed joint cartilage. The substrates for these cell cultures are hydrogels – aqueous solutions in which the cells are arranged in their predetermined structures. In her BMBF-funded project entitled "BlindZero", Prof. Duarte Campos focuses on irreversible diseases of the human cornea. Using a new process based on innovative hydrogels and a special technique of three-dimensional printing – known as 3D bioprinting –, she hopes to open up the possibility to one day "print" specially cultivated corneal tissue directly onto the eye of the affected patient.

"When injuries, infections or congenital defects result in damage to the cornea that cannot be treated using conventional methods, until now only transplantation was an option. Corneal transplantations are done quite frequently, but in spite of considerable progress, they are still fraught with complications such as rejections," explains Daniela Duarte Campos. She hopes to circumvent these issues by propagating the patient's own cells, adding appropriate hydrogels, and then putting them into a special 3D printer. "The idea is to apply this mixture directly to the patient's eye in a single surgical intervention and thus generate a new cornea. This concept will first be tested with human cells in the laboratory and later further analysed using preclinical models," explains the researcher, who is a member of the newly established Faculty of Engineering Sciences at Heidelberg University.

Daniela Duarte Campos studied biomedical engineering at the University of Minho in Braga (Portugal) and received her PhD in biomaterials and tissue engineering from RWTH Aachen University in 2016. After a research stay at the Wake Forest Institute for Regenerative Medicine in Winston-Salem (USA), she led a junior research group at the RWTH Aachen University Hospital. Before joining Heidelberg University in 2021, she was a postdoc at the Heilshorn Biomaterials Lab of Stanford University and a project leader at the Institute of Applied Medical Engineering of RWTH Aachen University. Daniela Duarte Campos has been recognised numerous times for her previous work.

The "NanoMatFutur" competition sponsored by the Federal Ministry of Education and Research helps junior researchers form their own independent research group to pursue an ambitious project idea through innovative research approaches in materials science and materials technology.

Press release

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Source: University of Heidelberg

Further information

- University of Heidelberg
- Cluster of Excellence of Karlsruher Institute of Technology & Heidelberg University | 3D Matter Made to Order