Cancer research implies future for personalized medicine, reduction in animal testing

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On August 6th, *JoVE, the Journal of Visualized Experiments*, will publish two new methods for scientists to study and treat tumor growth. The methods introduce a lab-born, human tissue structure with replicated human biochemistry – offering scientists the opportunity to grow, observe, and ultimately learn how to treat biopsied human tumor cells.

The University Hospital of Würzburg scientists behind the experiment have created a new version of the testing structures known as biological vascularized scaffolds (BioVaSc). Their three-dimensional human-tissue structures are the first of their kind to be built with multiple human cell types. The structures offer two methods for study: a three-dimensional (3D) static system for short term testing that is beneficial for microscopy imaging, and a dynamic system that introduces a flow-simulation to simulate actual conditions of the human body. This is especially helpful in long term studies of metastasis, or, the spreading of cancer cells through the human vascular system.

"Our 3D tumor model is reducing or even replacing animal experiments," said engineer Jenny Reboredo. In their article, Reboredo and her colleagues explained that this human-tissue based testing system could eliminate the potential for the misinterpretation that often accompanies animal testing. Furthermore, this method solves the shortfalls of typical in-vitro testing, which is limited by the lack of intercellular interactions.

The authors also suggest that their use of primary cells derived from tumor biopsies is a "very important step towards personalized medicine." With the method the team has created, a lab could in the future take a biopsy of a cancer cell and do tests to find the most effective treatment before ever administering drugs to the human patient.

Further implications of Reboredo and her colleagues' work involve the use of a BioVaSc-type method for studying non-tumorous diseases. "In the long term we want to be able to develop disease models, especially for diseases where no animal models are available," Reboredo said.

When asked why she and her colleagues published in *JoVE*, Reboredo noted that their models "can be explained and visualized best in a movie [and] to publish in such a media is made possible by *JoVE*."

Provided by The Journal of Visualized Experiments