

technology

Revolutionary Research Tool Mimics Natural Micro-Environments in a Laboratory

The world of laboratory research and pharmaceutical testing might never be the same, thanks to Kalamazoo-based life sciences startup RealBio™ Technology, Inc.

For decades, researchers and pharmaceutical testing scientists could either grow cell cultures in a Petri dish or use animal subjects to generate relevant data. Petri dish-grown (in vitro) cells don't develop the same as tissue in the human body. Tissue grown in animal subjects (in vivo) has added costs and is not representative of the human body.

Part of the expense and high rate of failure in pharmaceutical small molecule development is due to the challenge of finding good in vitro models of human tissue that exhibit key characteristics of normal in vivo tissue organization and function. Researchers are in a race to identify the compounds that will fail in the development cycle, so critical resources can be channeled to the most promising product candidates.

The RealBio D4™ Culture System allows scientists to cultivate tissues and cells in an in vitro environment while mimicking the natural composition, configuration and function of human tissues. In the drug development

setting, the system enables researchers to observe and detect adverse or toxic effects of drug compounds at very early stages in the development process—helping speed the identification and elimination of drug candidates with unacceptable safety profiles before they advance to human trials. Other scientists may use the system to mimic diseased or healthy tissue for their research.

“The secret is in the design of the culture system, which combines an open, three-dimensional tissue scaffold with the ability to independently control nutrient flow and gas exchange,” said Paul Neeb, president and CEO at RealBio™ Technology. “The result is a system that promotes growth and maintenance of tissues that are more like the tissues grown in the human body.”

The new, patented technology opens doors for researchers and scientists to approach how they use cell cultures. Because the sources of gas and nutrients are separated (vs. infused in the Petri dish medium), researchers can slow down delivery of nutrients or gases, replicating conditions in diseased human tissue. Researchers could also isolate tissue in the D4 Culture System to evaluate compounds and variables that can't be ethically tested on humans or in animal models.

“This system provides researchers with flexibility,” said Neeb. “If research involves subsets of individuals with genetic or environmentally specific characteristics, those conditions can be replicated in the lab setting to quickly and efficiently identify safety profiles that should closely resemble real-life effects.”

The design ensures that cells can be cultured with an ideal mixture to promote healthy, consistent growth, improving the culture quality.

“Our system allows researchers to remove dying or dead cells, which can help the culture remain viable for an extended period of time. There is no other technology available today that can do that,” Neeb added.

Because accurate comparisons are a critical step in the scientific method, the RealBio D4™ Culture System could become an important tool to reduce the donor-to-donor variability often found in primary cell cultures grown

for research. The system is closed, so the possibility of contamination is greatly reduced and introduction of foreign compounds is the result of study protocols, instead of natural processes in animal subjects or contamination. Reducing variability helps researchers make decisions about the effects on human health with greater confidence.

Currently, the RealBio D4™ Culture System is being developed using bone marrow cells; however, the company is working to develop partnerships that would enable the system to be used in the culture of many different types of primary tissue. The most promising new application may be an in vitro cancer tumor model.

Grand Rapids-based MedBio Inc., also a member of the Initiative, manufactures for RealBio. •

For more information, please visit www.realbiotechnology.com.

