

## TECHNOLOGY TRANSFER OFFICE

# **3D-Culture Models for High-Throughput Screening** for Anti-Cancer Agents

UNIVERSITY OF COLORADO

## TECHNOLOGY TRANSFER OFFICE

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## **IP Status:**

Available for exclusive or nonexclusive licensing.

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### Background

3D cell cultures provide several advantages over 2D models. First, their well-defined geometry makes it possible to directly relate structure to function, enabling better theoretical analyses. Second, 3D culture models are superior at modeling *in vivo*-like growth and differentiation of tissues as compared to 2D models, making them potentially valuable in drug screening, since they can both identify new compounds and screen out compounds discovered through other means before they reach expensive *in vivo* trials.

In the modern era of tissue culture, scientists have experimented with 3D culture systems that incorporate extra cellular matrices (ECM), which provide support for the cells as well as a more realistic environment for analysis. The use of 3D cell culture is currently constrained by the lack of a biocompatible material in the marketplace that offers ease of use, experimental flexibility, and a seamless transition from *in vitro* to *in vivo* applications. Another major barrier in the use of 3D models incorporating ECM for high-throughput drug screening has been the cost and complexity associated with standardization and uniform miniaturization.

### Technology

A research team from the University of Colorado led by Daniel LaBarbera has developed an improved screening method to identify Epithelial-Mesenchymal Transition (EMT) agents: agents that alter specific phenotypes of a cell, and have been shown to affect human biological processes such as embryonic development, wound healing and cancer progression/ metastasis.

Compared to other types of 3D cell culture, this technology uses novel methods to more accurately model human disease *in vitro*, and is well-adapted for high-throughput screening (HTS). Specifically, this model incorporates ECM, human tissues in the disease state (e.g. metastatic breast cancer phenotype). It also couples the appropriate genetic readout to monitor this disease state to the disease state gene of choice.

### Application

Compounds discovered using this screening methodology can be developed into therapeutics that target the inhibition of a disease, particularly cancer. In the field of breast cancer, for example, a study using these 3D models showed that reversion of the malignant phenotype was possible in a 3D tissue culture. This deterioration was not observed in cells grown in a monolayer, demonstrating the importance of the microenvironment. Furthermore, use of this screening method may allow for individualized treatments for patients in the clinic, by testing for therapy responsiveness before administering treatment.

### **Key Document**



<u>3D-Models for High-Throughput Screening Drug Discovery and Development</u>. U.S. patent application filed December 10, 2010.