Cell Linkers for Heterotypic Cell Spheroids

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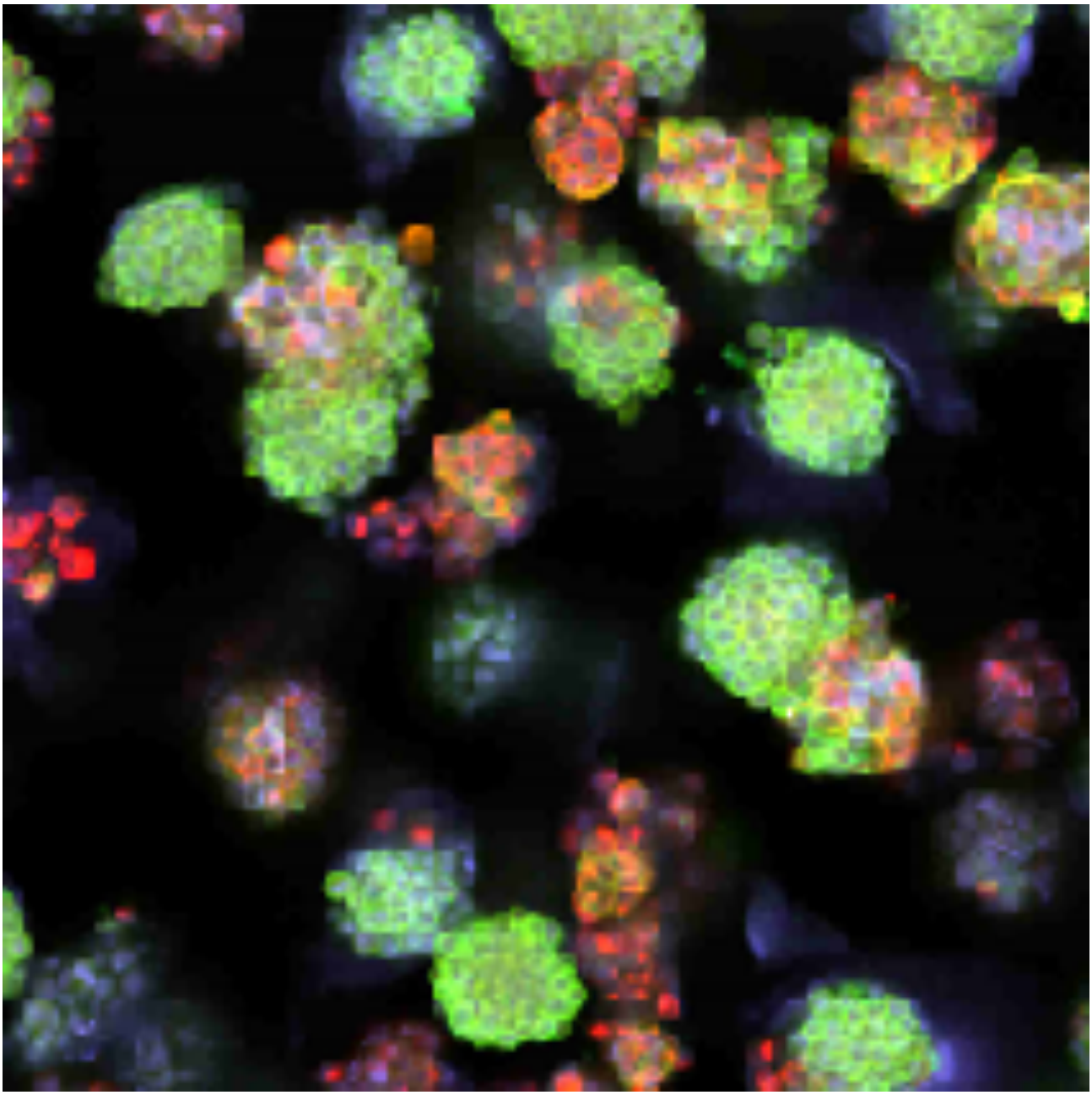
Technology description

Description

Three-dimensional (3D) cell culture models have become increasingly popular and are thought to be a more accurate physiological representation of the in vivo situation as compared to cells grown in two-dimensional monolayers. However, many 3D models are still limited and fail to account for cell-to-cell interactions between different cell types in vivo. At the present time, no material or process exists to create 3D mixed spheroids of diffrent cell types (e.g., endothelial and epithelial cells) within the same spheroid, mimicking the heterogeneity of organ microstructure.

Research between Kansas State University and the National Cancer Institute have developed cell linkers and an approach that promotes association of endothelial cells to epithelial cells, thus creating 3D heterogeneous spheroids. The value of this approach is the ability to more closely simulate interactions common in living organisms (in vivo) compared to what is currently state of the art in simple systems (in vitro) commonly employed for testing of, among others, drug activity, particularly where interaction of endothelial and epithelial cells affects the anticipated or desired drug activity.

An immediate application of this technology with commercial utility is in anti-cancer drug screening, including diseases such as breast cancer, prostate cancer, and colorectal cancer in which interaction of tumor cells with mesenchymal cells is a proven method of tumor growth regulation (Figure 1, prostate cancer cells with endothelial cells in the presence of cell linkers; Figure 2, colorectal cancer cells with endothelial cells in the presence of cell linkers).



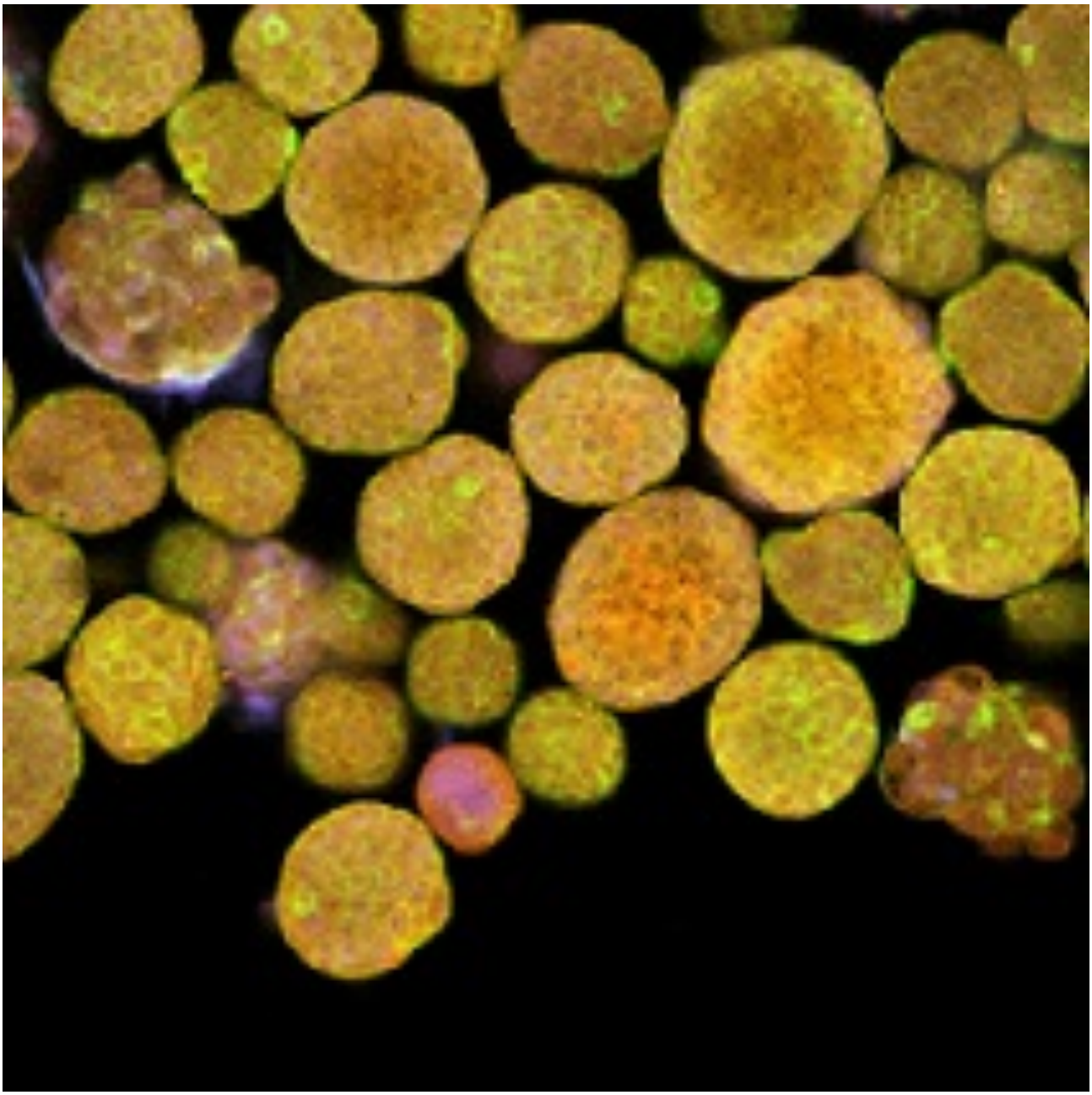


Figure 1: Spheroids of HUVEC and DU145 cells. Figure 2: Spheroids of HUVEC and HT29 cells.

Recognition: Synthetic peptide recognizes endothelial and epithelial cell surfaces
Model for drug penetration: Measure drug uptake

Application area

Production of 3D tumor spheroids
Cancer drug discovery
3D cell culture
Pharmacodynamics and Pharmacokinetics

Advantages

Heterogeneous spheroids: Create heterogeneous spheroids for pharmacodynamics studies
In vitro 3D cancer model: Recapitulate solid tumor architecture

Institution

Kansas State University

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