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LifeSciences

3D Tumor Drug Screening Models for Oncology Research

For many decades, oncology research and drug screening programs have relied upon 2D or monolayer culture systems of established tumor cell lines. Unfortunately, these flat biology or homogenous tumor models do not represent the complex cell-cell and cell-matrix biology that are found in cancer patients.

To recapitulate tumor biology, many 3D cell culture models have been developed that utilize animal-based hydrogels (Matrigel® or collagen), gravity-based or hanging drop methodology, or low-binding culture plates. Today, both tumor spheroid and organoid models are used for basic and preclinical research.

Although 3D oncology systems mimic multi-cellular architecture and functional pathways, they still pose many limitations. For example, tumor spheroids are formed via random cell aggregation and do not replicate heterogeneity, while cancer stem cell-derived organoids lack stromal environment.

Now, as a promising oncology solution, LifeNet Health LifeSciences is creating a new 3D tumor biology platform where patient-derived tumor cells are embedded and cultured within a proprietary human-based hydrogel (HuBiogel™). These human microtumor models display robust 3D growth and organization with active proliferation, colonization and hypoxia process — the hallmarks of the tumor microenvironment. Moreover, distinct kinomic pathway, genomic signatures, and drug response analyses performed with glioma PDX models have demonstrated the platform's predictive and translational benefits over other culture systems[1-3]. PDX microtumors have shown *in vivo*-like global kinase activity, gene expression and morphologic diversity.

Using this unique technology, LifeNet Health LifeSciences is developing microtumor assay models as an oncology service to academic, pharmaceutical and government researchers. Ready-to-use 3D tumor plates (96-well) will be produced with customer-supplied tumor cells and shipped for accelerating preclinical drug screening programs. In fact, single or combination of drug candidates can be evaluated in a cost/time saving manner.

References:

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