LifeNet Health®
LifeSciences

Human Extracellular Matrix Hydrogels and Cell Biology Modeling

The extracellular matrix (ECM) serves as an important biophysical scaffold for regulating cell growth and function. Traditionally, purified ECM proteins (collagen, laminin) are commonly used for 2D or monolayer cell culture applications. These insoluble structural proteins and local soluble factors provide the essential environmental controls for host cell-cell and cell-matrix interactions.

More recently, complex biomatrix hydrogels — e.g., Matrigel® and Geltrex™ — have become useful for developing 3D or multicellular culture models. Unfortunately, these animal-derived ECM culture systems do not fully mimic the tissue biology found in humans.

It is known that the compositional milieu of ECM hydrogels finely regulates cell behavior and functions. Cell-matrix interactions, in concert with specific growth factors, dramatically influence cell migration, proliferation, and differentiation processes. For example, reconstituted Matrigel® is enriched in laminin but lacks collagen-I making it unable to fully recapitulate the human stromal environment and biology. In addition, certain growth factors in Matrigel can self-induce a cellular phenotype (angiogenesis) and alter the gene expression profile. Therefore, a well-defined ECM system is needed to develop physiologically relevant cell- and tissue-culture models for advancing basic and translation research.

LifeNet Health LifeSciences has developed two novel, human-based ECM culture platforms, named HuGentra™ and HuBiogel®. Placenta-derived HuGentra is a collagen- and growth factor-rich biomatrix that actively promotes cell proliferation and differentiation. Amnion-derived HuBiogel is uniquely rich in collagen and laminin, with undetectable growth factors. These properties allow HuBiogel to be uniquely effective for use in 3D cell biology models. Technical and biological advantages of these human ECM hydrogels have been previously demonstrated[1,2].

References:

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2) Stackhouse, CT, Rowland, JR, Shevin, RS, Singh, R, Gillespie, GY and Willey, CD. A novel assay for profiling GBM cancer model heterogeniety and drug screening. Cells 8(7): 702 (2019).

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