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White Paper
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A Nimble Alternative to Cumbersome Extracellular Matrices: Culture of MCF-7 in 3DCellMaker vs Matrigel®

Introduction

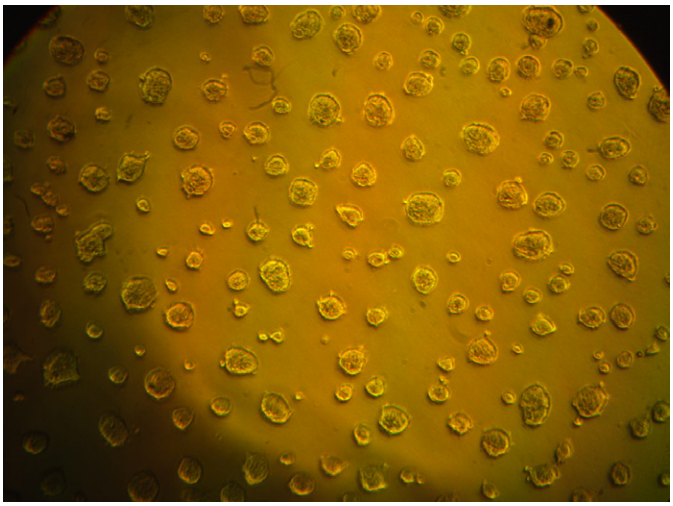
Three dimensional cell culture models have become increasingly popular for conducting scientific research. These 3D model better represent the true native microenvironment of cells when compared to two dimensional, monolayer, cell cultures. These models allow the researcher to conduct studies which provide better data in application to biological environments.

Method

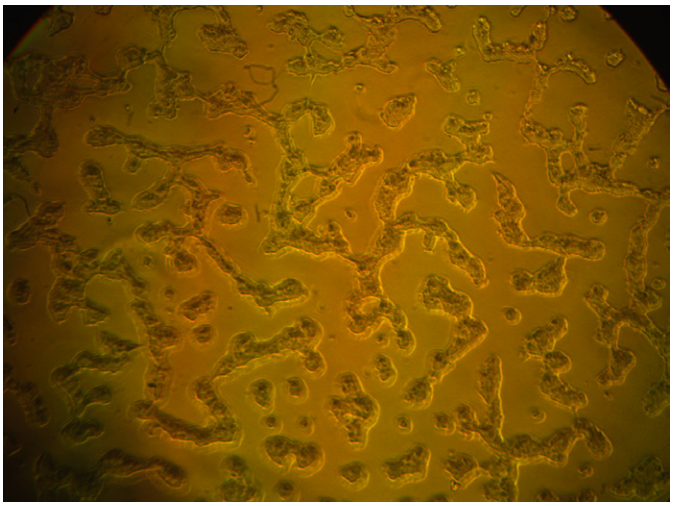
MCF-7 cells were cultured according to standard methods using basal media supplemented with glutamine, fetal bovine serum, and penicillin/streptomycin. These cells were then released from culture vessel using trypsin/EDTA solution and harvested to inoculate both 3DCellmaker gel and Matrigel®. Matrigel® was utilized according to manufacturer instructions.

Results

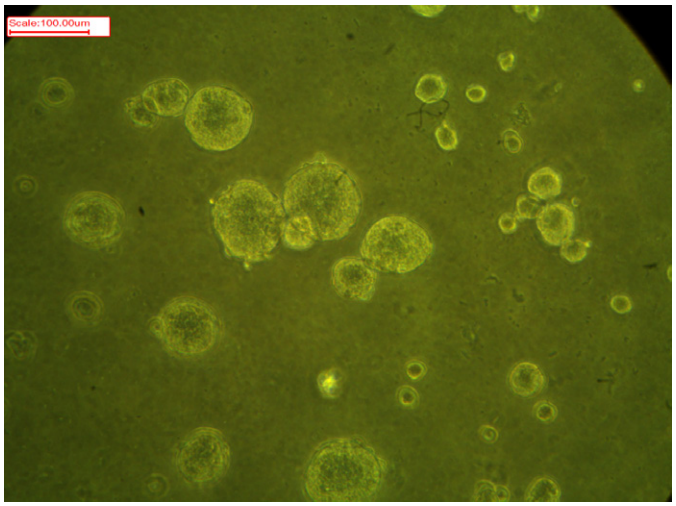
Culture of MCF-7 cells resulted in spherical growths ranging in size from 40-200µm in 3DCellmaker. Culture of MCF-7 in Matrigel® resulted in spherical growths similar in size, but in some cases resulted in webbing type growth.



MCF-7 72 Hours after seeding on Matrigel® (100X magnification). Spherical growths.



MCF-7 16 Hours after seeding on Matrigel® (100X magnification). Webbing type growth.



MCF-7 24 hours after seeding on 3DCellMaker
(200X magnification). Spherical growths.

Conclusion

3DCellmaker provides some clear advantages when compared to Matrigel® for culturing 3D cell structures. 3DCellMaker is synthetic polymer allowing for higher batch-to-batch reproducibility. No variability as with biologically derived ECMs. It contains no growth factors which may affect cell growth. This allows the end user to use the medium of their choice, even serum free media. 3DCellMaker is generally easier to work with under normal laboratory conditions. 3DCellMaker has a higher thermal transition point when compared to Matrigel® and similar ECM. For this reason, there is no need to keep lab equipment and reagents chilled. 3DCellMaker retains workable flow characteristics at room temperature. Also 3DCellMaker can be stored in solution at refrigerated conditions so there is no need to wait for thawing as with other ECMs, which must be stored frozen.

3DCellMaker also allows the end user to harvest 3D cell structures easily. Other ECMs such as Matrigel® require additional reagents (e.g. Corning Dispase or Corning Cell Recovery Solution or other proteolytic enzymes). 3DCellMakers are thermally reversible. All that is required to harvest cells is to cool plate/culture vessel to return the gel to a liquid state. Cells can then be physically extracted.

	Matrigel®	3DCellMaker
Source/Reproducibility	Biologically derived and can have lot to lot variation.	Synthetic: Reproducible from batch to batch.
Handling	Material and equipment must be handled cold. Matrigel® will begin to transition to gel at temperatures as low as 10°C.	Material and equipment can be used at normal room temperatures. Material does not begin to transition to gel until temperatures above 30°C.
Harvesting Cell Structures	Requires the use of special reagents to remove cell growth from gel.	Material is thermally reversible. Allows for simply chilling material to return to liquid state and physically removing cell growth from liquid.
Cost Effectiveness	~$300 for 10mL	~$100 for 10mL