

University of Massachusetts Medical School

eScholarship@UMMS

UMass Center for Clinical and Translational
Science Research Retreat

2017 UMass Center for Clinical and
Translational Science Research Retreat

May 16th, 1:45 PM

Building Better Tumor Models In Vitro: An Investigation into the Improvement of 3D Cell Culture Techniques

Brandon Piel

University of Massachusetts Lowell

Et al.

Let us know how access to this document benefits you.

Follow this and additional works at: https://escholarship.umassmed.edu/cts_retreat



Part of the [Biomedical Engineering and Bioengineering Commons](#), [Chemical Engineering Commons](#), [Investigative Techniques Commons](#), and the [Translational Medical Research Commons](#)

Repository Citation

Piel B, Doane M, Velpurisiva P, Rai P. (2017). Building Better Tumor Models In Vitro: An Investigation into the Improvement of 3D Cell Culture Techniques. UMass Center for Clinical and Translational Science Research Retreat. <https://doi.org/10.13028/v8st-4362>. Retrieved from https://escholarship.umassmed.edu/cts_retreat/2017/posters/64

Creative Commons License



This work is licensed under a [Creative Commons Attribution-NonCommercial-Share Alike 3.0 License](#).

This material is brought to you by eScholarship@UMMS. It has been accepted for inclusion in UMass Center for Clinical and Translational Science Research Retreat by an authorized administrator of eScholarship@UMMS. For more information, please contact Lisa.Palmer@umassmed.edu.

BUILDING BETTER TUMOR MODELS IN VITRO: AN INVESTIGATION INTO THE IMPROVEMENT OF 3D CELL CULTURE TECHNIQUES

Brandon Piel¹, Micheal Doane^{1,3}, Praveena Velpurisiva², Prakash Rai¹

¹Department of Chemical Engineering, ²Department of Biomedical Engineering and Biotechnology, ³Department of Biological Sciences, University of Massachusetts Lowell

In cancer drug discovery, 3D cell culture is a segue between monolayer cell culture and animal testing, offering better predictive modelling of drug performance before animal testing commences. However, even though cell spheroids in 3D cultures superficially resemble tumors, they typically lack the complexity and scale of tumors formed in vivo. Spheroids typically consist of a single cell type whereas tumors contain a whole ecosystem of cells. Also, most 3D protocols stop at day 10, where the spheroids are roughly 500-600 μm in diameter at the largest, whereas tumors that develop in the body are, on average, 7.5 cm in diameter. This study investigates the effects of coculturing cell lines in 3D cultures, the effect of growth factors like Epidermal Growth Factor (EGF) on spheroids, and works on developing methods to increase the size of spheroids to more macroscopic levels. Applications for use of these 3D culture models for imaging and treatment with drug-encapsulating nanoparticles will also be presented.

Contact:

Brandon Piel

University of Massachusetts Lowell

brandon_piel@uml.edu