

9-4-2014

3D Cultures of Human Liver Cell Lines Encapsulated in PuraMatrix on a Microarray Chip Platform

Pratap Lama
Cleveland State University

Alexander D. Roth
Cleveland State University

Pranav Joshi
Cleveland State University

Akshata Datar
Cleveland State University

Moo-Yeal Lee
Cleveland State University, m.lee68@csuohio.edu

How does access to this work benefit you? Let us know!

Follow this and additional works at: http://engagedscholarship.csuohio.edu/u_poster_2014

 Part of the [Biomedical Engineering and Bioengineering Commons](#)

Recommended Citation

Lama, Pratap; Roth, Alexander D.; Joshi, Pranav; Datar, Akshata; and Lee, Moo-Yeal, "3D Cultures of Human Liver Cell Lines Encapsulated in PuraMatrix on a Microarray Chip Platform" (2014). *Undergraduate Research Posters 2014*. Book 20.
http://engagedscholarship.csuohio.edu/u_poster_2014/20

This Article is brought to you for free and open access by the Undergraduate Research Posters at EngagedScholarship@CSU. It has been accepted for inclusion in Undergraduate Research Posters 2014 by an authorized administrator of EngagedScholarship@CSU. For more information, please contact library.es@csuohio.edu.



This digital edition was prepared by MSL Academic Endeavors, the imprint of the Michael Schwartz Library at Cleveland State University.

3D Cultures of Human Liver Cell Lines Encapsulated in PuraMatrix on a Microarray Chip Platform

Washkewicz College of Engineering

Student Researchers: Pratap Lama, Alexander D. Roth, Pranav Joshi,
and Akshata Datar

Faculty Advisor: Moo-Yeal Lee

Abstract

A high-throughput cell printing technology has developed to simulate the liver tissue environment using a hydrogel-based chip platform that has potential to shift *in vivo* drug toxicity models towards *in vitro* tests. However, the hydrophobic nature of polystyrene chips is not promoting direct adhesion of hydrogels, which created a problem with spot attachment. The main goal of this research is to create a surface chemistry that helps to attach a peptide-based hydrogel, including PuraMatrix, to a polystyrene-based micropillar chip. Seven analogs of maleic anhydride co-polymers were used to coat the micropillar chip to create a functional surface. Then, six ionic solutions were tested for inducing gelation of PuraMatrix. Formation of bubbles and spot detachment on the chip platform was quantified. As a result, an optimum polymer, PMA-OD was selected for surface attachment based on its low bubble formation and high spot attachment. This polymer could easily coat the chip for better gel adhesion. In regards to the gelation of PuraMatrix, poly-L-lysine was the most favorable for spot attachment and cell viability on the chip platform. In future research, encapsulated human liver cells expressing drug metabolizing enzymes will be tested with different drugs to determine mechanisms of drug toxicity.