Assessing biocompatibility of polymeric materials as scaffolds to establish 3D cell culture in a microfluidic platform. *by Dennis*

Abstract Id: ***462*** *Submitted:* ***March 4, 2019*** *Event:* ***Conference for Undergraduate Research at FIU 2019***
Topic: ***Biological Engineering***

The implementation of 3D cell culture helps researchers to have a deeper understanding of cells morphology, cellular environment and understanding their behavioral changes. The implementation of 3D cell culture systems into diagnostics, drug discovery and fundamental research in the field of life sciences for both academic and industrial applications has generated deeper insights leading towards early identification of various disease, assessing new drugs and treatment, and even genome sequencing.

The current techniques for establishing a 3D cell culture requires a scaffold material which acts as an anchorage for cells to grow. The materials available have a certain limitation in term of biocompatibility and biodegradability.

In this work, we intend to explore different polymeric materials which can be used as scaffolds for cell growth. The work involves using novel polymers such as Cellulose, Alginates, PDMS etc. to prepare scaffold and assess its biocompatibility. The use of the new polymer is challenging and hence the applications are of great significance because they provide a micro-environmental insight that allows the formation of artificial tissue from cultured cells by providing promising tissue-like connectivity with their cell-to-cell interaction. In this work, MDAMD 231 cells were cultured on various scaffolds and assessed for cell proliferation and their biocompatibility. Cells were grown for a period of 7 days and a stability study was also done.

Further, in our study, we intend to integrate a microfluidic platform to establish a 3D culture which would grant dynamic manipulation of culture status for biochemical and biomechanical purposes. Once the 3D culture is establishing we would assess tumor morphology and tumor regression using various combination of anticancer drugs. The developed method would serve as a platform for screening of various drugs to accelerate better cancer therapies.