

Nayar Prize II, Phase II Quarterly Progress Report (Q1) January 2018

Project: Microfluidic Drug-Microbiota Interaction Platform
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Progress Summary of Nayar Prize II, Phase II, Quarter 1

Since October, our primary activities have been toward establishing cultures of the primary colon (Objective 1) and characterizing the role of bacteria in modulating the enzymatic activity of colon cells (Objective 3). Our overall project goals are to study the role microbiota play in influencing drug metabolism. To facilitate study of interactions between the large number of potential combinations of drugs and microbiota, we are developing a microfluidic platform to carry out the study in high-throughput.

Development of the primary colon culture is quite challenging as the microenvironment external to the in vivo gut environment does not have all the factors to support the growth and function of the cells. We have carried out a large number of experiments to grow the primary colon on a variety of extracellular matrices—fibronectin, collagen type I, collagen type IV, and Matrigel. We have conducted these experiments in tissue culture plates as well as in the microfluidic devices. We have exciting results in which the colon cells express e-cadherin, which is one of the important cellular proteins (**Figure 1**). We are in the process of further characterization of the cells with parameters such as tight junction proteins. For Objective 3, we have identified several new bacteria that influence human disease as well as metabolism of human drugs. We are in the process of procuring the bacterial strains. We have, in the meantime, extended our studies to optimize the co-culture of colon cells and bacteria.

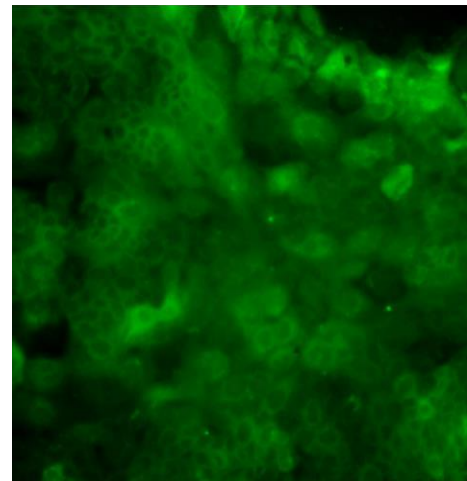


Figure 1. Expression of e-cadherin protein in primary colon cells.