

*International Conference on***PHARMACEUTICAL AND BIOMEDICAL ENGINEERING***October 16-17, 2017 Osaka, Japan***Traction force screening of physical changes in pathology enabled by a higher-throughput multi-well compliant PDMS device****Haruka Yoshie¹, Newsha Koushki¹, Rosa Kaviani¹, Kavitha Rajendran², Quynh Dang², Amjad Husain², Sean Yao², Chuck Li³, John K Sullivan³, Magali Saint-Geniez⁴, Ramaswamy Krishnan² and Allen J Ehrlicher¹**¹McGill University, Canada²Beth Israel Deaconess Medical Center, USA³Amgen Inc., USA⁴Schepens Eye Research Institute, USA

Acto-myosin contractility is an essential element of cellular biology and manifests as traction forces that cells exert on their surroundings. The central role of these forces makes them a novel therapeutic target in diverse diseases. This requires accurate and higher capacity measurements of traction forces. To address this need, we employ traction force microscopy in a parallelized 96-well format, which we refer to as Contractile Force Screening (CFS). We fabricate these plates using very compliant Poly Di Methyl Siloxane (PDMS) rubber, with a lower-bound Young's modulus of approximately 0.7 kPa. We have recently demonstrated the utility and versatility of this platform by quantifying the compound and dose-dependent contractility responses of human airway smooth muscle cells and retinal pigment epithelial cells. Here, I will present our preliminary work using this system to understand the contractile changes associated with the Epithelial to Mesenchymal Transition (EMT) in cancer metastasis. We found that, the strain energy of cells increases more than an order of magnitude during EMT, which suggests that the work exerted by cells during metastasis may be a key metric for characterizing these cells and potentially identifying compounds to rectify their behavior. Changes in cellular forces are not only limited to any one disease, but may play a role in the vast majority of human pathologies, from asthma to cancer. We believe that contractile force screening will be a broadly transformative technology allowing diverse quantitative biology and health science researchers to investigate biophysical and biomechanical challenges.

Biography

Haruka Yoshie has received her BSc in Chemistry from McGill University, Montreal, Canada. She has worked as a Research Assistant in Dr. James Martin's group at Meakins-Christie Laboratory, Montreal, Canada. She has completed her MEng in Dr. Allen Ehrlicher's group in Bioengineering at McGill University. She is currently a PhD student in Dr. Allen Ehrlicher's group at McGill University.

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