Accepted Manuscript

An impedance-based cell contraction assay using human primary smooth muscle cells and fibroblasts

Daniel D. Bravo, Tania Chernov-Rogan, Jun Chen, Jianyong Wang

PII: S1056-8719(17)30198-3
DOI: doi:10.1016/j.vascn.2017.10.006
Reference: JPM 6475

To appear in: *Journal of Pharmacological and Toxicological Methods*

Received date: 7 August 2017
Revised date: 10 October 2017
Accepted date: 18 October 2017

Please cite this article as: Daniel D. Bravo, Tania Chernov-Rogan, Jun Chen, Jianyong Wang , An impedance-based cell contraction assay using human primary smooth muscle cells and fibroblasts. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Jpm(2017), doi:10.1016/j.vascn.2017.10.006

An Impedance-based Cell Contraction Assay Using Human Primary Smooth Muscle Cells and Fibroblasts

Daniel D. Bravo, Tania Chernov-Rogan, Jun Chen and Jianyong Wang*

Biochemical and Cellular Pharmacology, Genentech, Inc. South San Francisco, California 94080-4990, United States

*To whom correspondence should be addressed: E-mail: wang.jianyong@gene.com.

Abstract

Introduction: Many cell types (including muscle cells and fibroblasts) can contract at physiological conditions and their contractility may change during tissue injury and repair or other diseases such as allergy and asthma. The conventional gel contraction assay is commonly used to monitor the cellular contractility. It is a manual assay and the experiment usually takes hours even days to complete. As its readout is not always accurate and reliable, the gel contraction assay is often used to qualitatively (but not quantitatively) characterize cellular contractility under various conditions. **Method:** To overcome the limits of the gel contraction assay, we developed an impedance-based contraction assay using the xCELLigence RTCA MP system. This technology utilizes special 96-well E-plates with gold microelectrode arrays printed in individual wells to monitor cellular adhesion by recording the electrical impedance in real time. The impedance change (percentage vs. control) can be used as the readout for cellular contraction. **Results:** We demonstrated that the impedance-based contraction assay can be performed within two hours. Using this new method, we quantitatively characterized the effects of several contractile stimulators and inhibitors on human primary bronchial smooth muscle cells and primary lung fibroblasts. **Discussion:** The impedance-based contraction assay can be applied to both basic research and drug discovery for characterizing cellular contraction quantitatively. Because it has high throughput capacity and high reproducibility, the impedance-based contraction assay is useful for high throughput functional screening in drug industry.