**Real Time Viability Evaluation and Monitoring of Rat Cardiomyocyte Using Surface Plasmon Resonance**

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Being the leading cause of death globally, Cardiovascular Diseases (CVD) vary from different types of strokes, cardiomyopathies, hypertension, and heart failure. Animal and human trials are the foremost option for drug testing, disease modeling, and biomarker analysis. These approaches have the benefit of providing a systematic view rather than just assessing the heart, however, they require significant labor, time, and cost. Microfluidics and lab-on-chip devices are fast emerging in the recent years. They are meant to decrease the need for clinical trials and fast forwarding the drug marketing development. However, there still lies a need for better optochemical technologies to detect desired biomarkers and study CVD models in their original physiological condition. Surface Plasmon Resonance (SPR) technology employs an incident laser light and its refractive angle to respectively stimulate and read from resonant oscillation of conduction electrons at the interface between negative and positive permittivity material. In this research, we report a novel live-cell SPR platform to measure and characterize the contractibility of beating cardiomyocytes. Rat cardiomyocytes were isolated from neonatal rat hearts day 1 through 3 and cultured on SPR gold chips. Their spontaneous contraction under normal and drug induced conditions were monitored using SPR technology. Our research provides not only live monitoring of beating characteristic for cardiomyocytes, but also a comprehensive kinetic analysis of their released biomarkers using detection-specific designed gold chips.

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