Assessment of drug-induced contractility by simultaneous recording of cell motion imaging and electrical impedance

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Drug-induced cardiotoxicity is critical in the non-clinical testing. Applications of iPS-derived cardiomyocytes (iPS-CMs) hold great promise as a human cell-based platform. To date, multielectrode array (MEA) system has been widely used as a standardized assay to detect proarrhythmia risk with iPS-CM. In addition, evaluation of inotropic effects in vivo is recognized as a safety pharmacology in drug development. Given its impact on drug development, it should be useful to detect the drug-induced effects on contractility in vitro. In the present study, we used the cell motion imaging system (CMI) and the measurement of cell-induced electrical impedance (IMP) for the contractility assessment. We confirmed the effects of isoprenaline and verapamil using these systems. Simultaneous recording of CMI and IMP showed clear correlation between CMI and IMP. Our results suggest that both CMI and IMP can monitor the contraction movement of iPS-CMs.