

Cardiomyocytes in Voltage Clamp and Current Clamp by Automated Patch Clamp

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Abstract

In recent years, human stem cell-derived cardiomyocytes have proven to recapitulate key features of human cardiac electrophysiology in vitro. Furthermore, it has become apparent that the intact ensemble of cardiac ion channels is necessary to determine proarrhythmic effects reliably. Hence, due to their increasing availability, stem cell-derived cardiomyocytes have become the preferred choice of cardiac cells.

This poster summarizes the promises and challenges of combining iPSC-derived cardiac myocytes with automated patch clamp. Features like high throughput, temperature control, easy internal solution exchange and full automation make planar patch clamp a desired method for characterizing iPSC-derived cardiomyocytes.

One of the biggest challenges of planar patch clamp in this context is the fact that individual cells cannot be chosen, but cells will be selected randomly. In addition cells have to be harvested before the application to the patch clamp chip and cannot be patched as adherent cells.

With this poster, we show our progress on these challenges. Two automated patch clamp platforms, the Patchliner, as a medium throughput, and the SyncroPatch 384PE, as a high throughput device, were used for this study.

Pharmacological measurements in voltage clamp as well as current clamp will be shown also under physiological temperatures and perforated patch.

HTS Patch clamp performance of human iPSC-derived cardiomyocytes (compared to a stably transfected cell line)

