



VOLTA Scanner Case Study

“Amazing, highly reproducible ion-channel data.”
“We love it!”

INTRODUCTION

Traditional cardiomyocyte depolarization assays have long stood as a bottleneck to progress in the landscape of scientific research. Their slowness, susceptibility to noise, substantial costs, and demand for specialized expertise have collectively hindered the pace of drug discovery. The pursuit of robust, high-throughput ion-channel assays for drug safety validation in human induced pluripotent stem cell (iPSC) derived cardiomyocytes has remained a daunting task. In the face of these challenges, a call for transformative innovation persists across the field. Accuracy and efficiency are urgently needed. It is within this context that Lumencor unveils a revolutionary new cardiomyocyte depolarization assay platform, redefining the landscape of drug safety screening.

Embrace VOLTA, a kinetic plate reader designed to elevate your pharmacological cardiac safety profiling. Step into a testing realm in which each data point unfolds a new chapter of knowledge, where light transcends boundaries, and where the future of scientific discovery is revealed. VOLTA implements all-optical assays for ion-channel function, leaving the physical limitations imposed by electrodes behind. In so doing, it transcends the inherent low throughput of manual patch-clamp assays and the impediment of obtaining stable high resistance seals that pervades automated patch-clamp (APC) platforms.

01

Key Outcome

“VOLTA is the workhorse of our pharmacology safety group for T-wave data.”

02

Key Outcome

“VOLTA data led us to a strong publication.”

03

Key Outcome

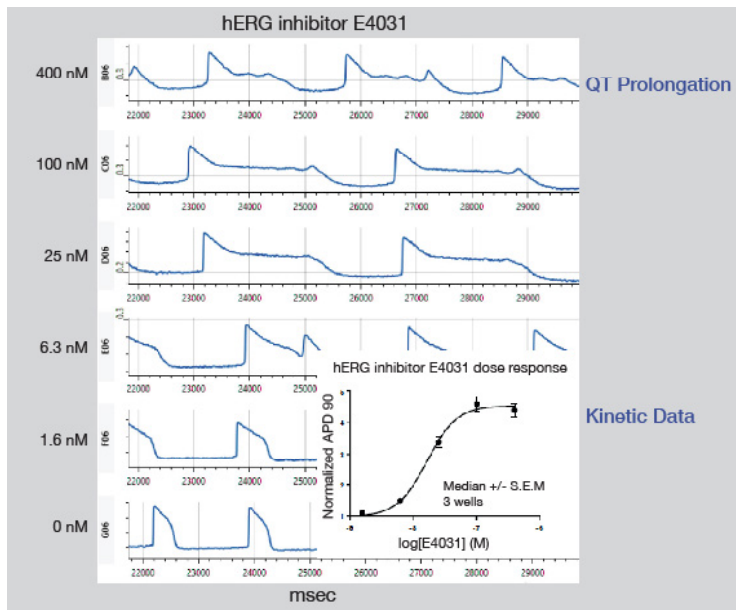
“Our group is making key decisions from data coming from VOLTA.”

THE CHALLENGE

In the realm of diabetes, respiratory diseases, inflammatory conditions, neurological disorders, and cardiovascular ailments, the pursuit of effective ion-channel targets is paramount. However, the intricacies of measuring ion-channel activity have presented formidable challenges. Demands for high-throughput (HT) approaches to ion-channel investigations led to the emergence of Automated Patch Clamping. Yet, while this innovation has accelerated research, instrumentation has often left researchers grappling with issues of detail, stability, and reproducibility.

Lumencor’s revolutionary VOLTA introduces a paradigm shift by employing an all optical, rather than electrical, ion-channel assay for high-throughput screening.

The technology allows for the simultaneous observation of cellular function with sub-millisecond resolution across 96- and 384- well microplates. The heart of VOLTA lies in its ability to initiate kinetic assays of cellular activity. As the ion channel responds, its manifestations unfold as intricate changes in fluorescence-detected transmembrane voltage patterns. These patterns serve as a direct representation of drug concentrations/well, ushering in a new era of analytical precision.



THE SOLUTION

VOLTA is an optical platform with parallel photometric detection. It houses a meticulously designed ensemble of assay-specific hardware, including a tailor-made Light Engine, scan head boasting a motorized stage, carefully selected fluorescent probes, seamlessly integrated computer, and user-friendly software.

VOLTA simultaneously scans 96 wells, rapidly extracting valuable insights. Precision in data acquisition begins with synchronized well illumination. **VOLTA isn't just about capturing data—it's about capturing it flawlessly and swiftly.** With its remarkable 10 kHz sampling rate, ion-channel activity is recorded with high temporal resolution.

VOLTA hosts two lasers: one for stimulation (462 nm), another for voltage-sensitive dye readout (660 nm.) It's engineered to synchronize cellular activity as well as monitor sensitive fluorescence detection. Whether your assay implements simultaneously pulsing cells or depends on optically pulsed initiation, VOLTA's lens array guides and shapes light beams with unmatched precision. Each well receives targeted illumination, ensuring no detail eludes interrogation.

THE RESULTS



180 well plates / hour
All wells read in parallel

Typically 20sec scan duration for 96 well plate.



50% cost AND best in class data
Highly reproducible ion-channel data

No other ion-channel platform offers VOLTA's robust, high-speed performance at half the price.

THE FUTURE

Despite two decades of automated patch clamp (APC) technology, a high throughput screening (HTS) solution for ion-channel drug discovery is painfully absent. The demand for robustness, reproducibility, speed and value grows stronger.

In response to this demand, the VOLTA is a kinetic ion-channel assay platform poised to deliver high throughput with best-in-class reproducibility and precision. This all-optical solution truly is a beacon of progress. In an assay environment traditionally governed by electronics, VOLTA changes the narrative. It ushers in light as the innovative transduction approach for heightened consistency, unparalleled control, and rapid responses. VOLTA facilitates scientific discovery empowering every user with precision in an assay historically plagued with technical difficulties, irreproducibility and cost.

Embrace VOLTA's groundbreaking capabilities to elevate your research to new heights and illuminate the path to scientific revelation [here](#).

VOLTA is an optical solution

VOLTA is a complete optical solution for fast, stable ion-channel assays: scanner/reader, fluorophore, computer and software.

VOLTA offers value

Purchase at half the price of today's slower, less reproducible HTP platforms.

VOLTA is the future

Experience the power of light in unraveling the secrets of ion-channels.