***eLife’s* transparent reporting form**

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**Sample-size estimation**

* You should state whether an appropriate sample size was computed when the study was being designed
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* If no explicit power analysis was used, you should describe how you decided what sample (replicate) size (number) to use

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No explicit power analysis was used. Replicates and sample sizes were determined from previous experiments and published data using similar compounds.

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We have reported the number of cells (N) used in each experiment (this information is found in the figure legend for each figure).

**Statistical reporting**

* Statistical analysis methods should be described and justified
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We have described the statistical analyses and references to the p values used in this manuscript in the Methods section. The specific statistics (ie mean ± SEM), n number are found in the figure legends. P values are reported in Summary Table 1 and found within the text in the Results Section.

(For large datasets, or papers with a very large number of statistical tests, you may upload a single table file with tests, Ns, etc., with reference to sections in the manuscript.)

**Group allocation**

* Indicate how samples were allocated into experimental groups (in the case of clinical studies, please specify allocation to treatment method); if randomization was used, please also state if restricted randomization was applied
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Data is grouped by the specific compound tested and the ion channel it is being applied to. Data is represented accordingly in the Results Section.

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Please indicate the figures or tables for which source data files have been provided:

Source data for figures 4-10 have been uploaded as Source data in table format, linked to the corresponding figure.

MATLAB code used in cardiomyocyte simulations is published (O’Hara, T., Virag, L., and Rudy, Y. 2011. Simulation of the undiseased human cardiac ventricular action potential: model formulation and experimental validation. *PLoS Computational Biology*. (doi: 10.1371/journal.pcbi.1002061))

This paper is referenced in the Methods Section and the corresponding Results Section.