Supplementary Material

Movie Legends

Movie 1. Termination of $I_{Ca,L}$-mediated reentry by slow activation of I_{KATP} over 5 minutes (first 90 s shown). A stable $I_{Ca,L}$-mediated spiral wave is initially present in the center of heterogeneous bi-excitable tissue (4.5 x 4.5 cm), with intermittent I_{Na}-mediated wavefronts appearing in the periphery, as indicated by the transient rapidly-conducting bulges along the spiral arm. Slow I_{KATP} activation gradually converts the stable $I_{Ca,L}$-mediated spiral to a meandering $I_{Na,L}$-mediated spiral wave, which eventually terminates by collision with the tissue border (near 86,000 ms).

Movie 2. Conversion of $I_{Ca,L}$-mediated reentry to I_{Na}-mediated reentry by rapid activation of I_{KATP} over 50 ms. A stable $I_{Ca,L}$-mediated spiral wave is initially present in the center of heterogeneous bi-excitable tissue (4.5 x 4.5 cm), with intermittent I_{Na}-mediated wavefronts appearing in the periphery, as indicated by the transient rapidly-conducting bulges along the spiral arm. Rapid I_{KATP} activation over 50 ms (beginning at 500 ms) rapidly shortens APD and converts the stable $I_{Ca,L}$-mediated spiral to a stable $I_{Na,L}$-mediated spiral wave.

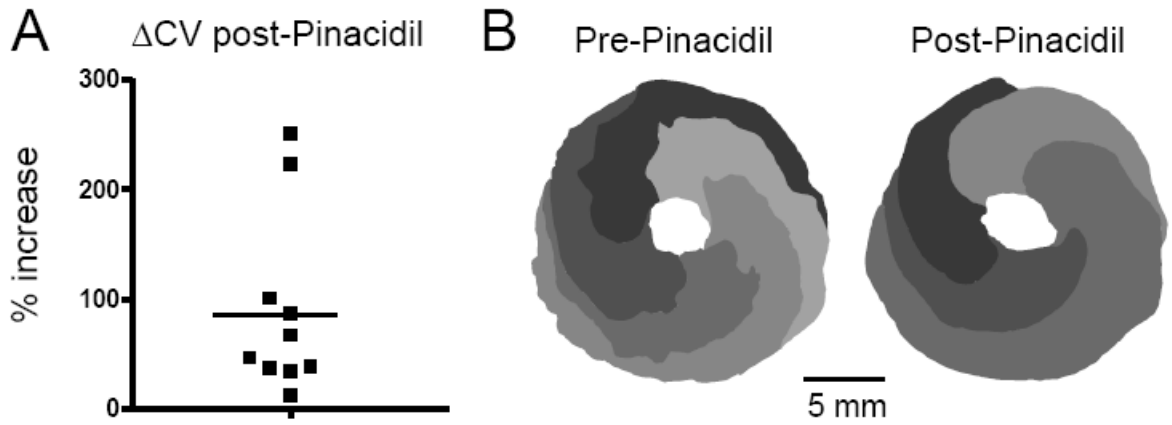

Figure 6. Effects of pinacidil on conduction velocity of EAD-mediated reentry around a central obstacle in NRVM monolayers. **A.** The percent increase in conduction velocity after pinacidil in 10 monolayers (solid squares) in which BayK4688 + isoproterenol induced sustained reentry around a central obstacle. Mean increase is indicated by the horizontal bar. **B**. Isochrome map during reentry in a representative monolayer, pre- and post-pinacidil treatment. Increased spacing between 80 ms isochrome lines post-pinacidil reflects increased conduction velocity.

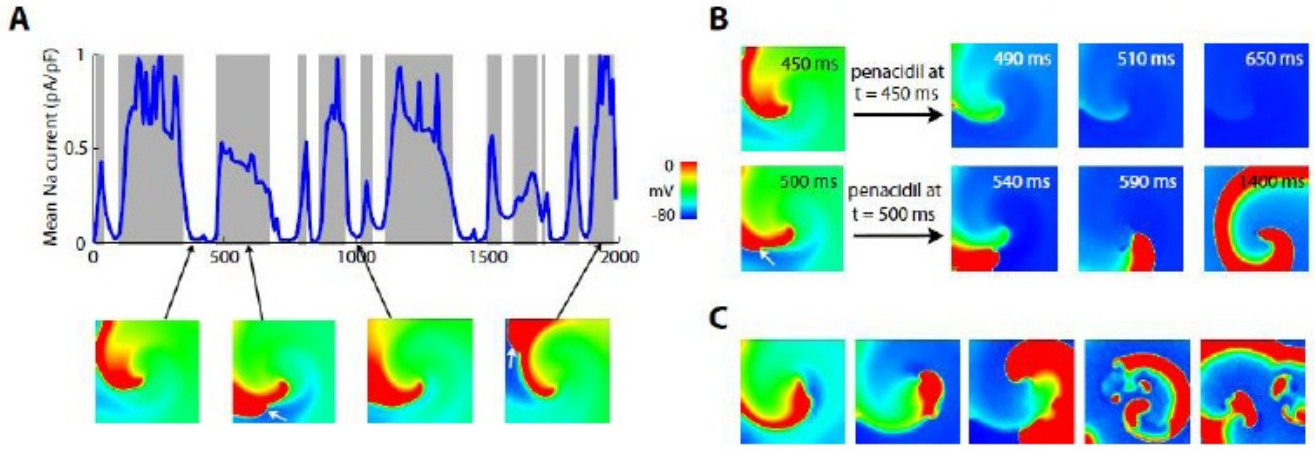

Figure 7. Effect of I_{KATP} activation on $I_{Ca,L}$-mediated reentry in simulated 2D heterogeneous cardiac tissue (300 x 300 myocytes). **A**. Outcomes of rapidly activating I_{KATP} at various time points during reentry driven by an $I_{Ca,L}$-mediated rotor in the center of the tissue. Grey zones indicate that $I_{Ca,L}$-mediated reentry converted to I_{Na}-mediated reentry after I_{KATP} activation, white zones that reentry terminated. The blue line shows I_{Na} amplitude averaged over all cells in the tissue over time. I_{KATP} activation terminated reentry only if no significant I_{Na}-mediated wavefronts were present. Voltage snapshots (below) show the $I_{Ca,L}$-mediated rotor in the center of the tissue, with I_{Na}-mediated wavefronts intermittently present along the spiral arm (2^{nd} and 4^{th} panels, white arrows). **B**. Voltage snapshots showing termination of reentry by I_{KATP} activation at t=450 ms (top row), but conversion to I_{Na}-mediated reentry at t=500 ms (bottom row). **C**. When the number K_{ATP} channels was randomly varied from myocyte to myocyte (using a Gaussian distribution with mean 3.8 channels/μm^2 and standard deviation 2.0), I_{KATP} activation caused the stable $I_{Ca,L}$-mediated rotor to convert to an I_{Na}-mediated rotor, which then broke up into multi-wavelet VF.