Supplementary Materials

1 Expression of ion channel currents [12]

Fast Na$^+$ current (I$_{Na}$):

$$I_{Na} = G_{Na}m^3hj(V_m - E_{Na})$$

Equation 1

L-type Ca^{2+} current (I$_{CaL}$):

$$I_{CaL} = G_{CaL}dff_{Ca}4\frac{V_mF^2Ca_ie^{2V_mF/RT}-0.341Ca_o}{e^{2V_mF/RT}-1}$$

Equation 2

Transient outward current (I$_{to}$):

$$I_{to} = G_{to}rs(V_m - E_K)$$

Equation 3

Slow delayed rectifer current (I$_{Ks}$):

$$I_{Ks} = G_{Ks}x_s^2(V_m - E_{Ks})$$

Equation 4

Rapid delayed rectifier current (I$_{Kr}$):

$$I_{Kr} = G_{Kr}\sqrt{\frac{K_o}{5.4}}x_{r1}x_{r2}(V_m - E_K)$$

Equation 5

Inward rectifier K$^+$ current (I$_{K1}$):

$$I_{K1} = G_{K1}\sqrt{\frac{K_o}{5.4}}x_{K1\infty}(V_m - E_K)$$

Equation 6

Plateau Ca$^+$ current

$$I_{pCa} = G_{pCa}\frac{Ca_i}{K_{pCa}+Ca_i}$$

Equation 7

Plateau K$^+$ current

$$I_{pK} = G_{pK}\frac{V_m-E_K}{1+e^{(25-V_m)/5.98}}$$

Equation 8

Background sodium and calcium leakage current

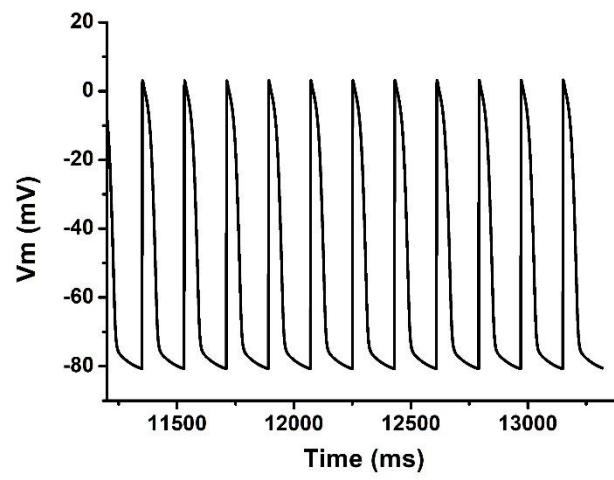$$I_{bNa} = G_{bNa}(V_m - E_{Na})$$ **Equation 9**
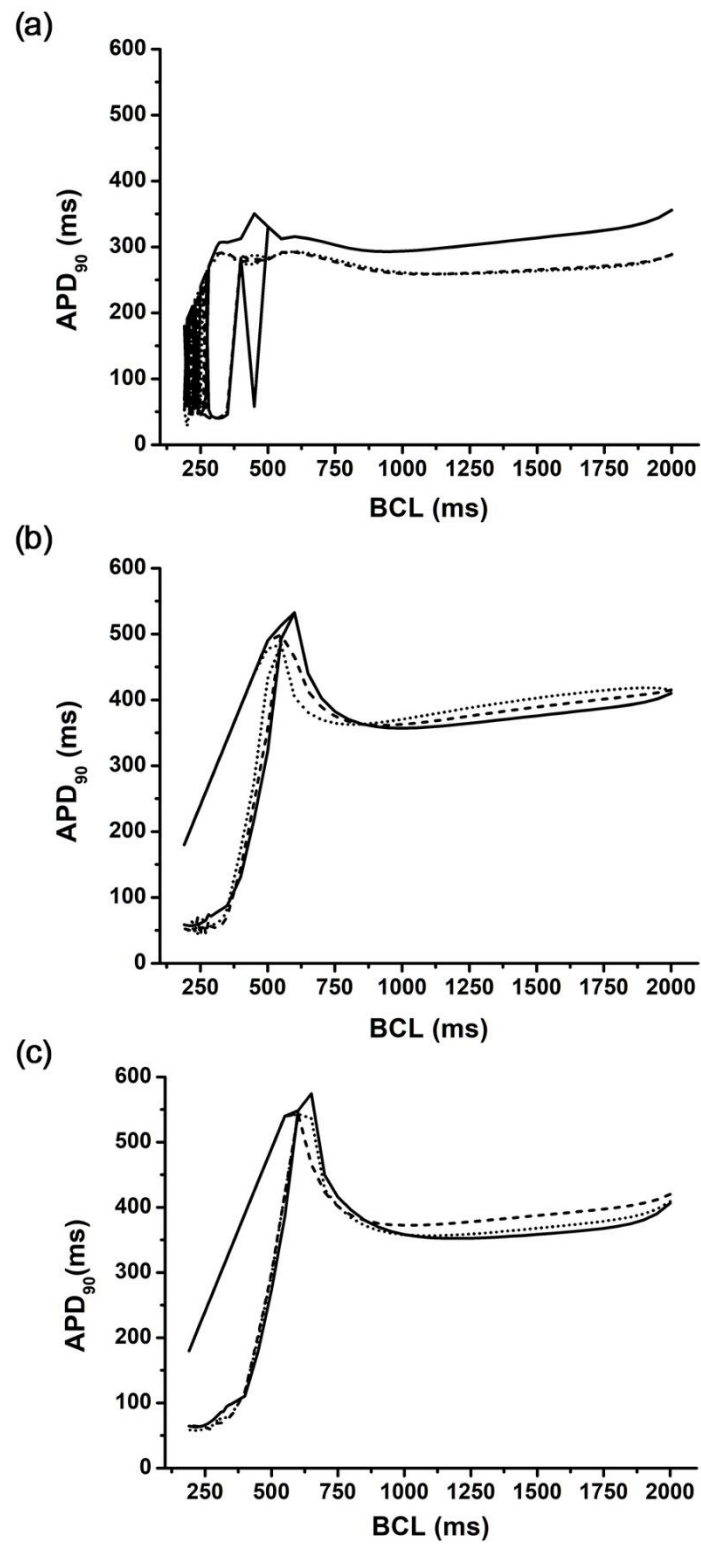
$$I_{bCa} = G_{bCa}(V_m - E_{Ca})$$ **Equation 10**

Reference

[12]. Ten Tusscher, K.H.W.J., A model for human ventricular tissue. *AJP Hear. Circ. Physiol.* 2004; Volume 286, Issue 4, pp. H1573–H1589.
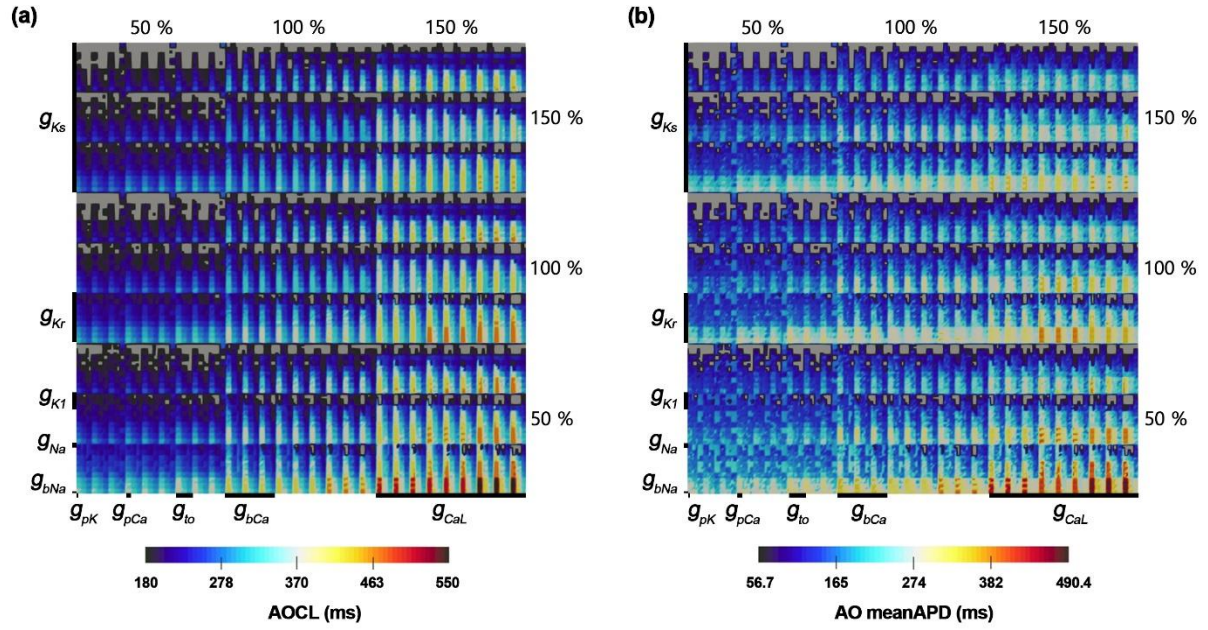
Supplementary Figures

Supplementary Figure S 1. Representative action potential trace under the no alternans condition

Supplementary Figure S 2. APDr curve in the cases that APD alternans occur under the resting cycle length condition; (a), AOCL = 450 ms; (b), AOCL= 500ms; (c), AOCL =550 ms

Supplementary Figure S 3. Unoptimized population maps of AOCL (a) and alternans onset mean APD (b); AOCL, alternans onset cycle length; APD, action potential duration; Gray parts represent no APD alternans scenarios.