Supp. Table S1. Post-hoc analysis of the ANOVA statistics for Figure 2: Immunoblot

B. Total hERG Protein		
ANOVA P value	p= 0.7548	
Post-Hoc Analysis	WT hERG v. 50/50 Mix	NS
	WT hERG v. p. Asp219Val	NS
	50/50 Mix v. p Asp.219Val	NS
C. Mature/Immature hERG Protein Ratio		
ANOVA P value	p= 0.8808	
Post-Hoc Analysis	WT hERG v. 50/50 Mix	NS
	WT hERG v. p. Asp219Val	NS
	50/50 Mix v. p Asp.219Val	NS

These analyses demonstrate that none of the differences between the WT hERG, 50/50 mix or p. Asp219Val hERG protein on immunoblot are significant, either for **B)** total protein or **C)** ratio of mature to immature hERG.

Supp. Table S2. Post-hoc analysis of the ANOVA statistics for Figure 3: Activation

B. Normalized Current Density		
ANOVA P value	p= 0.2078	
Post-Hoc Analysis	WT hERG v. 50/50 Mix	NS
	WT hERG v. p. Asp219Val	NS
	50/50 Mix v. p Asp.219Val	NS
D.Voltage Dependence of Activation		
ANOVA P value	p <0.001	
Post-Hoc Analysis	WT hERG v. 50/50 Mix	p <0.05
	WT hERG v. p. Asp219Val	p <0.001
	50/50 Mix v. p Asp.219Val	p <0.001

B) These analyses demonstrate that none of the differences between the current densities for WT hERG, 50/50 mix or p. Asp219Val hERG protein are significant. **D)** This post-hoc analysis demonstrates that the differences between the $V_{1/2}$ for the WT, 50/50 mix or p. Asp219Val hERG in their voltage dependence of activation are all significant.

Supp. Table S3. Post-hoc analysis of the ANOVA statistics for Figure 4: Inactivation

A. Steady State Inactivation			***C. Recovery from Inactivation***		
ANOVA P value	p <0.001		ANOVA	Voltage (mV)	ANOVA p Value
Post-Hoc Analysis	WT hERG v. 50/50 Mix	p <0.001		-60	p <0.05
	WT hERG v. p. Asp219Val	p <0.001		-50	p <0.001
	50/50 Mix v. p Asp.219Val	NS		-40	p <0.001
				-30	p <0.001
B. Onset of Inactivation					
ANOVA	Voltage (mV)	ANOVA p Value	WT hERG v. 50/50 Mix	Voltage (mV)	
	-20	NS		-60	p <0.05
	-10	NS		-50	p <0.001
	0	NS		-40	p <0.001
	10	NS		-30	p <0.001
	20	NS			
	30	NS	WT hERG v. p. Asp219Val	Voltage (mV)	
	40	NS		-60	p <0.05
	50	p <0.05		-50	p <0.001
	60	p <0.05		-40	p <0.001
	70	NS		-30	NS
Post-Hoc Analysis					
			50/50 Mix v. p Asp.219Val	Voltage (mV)	
WT hERG v. 50/50 Mix	Voltage (mV)			-60	NS
	-20	NS		-50	NS
	-10	NS		-40	p <0.001
	0	NS		-30	p <0.001
	10	NS			
	20	NS			
	30	NS			
	40	NS			
	50	p <0.05			
	60	p <0.05			

	70	NS
WT hERG v. p. Asp219Val	Voltage (mV)	
	-20	NS
	-10	NS
	0	NS
	10	NS
	20	NS
	30	NS
	40	NS
	50	NS
	60	NS
	70	NS
50/50 Mix v. p Asp.219Val	Voltage (mV)	
	-20	NS
	-10	NS
	0	NS
	10	NS
	20	NS
	30	NS
	40	NS
	50	NS
	60	NS
	70	NS

A) These analyses demonstrate that the differences between the steady state inactivation $V_{1/2}$ for WT hERG and 50/50 mix, as well as WT hERG and p. Asp219Val hERG protein are significant, while the differences between 50/50 mix and p. Asp219Val hERG are not significant. **B)** This post-hoc analysis demonstrates that the differences between the onsets of inactivation for the WT and 50/50 mix as well as WT hERG and p. Asp219Val hERG are significant at voltages -50mV and -60 mV, while the differences between 50/50 mix and p. Asp219Val hERG are not significant. **C)** This post-hoc analysis demonstrates that the differences between the WT and 50/50 mix in recovery from inactivation are significant at all voltages tested. The differences in WT hERG and p. Asp219Val hERG in recovery from inactivation are significant at voltages -60mV- -40 mV, and the differences between 50/50 mix and p. Asp219Val hERG are significant at -40mV and -30 mV.

Supp. Table S4. Post-hoc analysis of the ANOVA statistics for Figure 5: Deactivation

B. Deactivation Time Constants			***C. Ratio of Tau Fast to Total Deactivation Time***		
Tau Slow			ANOVA	Voltage (mV)	ANOVA p Value
ANOVA	Voltage (mV)	ANOVA p Value		-100	NS
	-100	NS		-90	NS
	-90	NS		-80	NS
	-80	NS		-70	p <0.001
	-70	NS		-60	p <0.05
	-60	NS		-50	p <0.001
	-50	NS		-40	p <0.001
	-40	NS			
			Post-Hoc Analysis		
Post-Hoc Analysis					
			WT hERG v. 50/50 Mix	Voltage (mV)	
WT hERG v. 50/50 Mix	Voltage (mV)			-100	NS
	-100	NS		-90	NS
	-90	NS		-80	NS
	-80	NS		-70	p <0.001
	-70	NS		-60	NS
	-60	NS		-50	p <0.001
	-50	NS		-40	p <0.001
	-40	NS	WT hERG v. p. Asp219Val	Voltage (mV)	
WT hERG v. p. Asp219Val	Voltage (mV)			-100	NS
	-100	NS		-90	NS
	-90	NS		-80	NS
	-80	NS		-70	p <0.001
	-70	NS		-60	p <0.001
	-60	NS		-50	p <0.001
	-50	NS		-40	p <0.001
	-40	NS	50/50 Mix v. p Asp.219Val	Voltage (mV)	

50/50 Mix v. p Asp.219Val	Voltage (mV)			-100	NS
	-100	NS		-90	NS
	-90	NS		-80	NS
	-80	NS		-70	NS
	-70	NS		-60	NS
	-60	NS		-50	p <0.001
	-50	NS		-40	NS
	-40	NS			
Tau Fast					
ANOVA	Voltage (mV)	ANOVA p Value			
	-100	NS			
	-90	p <0.001			
	-80	p <0.001			
	-70	p <0.001			
	-60	p <0.001			
	-50	p <0.001			
	-40	p <0.001			
Post-Hoc Analysis					
WT hERG v. 50/50 Mix	Voltage (mV)				
	-100	NS			
	-90	p <0.001			
	-80	p <0.001			
	-70	p <0.001			
	-60	p <0.001			
	-50	p <0.001			
	-40	p <0.001			
WT hERG v. p. Asp219Val	Voltage (mV)				
	-100	NS			
	-90	p <0.001			
	-80	p <0.001			
	-70	p <0.001			
	-60	p <0.001			
	-50	p <0.001			
	-40	p <0.001			

50/50 Mix v. p Asp.219Val	Voltage (mV)	
	-100	NS
	-90	NS
	-80	NS
	-70	NS
	-60	NS
	-50	NS
	-40	NS

B) These analyses demonstrate that none of the differences in the Tau Slow time constant for WT hERG, 50/50 mix, and p. Asp219Val hERG protein are significant at any voltage. This post-hoc testing does demonstrate significant differences in the Tau Fast time constant between WT hERG and 50/50 mix at voltages -90 mV - -40 mV, as well as significant differences between the WT hERG and p. Asp219Val hERG at voltages -90mV - -40mV. There is not a significant difference in Tau Fast time constants between 50/50 Mix and p. Asp219Val hERG. **C)** Post-hoc analysis demonstrates that the differences between ratios of Tau Fast to total deactivation time is significant at voltages -70- -40 mV. These differences are significant between WT hERG and 50/50 mix at -70 mV, -50 mV and -40 mV, between WT hERG and p. Asp219Val from -70 mV- -40mV and between 50/50 mix and p. Asp219Val at -50 mV.