

A

	Neomycin IC ₅₀ (μM), p value	Neomycin Hill coefficient
KCNQ2(wt)	211 ± 26	1.8 ± 0.4
KCNQ2(S541A)	229 ± 16, p > 0.05	1.7 ± 0.2
KCNQ2(S541D)	109 ± 4, p < 0.001	1.7 ± 0.1
KCNQ2(R353G)	109 ± 6, p < 0.001	1.3 ± 0.1
KCNQ2(S534D)	152 ± 20, p=0.075	1.6 ± 0.3

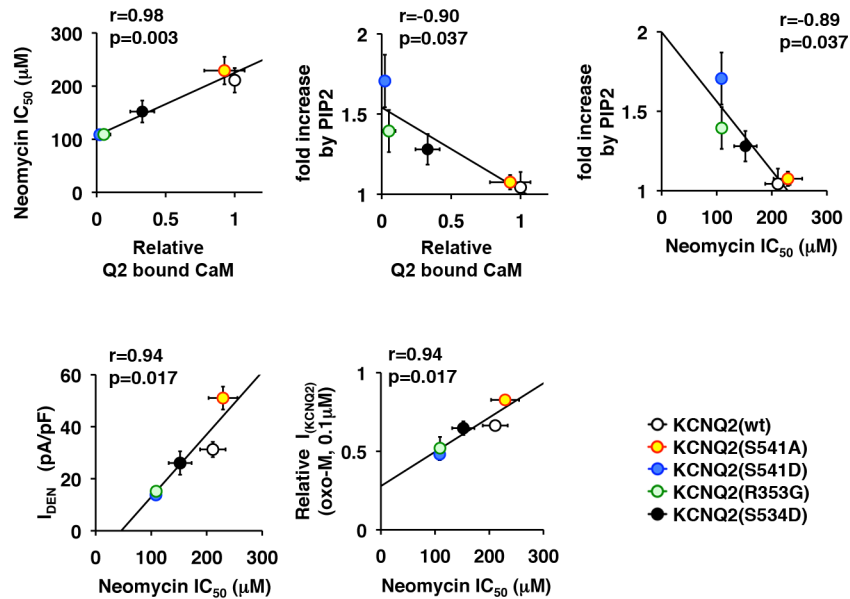
B

Figure S1. Strong correlation among KCNQ2 bound calmodulin and PIP2 related parameters.

A) Summary of fitted values shown in Fig. 4. Neomycin IC₅₀ and Hill coefficients are indicated. Two-tailed P values of t-test against KCNQ2(wt) using these fitted variables are indicated.

B) Scatter plots using quantified values shown in fig. 1d (KCNQ2 current at t = 1 min), fig. 1e (current density), fig. 2a (KCNQ2 bound calmodulin), fig. 4e and h (neomycin IC₅₀), fig. 4f (diC8-PIP2 induced augmentation) and corresponding results using KCNQ2 (R353G) and KCNQ2 (S534D) are plotted with various combinations. Correlation coefficients (r) and p values are shown. These plots show significant correlations between calmodulin binding, neomycin IC₅₀ and PIP2 related parameters.

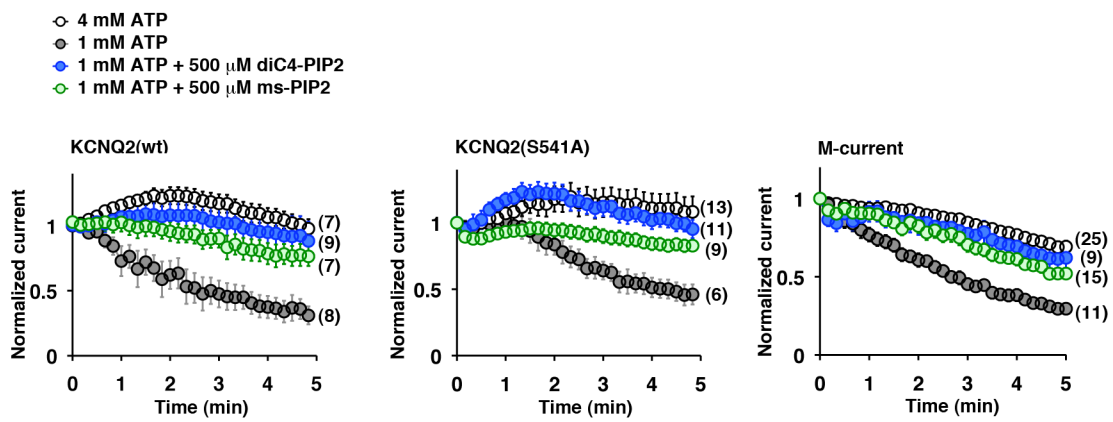


Figure S2. Rundowns of KCNQ2 (wt), KCNQ2(S541A) currents and the M-currents from SCG neurons.

The KCNQ2 channel showed severe rundown in the presence of 1 mM ATP, which was prevented either by 4 mM ATP, diC4-PIP2, or ms-PIP2. The M-current from SCG (right panel) showed similar rundown when recorded with whole-cell patch clamp technique. This run down is attenuated by, 4 mM ATP, diC4-PIP2, or ms-PIP2 .