SUPPLEMENTAL MATERIAL

Supplemental text

How to derive the relationship between τ_o and $\tau_{o,\,obs}$?

If the pdf (probability density function) of the closed times is a single-exponential pdf represented by the equation: $f(t)=(1/\tau_{c1})*\exp(-t/\tau_{c1})$, the fraction of all closed events shorter than the filter dead time (t_d) is $P(t\leq t_d) = 1-\exp(-t_d/\tau_{c1})$. Since >95% of all closed events belongs to the first component, we can make the approximation $P(t\leq t_d) \approx 1-\exp(-t_d/\tau_{c1})$ even for our 4-exponential closed-time distribution. This fraction of closed events will not be detected; we will only detect the fraction of events longer than the filter dead time, given by $P(t>t_d) = \exp(-t_d/\tau_{c1})$. Therefore, our apparent overall closing rate (koc_{obs}) will be slower than the real overall closing rate koc_{real} (= ko1+ko2). The relationship is $koc_{obs} = koc_{real}*P(t>t_d)$, because koc is proportional to the number of closures and we can only detect a fraction $P(t>t_d)$ of all closures. Therefore, $koc_{obs} = koc_{real}*\exp(-t_d/\tau_{c1})$. Because $\tau_{o,obs} = 1/\ koc_{obs}$ and $\tau_{o,real}=1/koc_{real}$, we can write $\tau_{o,real} = \tau_{o,obs} *\exp(-t_d/\tau_{c1})$. In our article τ_o stands for $\tau_{o,real}$.

Figure legends

Figure S1. Bar charts comparing various selected single-channel parameters for the SUR and TMD0 channels obtained at -40 mV.
Statistical significance was calculated using an unpaired Student *t*-test and significant differences were found for the pairs of parameters marked by brackets (** for $p<0.05$).

Figure S2. Bar charts comparing various selected single-channel parameters for the SUR and TMD0 channels obtained at -100 mV.
Statistical significance was calculated using an unpaired Student *t*-test and significant differences were found for the pairs of parameters marked by brackets (** for $p<0.05$).

Figure S3. No detectable voltage dependence of ATP inhibition.
A. Time course of a macroscopic current in response to different ATP concentrations at two membrane potentials. Current was recorded from a macropatch expressing SUR2A/Kir6.2Δ26 in the inside-out configuraton. The same patch was exposed to a series of [ATP] *(bars)* both at -100 and at -40 mV. B. ATP dose response curves at -100 and -40 mV are superimposable. There is no difference in the IC50 or the Hill coefficients obtained at the two membrane potentials.

TABLE S1

Number of SUR/Kir6.2Δ26 recordings whose closed times were best fitted with 3-5 exponentials*

		n_3	n_4	n_5	Total
SUR1	-40 mV	2 (17%)	4 (33%)	6 (50%)	12
	-100 mV	1 (8%)	5 (38%)	7 (54%)	13
SUR2A	-40 mV	4 (50%)	3 (38%)	1 (12%)	8
	-100 mV	4 (31%)	8 (61%)	1 (8%)	13
Overall		11 (24%)	20 (43%)	15 (33%)	46

*n_i denotes the number of recordings that could be best fitted with i exponentials. The percentages of n_i are in parentheses.

TABLE S2

Single channel parameters for chimera/Kir6.2Δ26 measured at -40 mV*

	Chimera 1	Chimera 2	Chimera 3	Chimera 4
γ (pS)	63.6 $\pm$ 3.8	60.3 $\pm$ 5.6	62.3 $\pm$ 2.5	65.3 $\pm$ 2.0
Po	0.80 $\pm$ 0.04	0.86 $\pm$ 0.02	0.84 $\pm$ 0.02	0.82 $\pm$ 0.03
τ_{c1} (ms)	0.23 $\pm$ 0.011	0.19 $\pm$ 0.001	0.19 $\pm$ 0.006	0.20 $\pm$ 0.006
τ_{c2} (ms)	2.24 $\pm$ 0.34	1.90 $\pm$ 0.26	2.42 $\pm$ 0.38	2.00 $\pm$ 2.78
τ_{c3} (ms)	13.03 $\pm$ 2.12	10.77 $\pm$ 0.82	17.42 $\pm$ 4.90	11.15 $\pm$ 0.88
τ_{c4} (ms)	1786 $\pm$ 649	2382 $\pm$ 1490	1828 $\pm$ 782	3918 $\pm$ 2078
a_{c1} (%)	98.24 $\pm$ 0.46	99.35 $\pm$ 0.07	99.09 $\pm$ 0.12	99.01 $\pm$ 0.32
a_{c2} (%)	1.15 $\pm$ 0.33	0.42 $\pm$ 0.06	0.58 $\pm$ 0.08	0.64 $\pm$ 0.15
a_{c3} (%)	0.59 $\pm$ 0.15	0.22 $\pm$ 0.04	0.32 $\pm$ 0.06	0.35 $\pm$ 0.17
a_{c4} (%)	0.011 $\pm$ 0.002	0.005 $\pm$ 0.001	0.010 $\pm$ 0.003	0.008 $\pm$ 0.003
τ_o (ms)	1.75 $\pm$ 0.05	1.72 $\pm$ 0.14	1.69 $\pm$ 0.04	1.75 $\pm$ 0.09
τ_{ib} (ms)	5.96 $\pm$ 0.91	4.89 $\pm$ 0.35	4.67 $\pm$ 0.36	6.63 $\pm$ 0.96
N	70.35 $\pm$ 20.46	160.51 $\pm$ 21.00	124.23 $\pm$ 20.24	124.63 $\pm$ 26.48
τ_b (ms)	140.37 $\pm$ 40.45	307.56 $\pm$ 48.47	234.55 $\pm$ 37.34	251.32 $\pm$ 58.43
n	4	4	4	7

* τ_{ci}, a_{ci}, τ_b, τ_{ib}, τ_o and N are defined in the Methods section; γ – single-channel conductance; Po – open probability; n – number of recordings used for the analyses; values are given in mean $\pm$ SEM

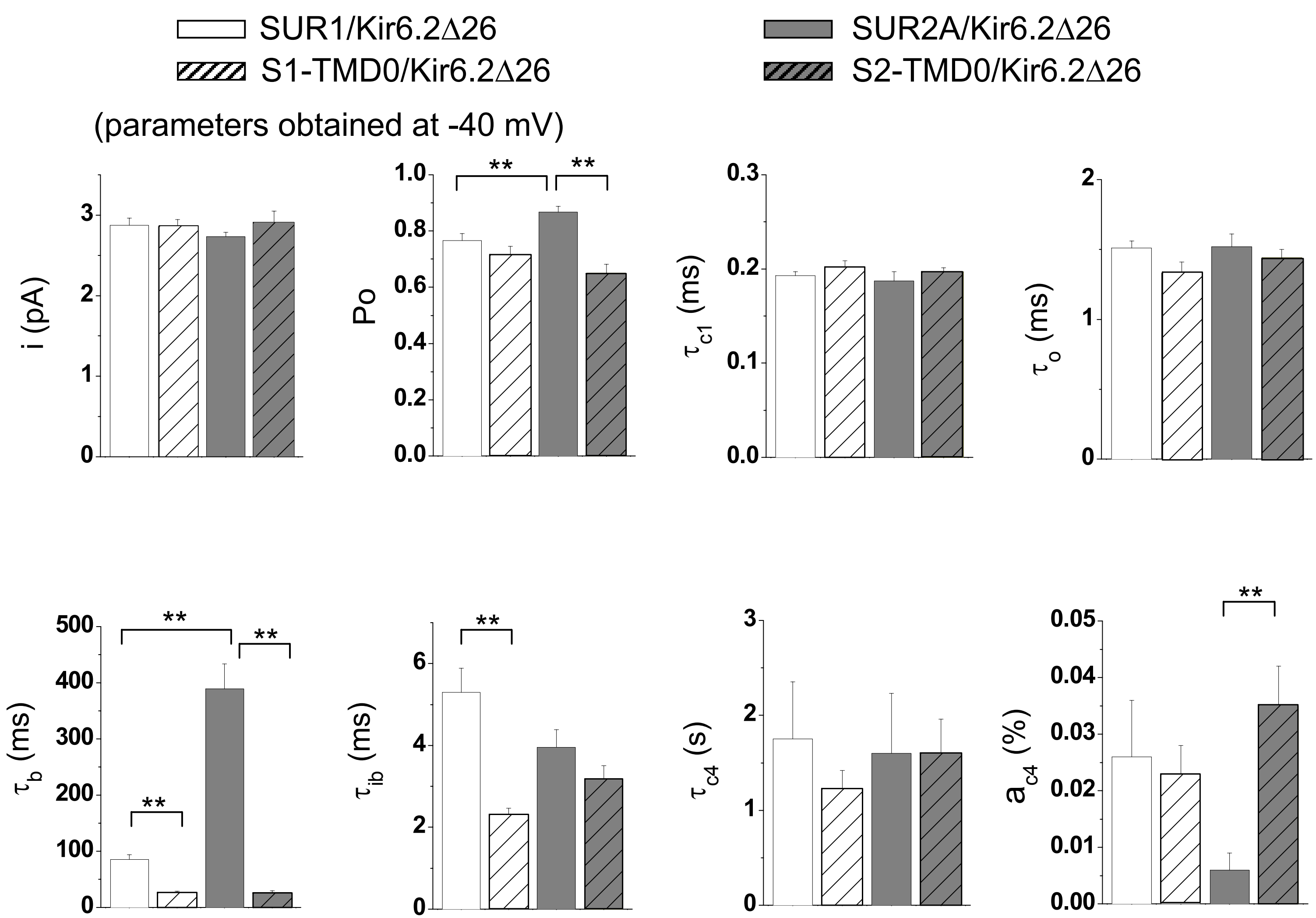
TABLE S3

Rate constants for studied channels (+ Kir6.2Δ26)*

	k_{43}	k_{34}	k_{32}	k_{23}	k_{2O}	k_{O2}	k_{O1}	k_{1O}
SUR1	***1.8 ± 0.6***	***4.0 ± 0.8***	***120.9 ± 7.6***	***86.8 ± 15.4***	***331.6 ± 27.2***	***13.1 ± 1.9***	***611.2 ± 19.9***	***5279 ± 99***
	(1.1 ± 0.2	0.6 ± 0.2	74.6 ± 5.5	55.0 ± 10.9	153.3 ± 11.3	29.4 ± 2.6	982.5 ± 25.2	3244 ± 69)
SUR2A	***4.2 ± 2.0***	***8.5 ± 4.0***	***135.3 ± 21.2***	***74.2 ± 8.9***	***372.6 ± 41.0***	***2.6 ± 0.4***	***630.6 ± 31.3***	***5452 ± 236***
	(1.2 ± 0.4	1.2 ± 0.5	90.7 ± 12.3	46.0 ± 11.7	127.2 ± 7.6	21.0 ± 2.4	1040 ± 22.8	3572 ± 89)
S1-TMD0	***1.1 ± 0.3***	***6.0 ± 1.1***	***123.6 ± 13.9***	***43.9 ± 4.1***	***595.3 ± 37.2***	***43.9 ± 5.4***	***643.6 ± 21.3***	***5062 ± 126***
	(1.1 ± 0.3	0.7 ± 0.2	75.6 ± 3.9	158.3 ± 22.4	443.3 ± 43.2	55.5 ± 3.6	878.1 ± 23.8	3342 ± 96)
S2-TMD0	***1.5 ± 0.5***	***5.2 ± 0.8***	***143.4 ± 12.1***	***71.3 ± 11.7***	***477.9 ± 31.5***	***40.8 ± 3.6***	***620.4 ± 23.6***	***5184 ± 88***
	(0.9 ± 0.2	1.0 ± 0.2	99.4 ± 6.47	133.7 ± 11.7	388.7 ± 32.0	58.5 ± 4.6	987.6 ± 28.5	3427 ± 74)
Chimera 1	***1.6 ± 1.0***	***3.7 ± 2.1***	***131.0 ± 33.5***	***115.2 ± 21.3***	***321.5 ± 29.8***	***9.0 ± 2.3***	***537.9 ± 26.0***	***4495 ± 191***
Chimera 2	***1.0 ± 0.3***	***3.8 ± 0.9***	***121.8 ± 20.4***	***109.5 ± 27.8***	***354.0 ± 46.3***	***3.2 ± 0.4***	***555.5 ± 49.6***	***5398 ± 44***
Chimera 3	***1.4 ± 0.4***	***4.6 ± 0.9***	***102.5 ± 19.2***	***78.1 ± 7.8***	***274.2 ± 21.9***	***4.3 ± 0.5***	***541.4 ± 14.7***	***5270 ± 146***
Chimera 4	***1.6 ± 1.1***	***3.2 ± 0.2***	***134.1 ± 24.3***	***96.3 ± 17.3***	***324.3 ± 20.2***	***5.2 ± 2.1***	***548.6 ± 30.5***	***5004 ± 144***
S2-TMD0-L0	***1.6 ± 0.4***	***8.2 ± 1.2***	***125.3 ± 9.2***	***66.22 ± 6.4***	***551.5 ± 32.6***	***21.8 ± 1.1***	***511.7 ± 6.8***	***4669 ± 62***

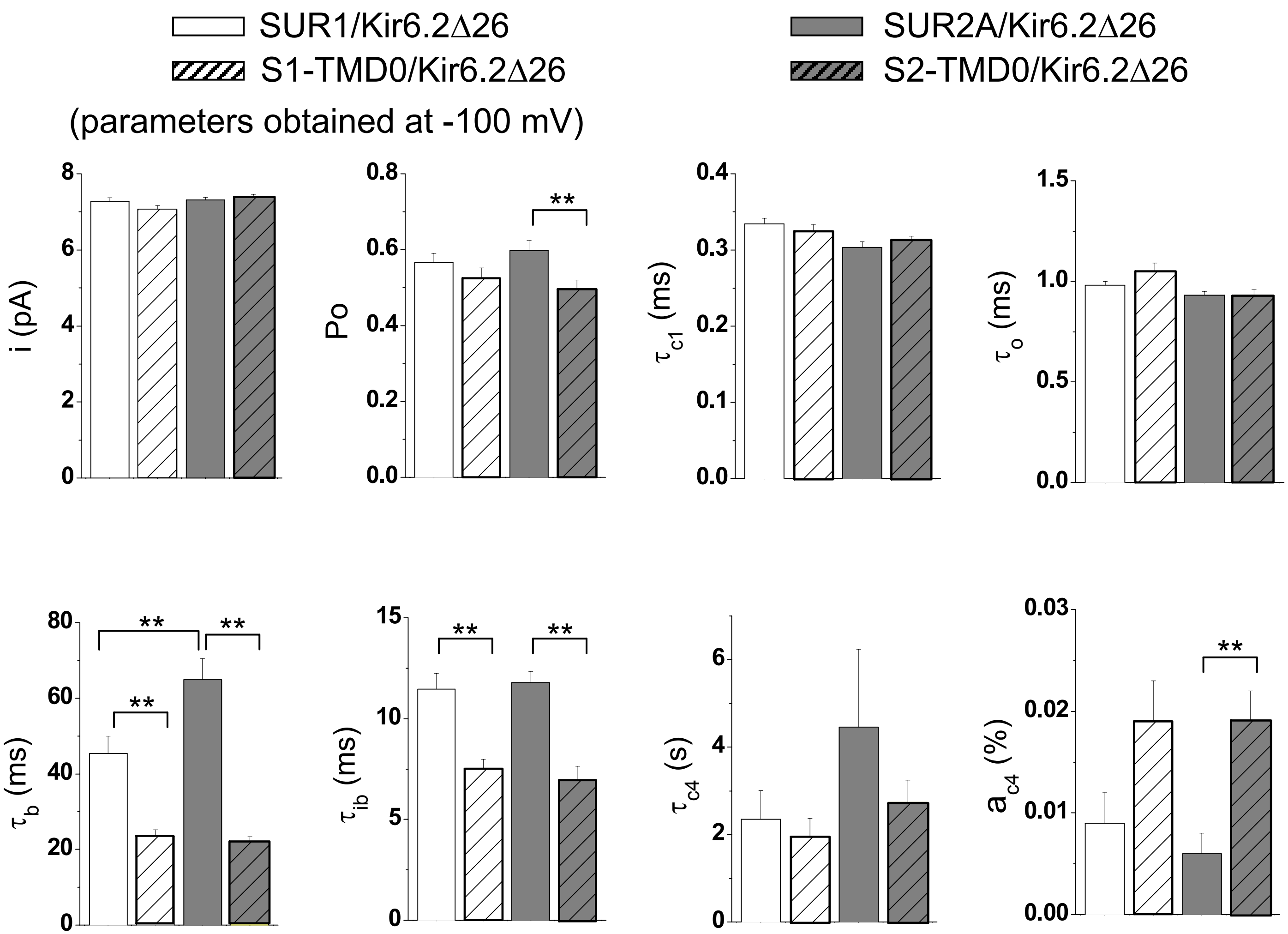
* rate constants obtained at -40 mV are bolded and italicized; rate constants obtained at -100 mV are in parentheses; values were given in mean ± SEM

FIGURE S1



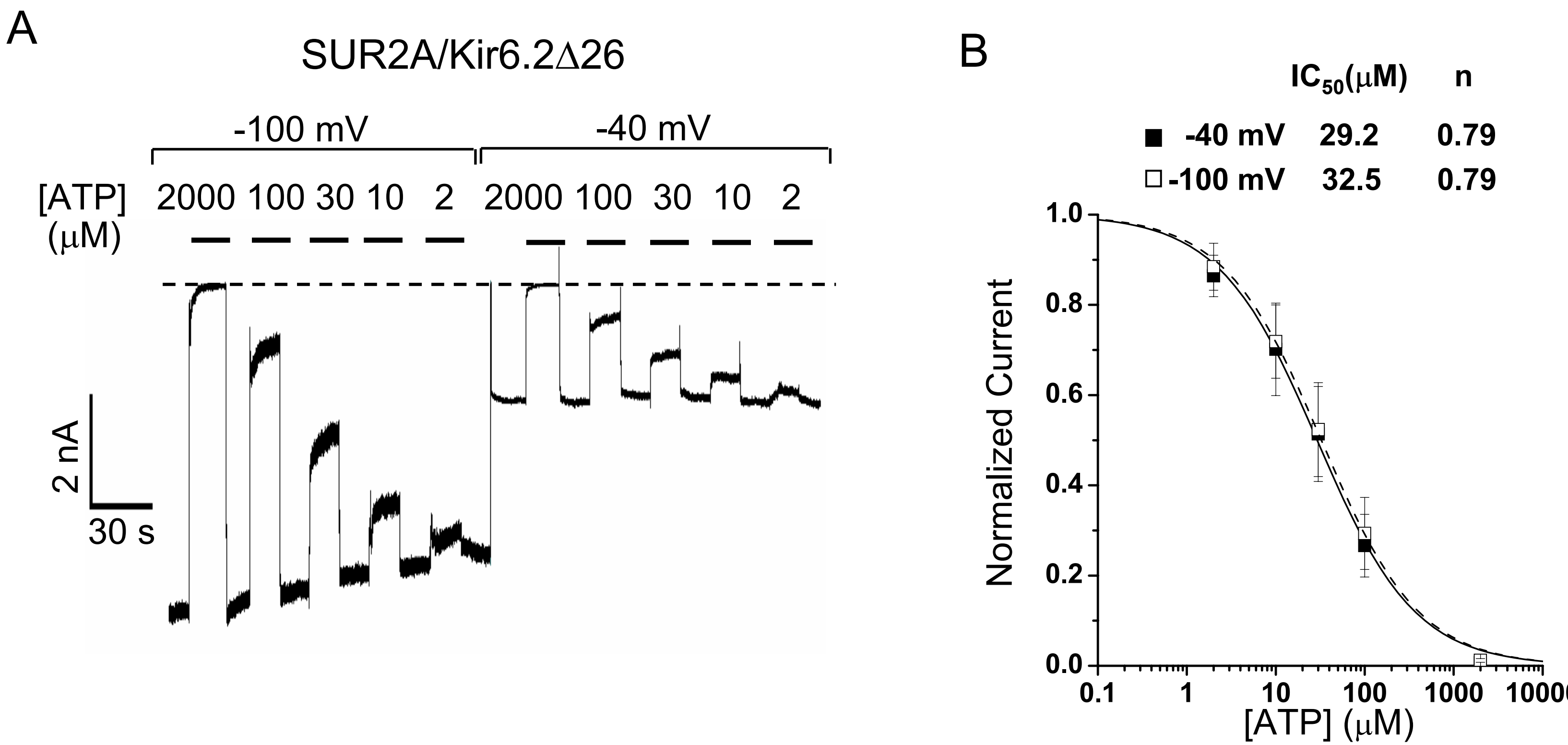
SUR1/Kir6.2Δ26
S1-TMD0/Kir6.2Δ26
SUR2A/Kir6.2Δ26
S2-TMD0/Kir6.2Δ26
(parameters obtained at -40 mV)
i (pA)
Po
τc1 (ms)
τo (ms)
τb (ms)
τib (ms)
τc4 (s)
ac4 (%)
**

FIGURE S2



SUR1/Kir6.2Δ26
S1-TMD0/Kir6.2Δ26
SUR2A/Kir6.2Δ26
S2-TMD0/Kir6.2Δ26
(parameters obtained at -100 mV)
i (pA)
Po
**
τc1 (ms)
τo (ms)
τb (ms)
τib (ms)
τc4 (s)
ac4 (%)

FIGURE S3


A
SUR2A/Kir6.2Δ26
-100 mV
-40 mV
[ATP] (μM)
2000 100 30 10 2
2000 100 30 10 2
2 nA
30 s
B
IC50(μM) n
-40 mV 29.2 0.79
-100 mV 32.5 0.79
Normalized Current
[ATP] (μM)
0.0
0.2
0.4
0.6
0.8
1.0
0.1
1
10
100
1000
10000