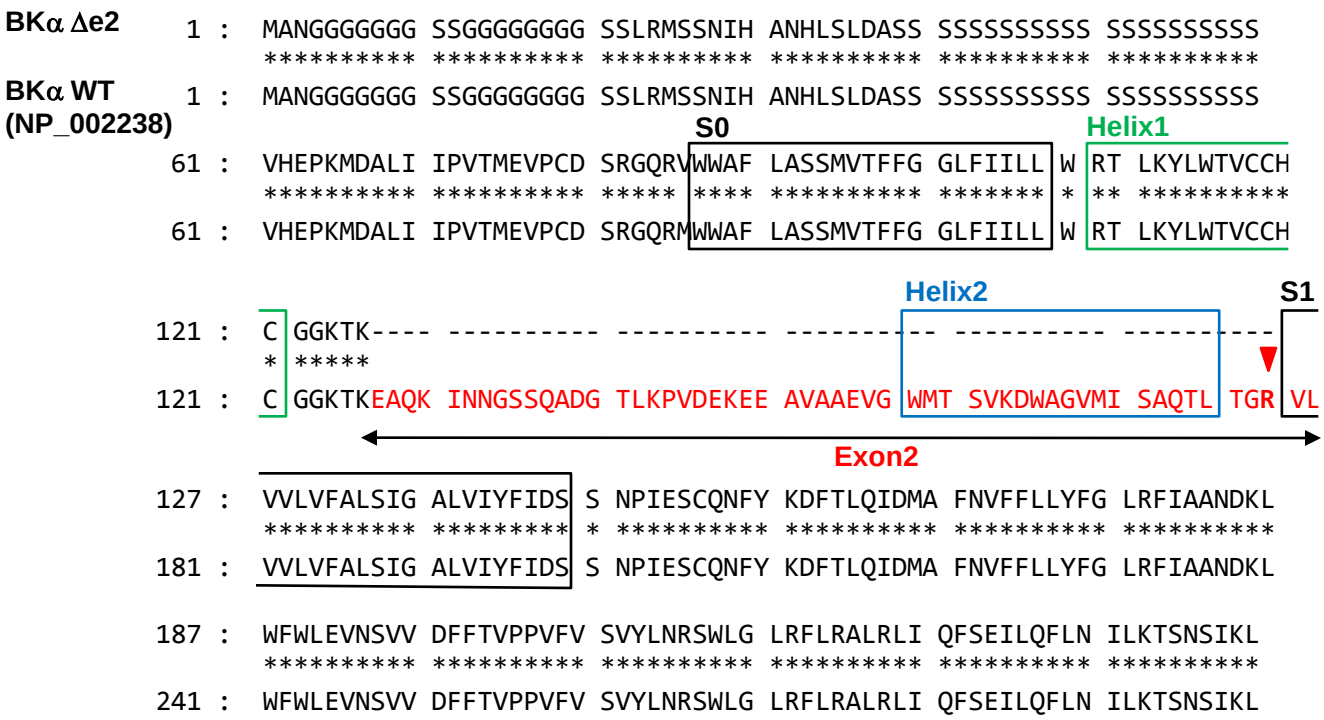
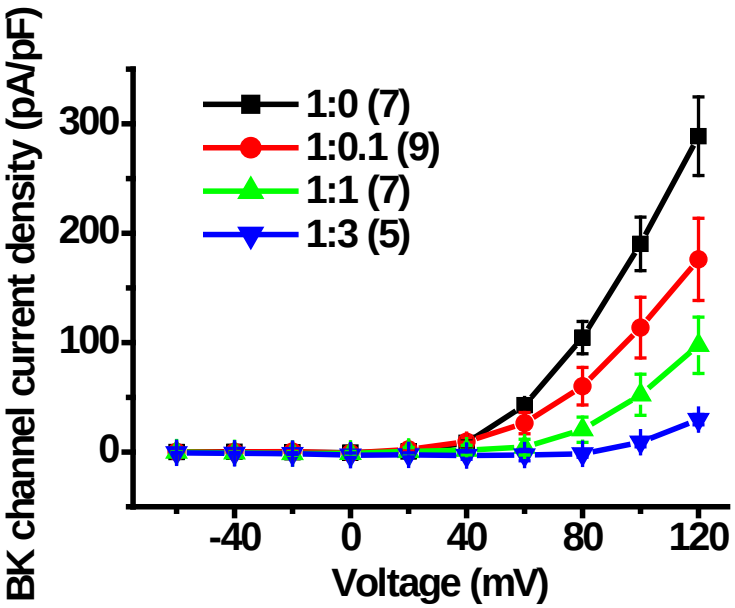
Fig. S1


BKα Δe2
BKα WT (NP_002238)
S0
Helix1
Helix2
S1
Exon2
1 : MANGGGGGGG SSGGGGGGGG SSLRMSSNIH ANHLSLDASS SSSSSSSSS SSSSSSSSS
61 : VHEPKMDALI IPVTMEVPCD SRGQRVWWAF LASSMVTFFG GLFIILLW RT LKYLWTVCCH
121 : CGGKTK---- ---------- ---------- ---------- ---------- ----------
121 : CGGKTKEAQK INNGSSQADG TLKPVDEKEE AVAAEVG WMT SVKDWAGVMI SAQTL TGR VL
127 : VVLVFALSIG ALVIYFIDS S NPIESCQNFY KDFTLQIDMA FNVFFLLYFG LRFIAANDKL
181 : VVLVFALSIG ALVIYFIDS S NPIESCQNFY KDFTLQIDMA FNVFFLLYFG LRFIAANDKL
187 : WFWLEVNSVV DFFTVPPVFV SVYLNRSWLG LRFLRALRLI QFSEILQFLN ILKTSNSIKL
241 : WFWLEVNSVV DFFTVPPVFV SVYLNRSWLG LRFLRALRLI QFSEILQFLN ILKTSNSIKL

A


BK channel current density (pA/pF)
300
200
100
0
1:0 (7)
1:0.1 (9)
1:1 (7)
1:3 (5)
-40
0
40
80
120
Voltage (mV)

B

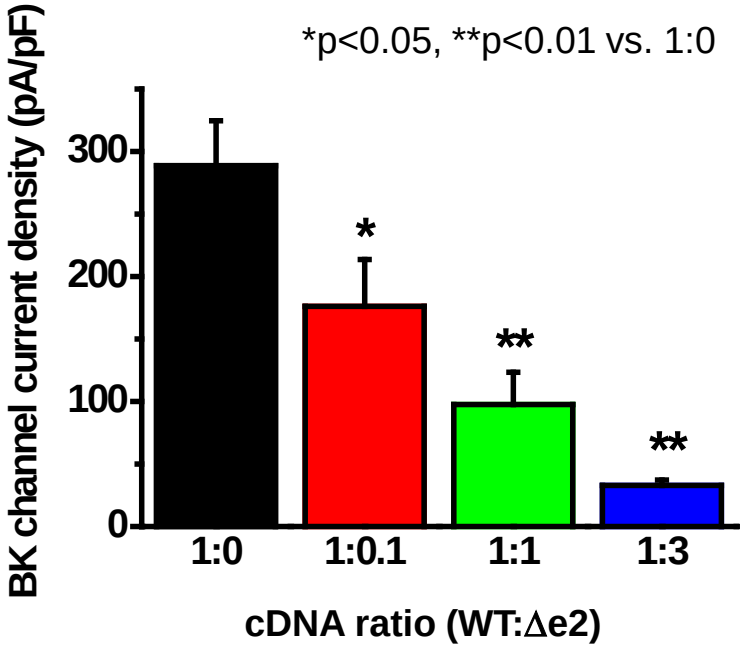

*p<0.05, **p<0.01 vs. 1:0
BK channel current density (pA/pF)
300
200
100
0
*
**
**
1:0
1:0.1
1:1
1:3
cDNA ratio (WT:Δe2)

Fig. S3

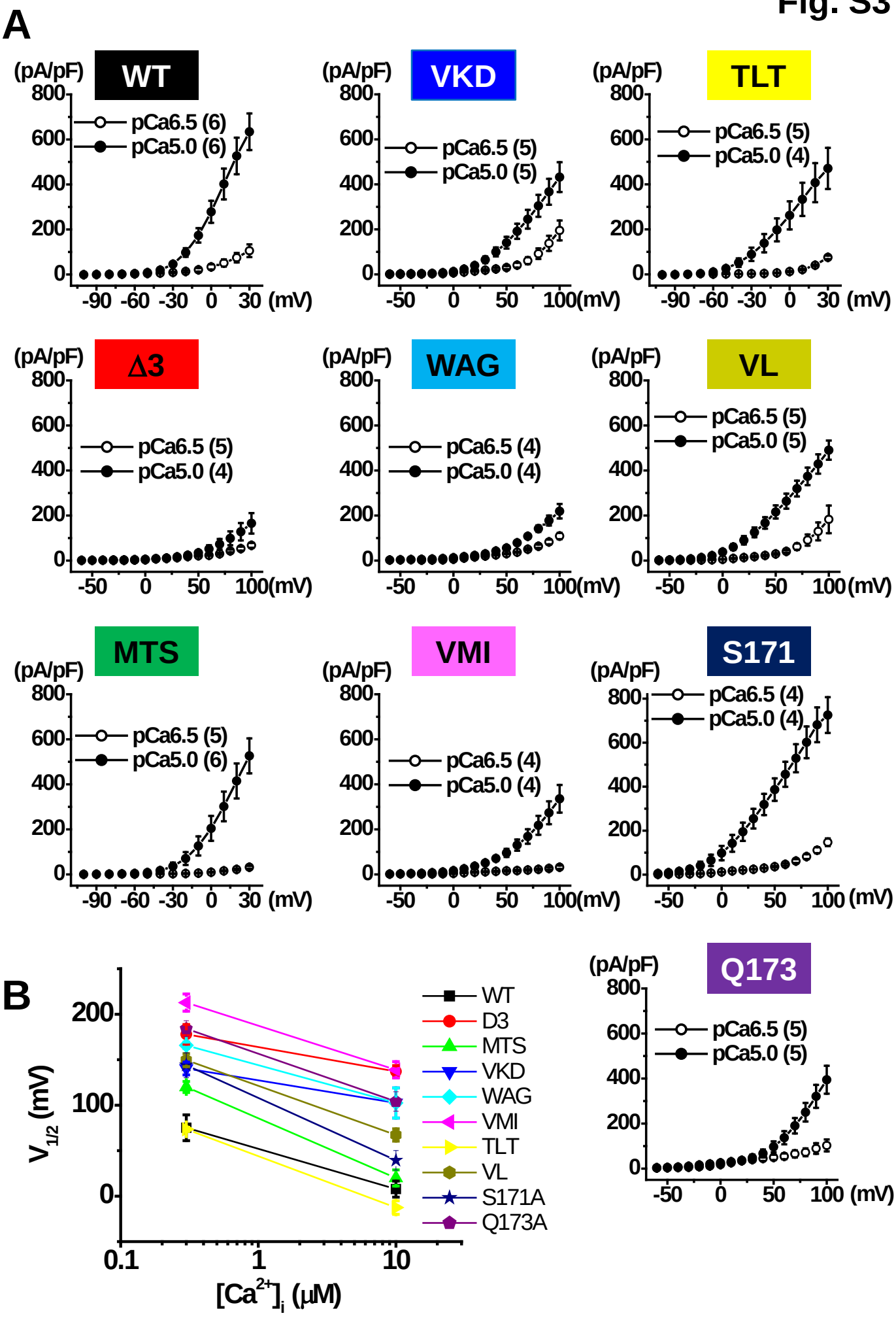

A
WT
pCa6.5 (6)
pCa5.0 (6)
VKD
pCa6.5 (5)
pCa5.0 (5)
TLT
pCa6.5 (5)
pCa5.0 (4)
Δ3
pCa6.5 (5)
pCa5.0 (4)
WAG
pCa6.5 (4)
pCa5.0 (4)
VL
pCa6.5 (5)
pCa5.0 (5)
MTS
pCa6.5 (5)
pCa5.0 (6)
VMI
pCa6.5 (4)
pCa5.0 (4)
S171
pCa6.5 (4)
pCa5.0 (4)
Q173
pCa6.5 (5)
pCa5.0 (5)
(pA/pF)
(mV)
B
V1/2 (mV)
[Ca2+]i (μM)
WT
D3
MTS
VKD
WAG
VMI
TLT
VL
S171A
Q173A

Table S1

For human BKαWT (NM_002247.3) (Q-PCR)	
hBKαWT_s653	TGACCTCCGTGAAGGACTGG
hBKαWT_a795	GCAGGATTCTATTGGGTTTGATG
For human BKαΔe2 (NM_001271518.1) (Q-PCR)	
hBKαΔe2_s542	GGGGCAAGACGAAGGTTG
hBKαΔe2_a634	GGCAGGATTCTATTGGGTTTG
For human BKαWT and BKαΔe2 (RT-PCR)	
hBKα_s479	GCCTCTTCATCATCTTGCTCTG
hBKα_a992	CTCAAACCAAGCCAACTTCTGT
For mouse BKαWT (NM_001253369.1) (Q-PCR)	
mBKαWT_s417	TACCTGTGGACCGTTTGCTG
mBKαWT_a540	CTGCCACCACCTCCTCTTTT
For mouse BKαΔe2 (NM_001253374.1) (Q-PCR)	
mBKαΔe2_s445	GGGGCAAGACGAAGGTTG
mBKαΔe2_a537	GGCAGGATTCTATTGGGTTTG
For mouse BKαWT and BKαΔe2 (RT-PCR)	
mBKα_s264	CACGAGCCCAAGATGGATG
mBKα_a781	ATAAACCGCAAGCCAAAGTAGAG
For human COX2 (NM_000963.3) (Q-PCR)	
hCOX2_s84	GACGCCCTCAGACAGCAAAG
hCOX2_a213	ATGGGTGGGAACAGCAAGG
For human GAPDH (NM_001289746.1) (Q-PCR)	
hGAPDH_s670	GACAACTTTGGTATCGTGGAAGG
hGAPDH_a802	AGGCAGGGATGATGTTCTGG
For mouse GAPDH (NM_001289726.1) (Q-PCR)	
mGAPDH_s776	CATGGCCTTCCGTGTTCCT
mGAPDH_a879	CCTGCTTCACCACCTTCTTGA

Table S2

Fig. 2F and G		Unitary currents at +50 mV (pA)		Conductance (pS)		Mean open time at +50 mV (ms)		# of recordings
WT+WT		11.4±0.2		232.9±3.5		10.3±1.4		8
WT+Δe2	**#1**	11.8±0.2		236.9±3.9		11.7±2.3		11
	#2	9.5±0.2	** ##	194.7±3.4	** ##	13.3±2.2		9
	#3	3.0±0.2	** ## $$	56.6±3.4	** ## $$	4.1±0.5	* ## $$	10

*p<0.05, **p<0.01 vs. WT+WT;
##p<0.01 vs. WT+Δe2 #1,
$$p<0.01 vs. WT+Δe2 #2

Table S3

Fig. 3	Unitary currents at +50 mV (pA)			
Predicted number of WT(Y359V)	**1**	**2**	**3**	**4**
WT(Y359V)+WT	1.4±0.1 (n=4)	3.2±0.1 (n=10)	6.6±0.2 (n=5)	9.0±0.2 (n=6)
WT(Y359V)+Δe2	Group 4: Not detected	Group 3: 2.9±0.2 (n=4)	Group 2: 6.7±0.2 (n=4)	Group 1: 8.9±0.1 (n=12)

Table S4

	Mutants of BKα	I_{BK} (pA/pF)		ratio of anti-FLAG positive cells	
		Mean	# of cells	Mean	# of ROIs (cells)
Fig.6B	**WT**	179.1±50.9	6	0.82±0.06	8 (142)
	Δ127-141 (Δ1)	175.2±26.7	4	0.90±0.05	6 (65)
	Δ142-150 (Δ2)	201.2±42.1	3	0.73 ±0.06	7 (68)
	Δ151-161 (Δ3)	-0.5±8.7 **	5	0.50±0.07 **	5 (39)
	Δ162-170 (Δ4)	-8.9±3.8 **	8	0.13±0.06**	5 (48)
	Δ171-178 (Δ5)	-5.2±4.2 **	7	0.08 ±0.04**	5 (39)
	Δ179-180 (Δ6)	2.7±6.5 **	9	0.08 ±0.01**	5 (66)
Fig.6C	**WT**	255.0±35.1	7	0.75±0.05	10 (104)
	MTS	119.9±37.3	5	0.53±0.07	5 (45)
	VKD	19.5±13.2 **	7	0.74 ±0.08	8 (95)
	WAG	78.3±39.1	4	0.82 ±0.04	8 (87)
	VMI	-1.3±4.8 **	7	0.80 ±0.06	8 (79)
	SAQ	0.3±0.9 **	5	0.06±0.04**	6 (48)
	TLT	427.5± 105.8 *	8	0.83±0.09	6 (31)
	GR	-4.4±4.5 *	3	0.08±0.02**	6 (65)
	VL	5.7±4.5 **	6	0.83 ±0.08	5 (63)
Fig.6D	**WT**	164.5±39.6	5	0.81±0.04	6 (65)
	S171	20.1± 7.7 **	6	0.82 ±0.07	5 (57)
	Q173	-7.1±4.6 **	6	0.65 ±0.06	5 (40)
	G177	58.4± 19.9 **	6	0.50 ±0.07**	5 (44)
	R178	15.7±5.5 **	7	0.21±0.05 **	5 (36)

*p<0.05, **p<0.01 vs. WT

Table S5

	$V_{1/2}$ (mV) of BKα mutants		
	$[Ca^{2+}]_i$ =300 nM (pCa 6.5) (Fig. 6E and 6F)	**$[Ca^{2+}]_i$ =10 μM (pCa 5.0) (Fig. S3)**	**$\Delta V_{1/2}$ (pCa5.0 – pCa6.5)**
WT	75.1±14.2 (6)	7.7±8.9 (6) **	-67.4
Δ3	177.9±10.8 (5)	137.1±6.5 (4) *	-40.8
MTS	120.0±6.1 (5)	20.0±8.9 (6) **	-100.0
VKD	140.3±7.0 (5)	102.0±9.3 (5) *	-38.3
WAG	165.8±3.6 (4)	102.4±16.6 (4) *	-63.4
VMI	212.8±9.5 (4)	138.9±9.0 (4) **	-73.9
TLT	73.5±2.2 (5)	-12.6±7.5 (4) **	-86.1
VL	149.5±7.2 (5)	67.3±6.8 (5) **	-82.2
S171	143.9±13.6 (4)	39.4±10.8 (4) **	-104.6
Q173	184.1±8.7 (5)	104.1±10.7 (5) **	-80.0

*p<0.05, **p<0.01 vs. pCa6.5