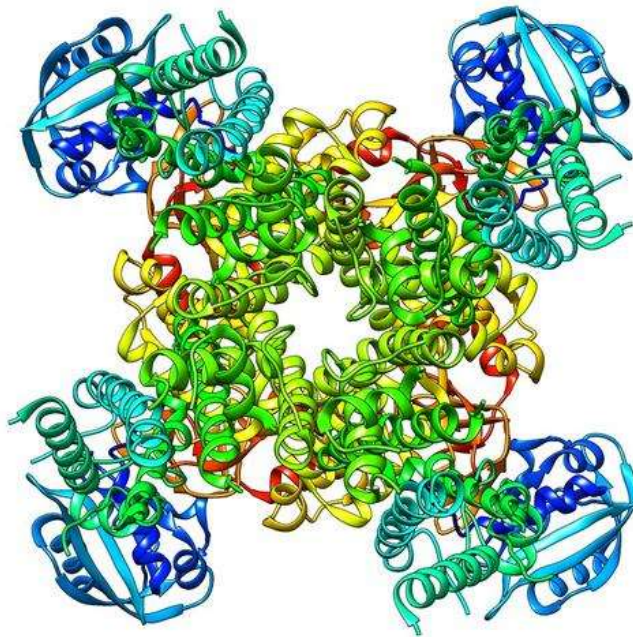




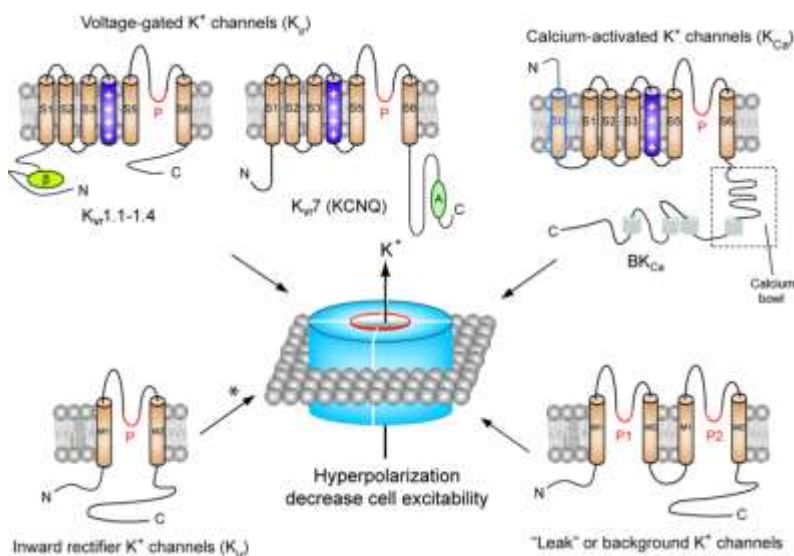
Potassium Channels



ICE Bioscience INC

ICE Established Potassium Channel Assays

ICE Potassium Channel Panel				
Family	Subfamily	Subtype	Official Symbol	Assay method
Voltage-gated potassium channels	Kv1	Kv1.1	KCNA1	patch clamp, fluorescence
		Kv1.2	KCNA2	patch clamp, fluorescence
		Kv1.3	KCNA3	patch clamp, fluorescence
		Kv1.4	KCNA4	patch clamp, fluorescence
		Kv1.5	KCNA5	patch clamp, fluorescence
		Kv1.6	KCNA6	patch clamp, fluorescence
		Kv1.7	KCNA7	patch clamp, fluorescence
		Kv1.8	KCNA8	patch clamp, fluorescence
	Kv2	Kv2.1	KCNB1	patch clamp, fluorescence
	Kv3	Kv3.1	KCNC1	patch clamp, fluorescence
		Kv3.2	KCNC2	patch clamp, fluorescence
		Kv3.4	KCNC4	patch clamp, fluorescence
	Kv4	Kv4.2	KCND2	patch clamp, fluorescence
		Kv4.3/KChiP2.2	KCND3	patch clamp, fluorescence
	Kv7	Kv7.1	KCNQ1	patch clamp, fluorescence
		Kv7.2	KCNQ2	patch clamp, fluorescence
		Kv7.3	KCNQ3	patch clamp, fluorescence
		Kv7.2/7.3	KCNQ2/3	patch clamp, fluorescence
Kv7.4		KCNQ4	patch clamp, fluorescence	
Kv7.5		KCNQ5	patch clamp, fluorescence	
Kv7.3/7.5		KCNQ3/5	patch clamp, fluorescence	
Calcium- and sodium-activated potassium channels	BKCa	KCa1.1	KCNMA1	patch clamp, fluorescence
	SKCa	KCa2.1	KCNN1	patch clamp, fluorescence
		KCa2.2	KCNN2	patch clamp, fluorescence
	KCa2.3	KCNN3	patch clamp, fluorescence	
IKCa	KCa3.1	KCNN4	patch clamp, fluorescence	
Inwardly rectifying potassium channels	GIRK	Kir2.1	KCNJ2	patch clamp, fluorescence
		Kir3.1/3.4	KCNJ3/5	patch clamp, fluorescence
	KATP	Kir3.2	KCNJ4	patch clamp, fluorescence
		Kir6.2/Sur1	KCNJ11	patch clamp, fluorescence
Kir6.2/Sur2A	KCNJ11	patch clamp, fluorescence		
Two P domain potassium channels	TASK	TASK-1	KCNK3	patch clamp, fluorescence
		TASK-3	KCNK9	patch clamp, fluorescence
	TREK	TREK-1	KCNK2	patch clamp, fluorescence



Potassium channel family

Kv1.1-Kv1.4 Assay Data Sheet

Channel	Kv1.1-1.4
Gene	KCNA1 (NM_000217), KCNA2 (NM_004974), KCNA3 (NM_002232), KCNA4 (NM_002233)
Sources	Human
Catalog Reference	ICE-HEK-Kv1.1 ICE-HEK-Kv1.2 ICE-HEK-Kv1.3 ICE-HEK-Kv1.4
Expression system	HEK293
Method	whole cell patch clamp
Standard time	2-4 weeks
Reference compound	4-AP

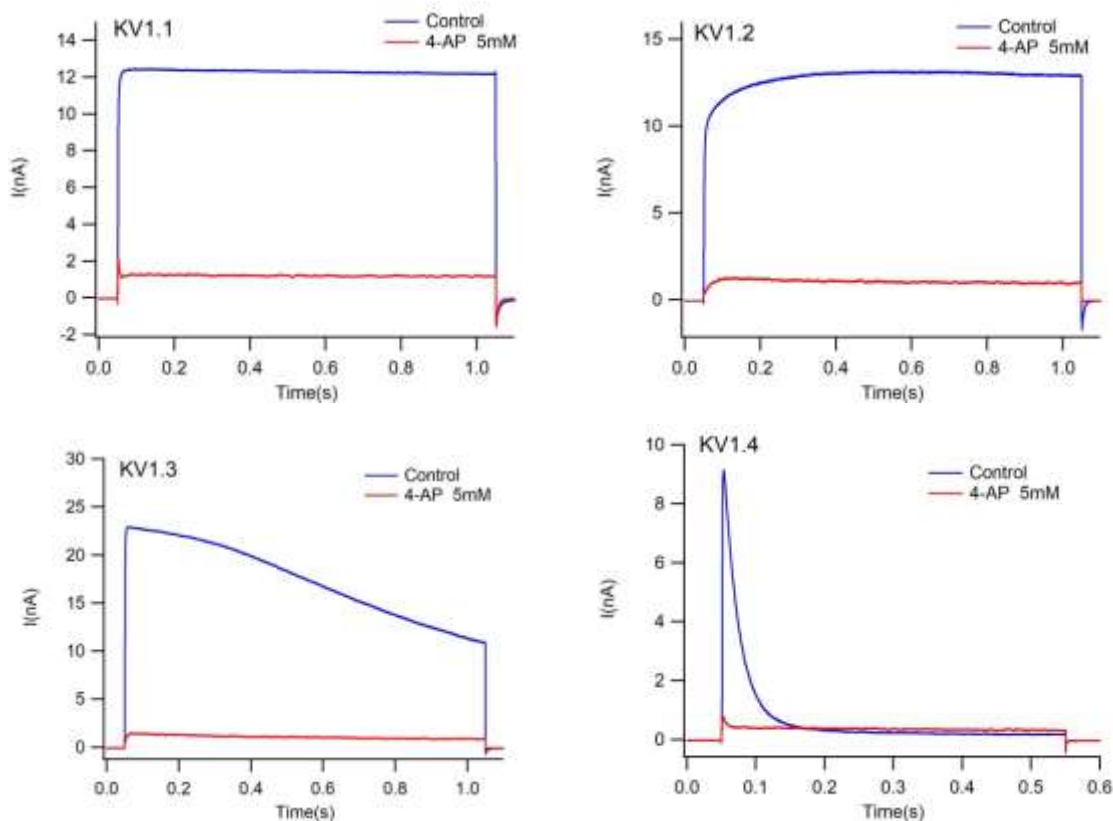


Figure 1. Representative traces of Kv1.1-1.4 currents, before and after 4-AP application

Further validation data available on request.

Kv1.5 Assay Data Sheet

Channel	Kv1.5
Gene	KCNA5
Sources	Human
Catalog Reference	ICE-HEK-Kv1.5
Expression system	HEK293
Method	whole cell patch clamp
Standard time	2-4 weeks
Reference compound	4-AP
Target	Atrial fibrillation

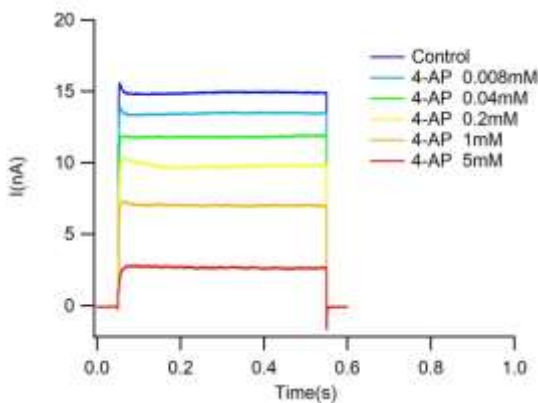


Figure 1. Representative traces of Kv1.5 currents, before and after 4-AP application at different concentrations

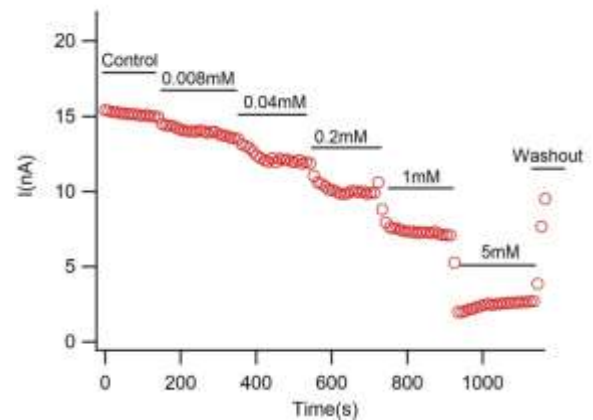


Figure 2. The time course of Kv1.5 currents after application of different 4-AP concentrations

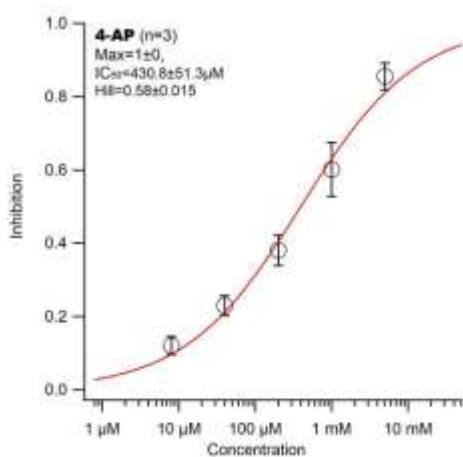


Figure 3. Concentration-dependent effect of 4-AP on Kv1.5 currents

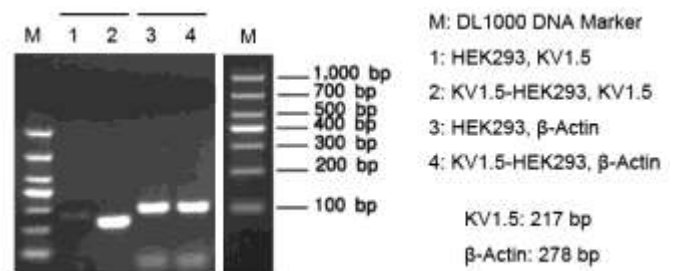


Figure 4. Expression of Kv1.5 mRNA in the stable cell line

Further validation data available on request.

Kv2.1 Assay Data Sheet

Channel	Kv2.1
Gene	KCNB1 (NM_004975)
Sources	Human
Catalog Reference	ICE-HEK-Kv2.1
Expression system	HEK293
Method	whole cell patch clamp
Standard time	2-4 weeks
Reference compound	4-AP
Target	migraine, seizure and ataxia syndromes

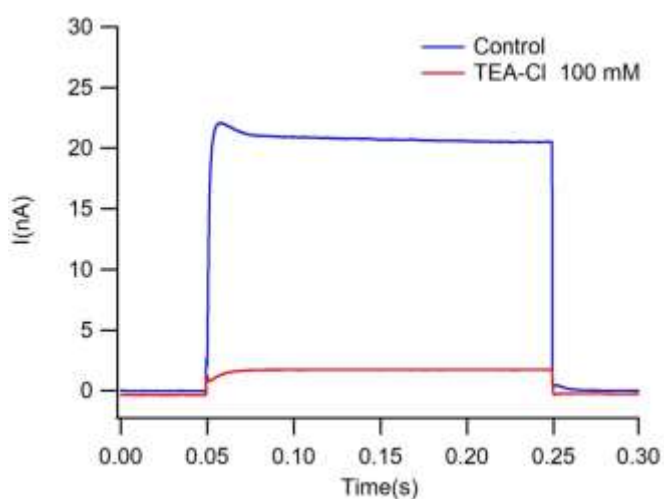


Figure 1. Representative traces of Kv2.1 currents, before and after TEA application

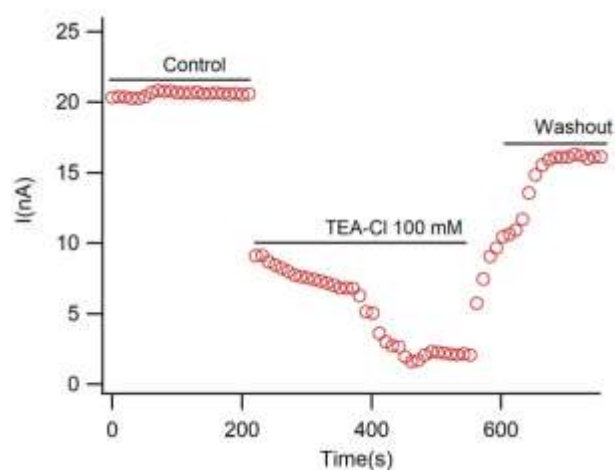


Figure 2. The time course of Kv2.1 currents after TEA application

Further validation data available on request.

Kv3.1 Assay Data Sheet

Channel	Kv3.1
Gene	KCNC1 (NM_004976)
Sources	Human
Catalog Reference	ICE-HEK-Kv3.1
Expression system	HEK293
Method	whole cell patch clamp
Standard time	2-4 weeks
Reference compound	4-AP
Target	seizure

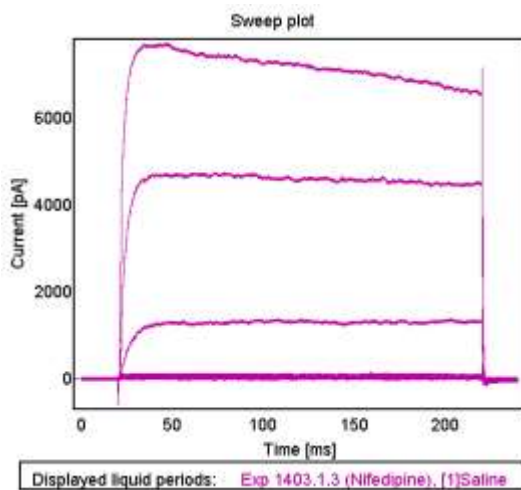


Figure 1. Representative traces of Kv3.1 currents at different voltages

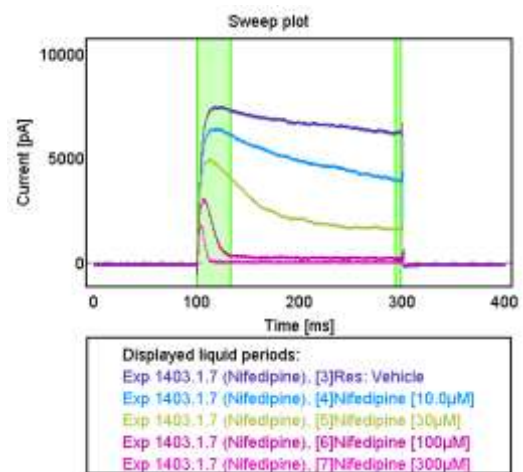


Figure 2. Representative traces of Kv3.1 currents, before and after nifedipine application at different concentrations

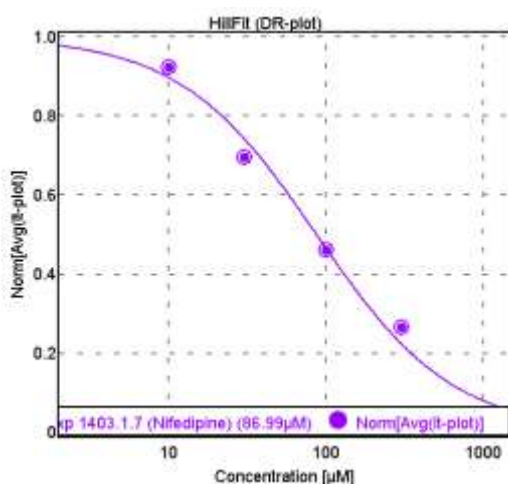


Figure 3. Concentration-dependent effect of 4-AP on Kv3.1 peak current ($IC_{50}=87\mu M$)

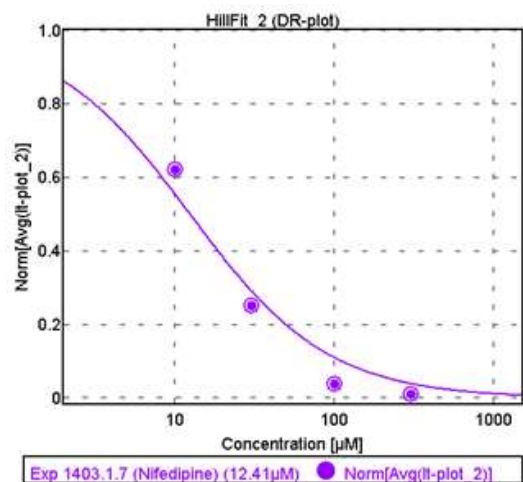


Figure 4. Concentration-dependent effect of 4-AP on Kv3.1 tail current ($IC_{50}=12.4\mu M$)

Further validation data available on request.

Kv3.4 Assay Data Sheet

Channel	Kv3.4
Catalog Reference	ICE-HEK-Kv3.4
Gene	KCNC4 (NM_004978)
Sources	Human
Expression system	HEK293
Method	whole cell patch clamp
Standard time	2 weeks
Reference compound	TEA or 4-AP
Target	Alzheimer's and Parkinson's diseases

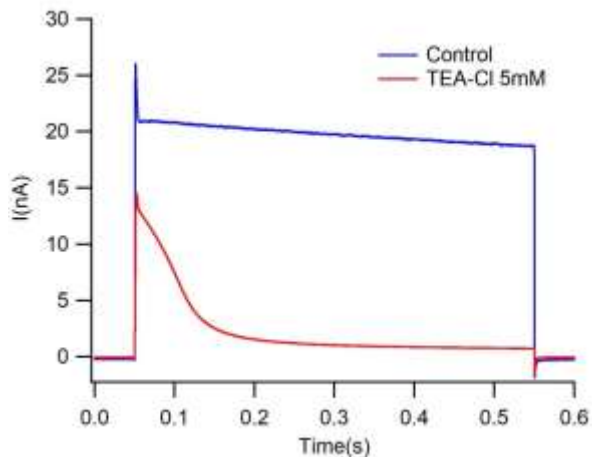


Figure 1. Representative traces of Kv3.4 currents, before and after TEA application

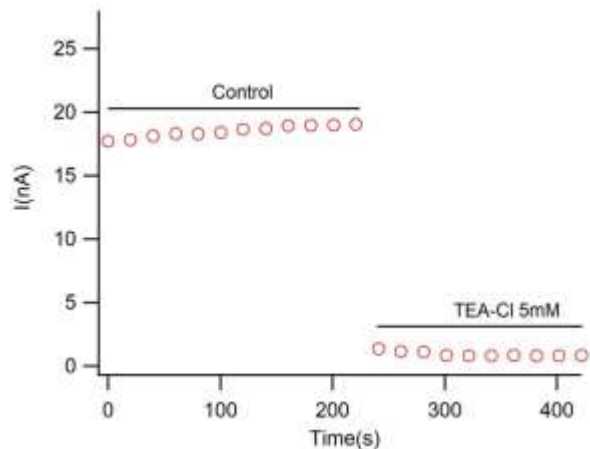


Figure 2. The time course of Kv3.4 tail current after TEA application

Further validation data available on request.

Kv4.2 Assay Data Sheet

Channel	Kv4.2/KCHIP2.2
Gene	KCND2 (NM_012281), KCNIP2 (NM_173195)
Catalog Reference	ICE-HEK-Kv4.2
Sources	Human
Expression system	HEK293
Method	whole cell patch clamp
Standard time	2 weeks
Reference compound	4-AP
Target	Fragile X Syndrome, seizure

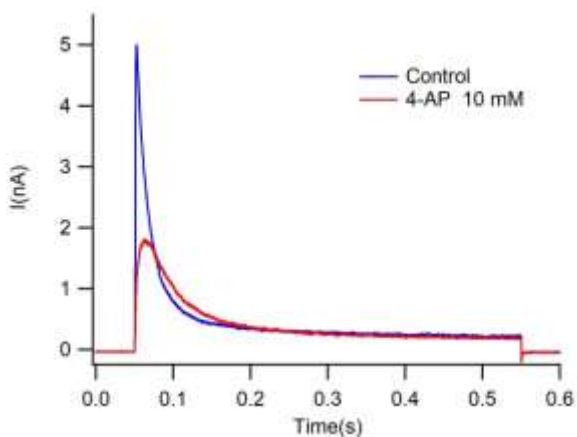


Figure 1. Representative traces of Kv4.2 currents, before and after 4-AP application

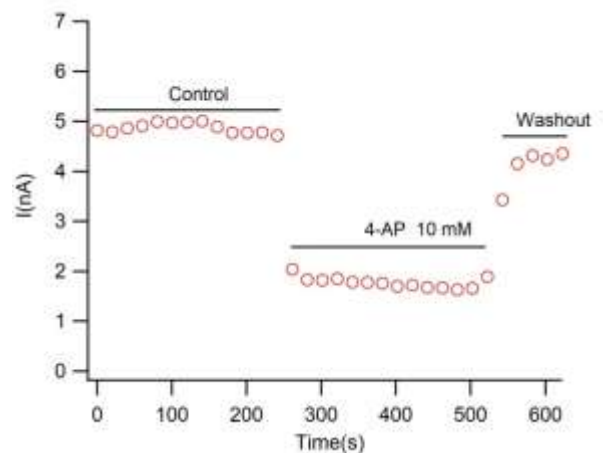


Figure 2. The time course of Kv4.2 peak current after 4-AP application

Further validation data available on request.

Kv4.3 Assay Data Sheet

Channel	Kv4.3
Gene	KCND3 (NM_004980)
Catalog Reference	ICE-HEK-Kv4.3
Sources	Human
Expression system	HEK293
Method	whole cell patch clamp
Standard time	2 weeks
Reference compound	4-AP
Target	migraine, seizure and ataxia syndromes

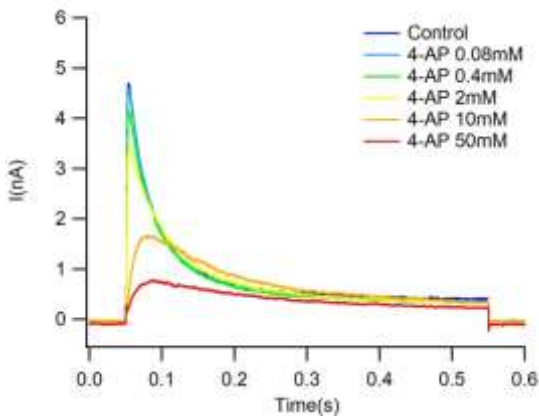


Figure 1. Representative traces of Kv4.3 currents, before and after 4-AP application at different concentrations

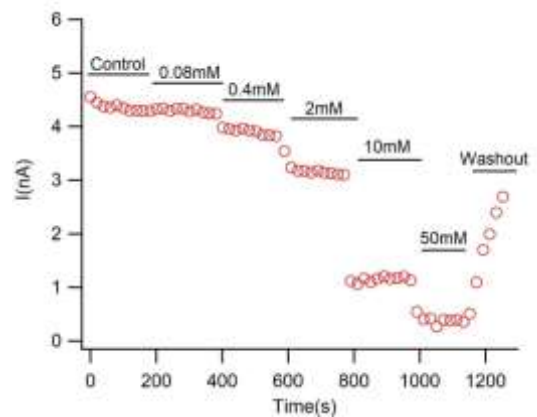


Figure 2. The time course of Kv4.3 currents after application of different 4-AP concentrations

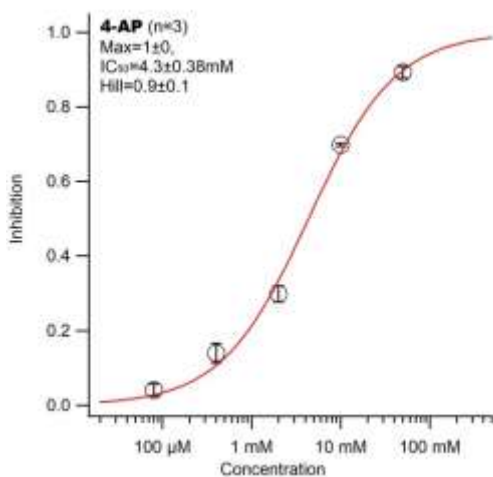


Figure 3. Concentration-dependent effect of 4-AP on Kv4.3 currents

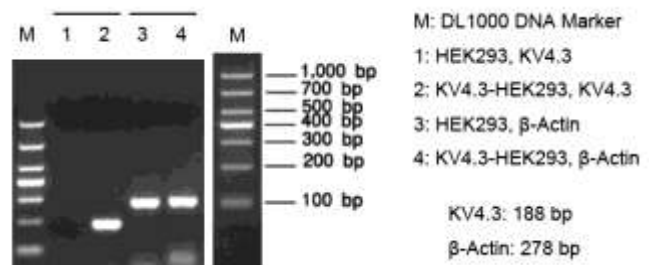


Figure 4. Expression of Kv4.3 mRNA in the stable cell line

Further validation data available on request.

Kv7.1 Assay Data Sheet

Channel	KV7.1 (KCNQ1/KCNE, KvLQT, IKs)
Gene	KCNQ1(NM_000218), KCNE(NM_000219)
Sources	Human
Catalog Reference	ICE-HEK-IKs
Expression system	HEK293
Method	whole cell patch clamp
Standard time	2-4 weeks
Reference compound	Chromanol 293B
Target	Atrial fibrillation

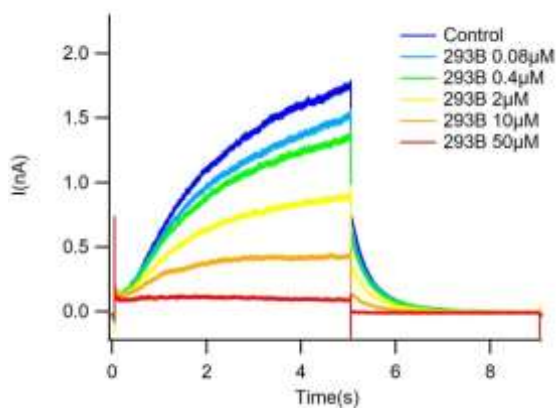


Figure 1. Representative traces of Kv7.1 currents, before and after chromanol 293B application at different concentrations

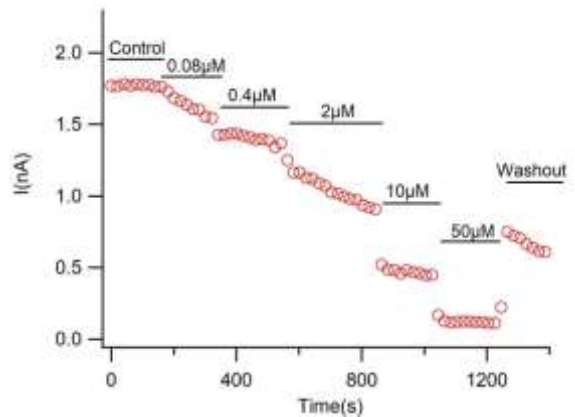


Figure 2. The time course of Kv7.1 currents after application of different chromanol 293B concentrations

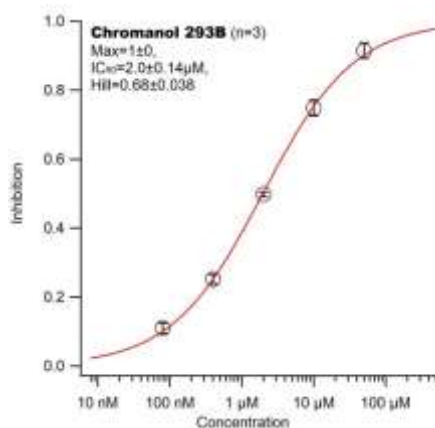


Figure 3. Concentration-dependent effect of chromanol 293B on Kv7.1 currents

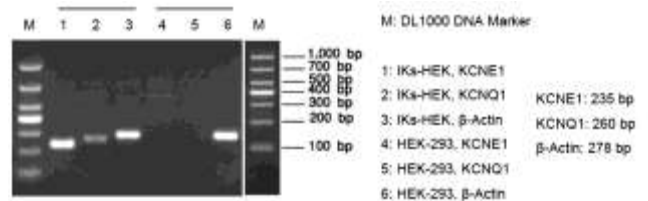


Figure 4. Expression of KCNQ1 and KCNE mRNA in the stable cell line

Further validation data available on request.

Kv7.2/7.3 Assay Data Sheet

Channel	KV7.2/7.2 (KCNQ2/3)
Gene	KCNQ2 (NM_172107), KCNQ3 (NM_004519)
Sources	Human
Catalog Reference	ICE-HEK-KCNQ2/3
Expression system	HEK293
Method	whole cell patch clamp
Standard time	2-4 weeks
Reference compound	XE991, ML213, retigabine
Target	seizure

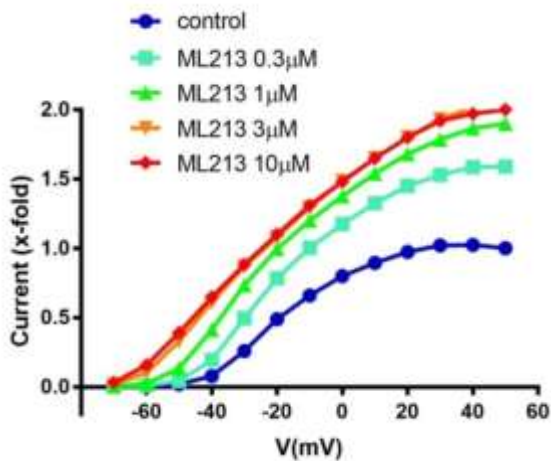


Figure 1. Representative traces of Kv7.2/7.3 currents, before and after ML213 application at different concentrations

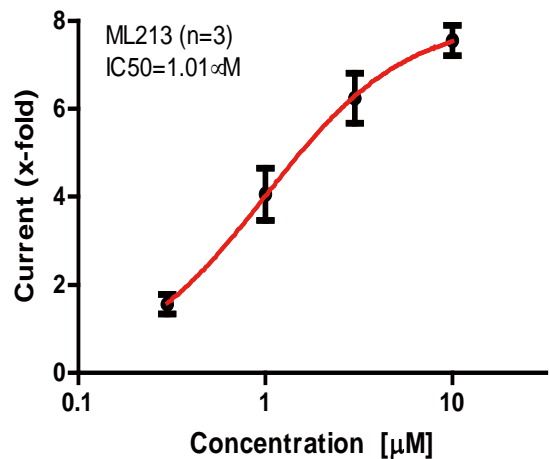


Figure 2. Concentration-dependent effect of ML213 on Kv7.2/7.3 currents

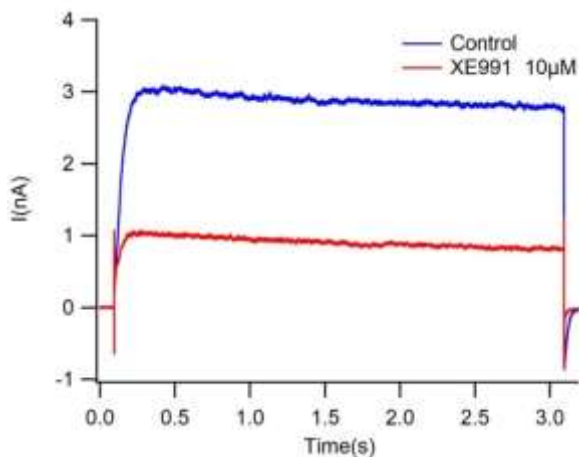


Figure 3. Representative traces of Kv7.2/7.3 currents, before and after XE991 application

Kv7.4 Assay Data Sheet

Channel	KV7.4 (KCNQ4)
Gene	KCNMA1(NM_004700)
Sources	Human
Catalog Reference	ICE-HEK-KCa1.1
Expression system	HEK293
Method	whole cell patch clamp
Standard time	2-4 weeks
Reference compound	XE991, ML213, retigabine
Target	Deafness

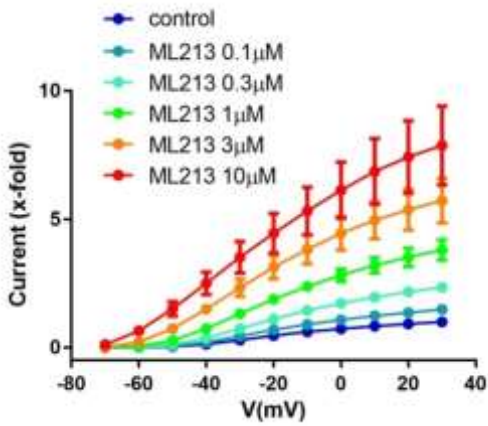


Figure 1. Representative traces of Kv7.4 currents, before and after ML213 application at different concentrations

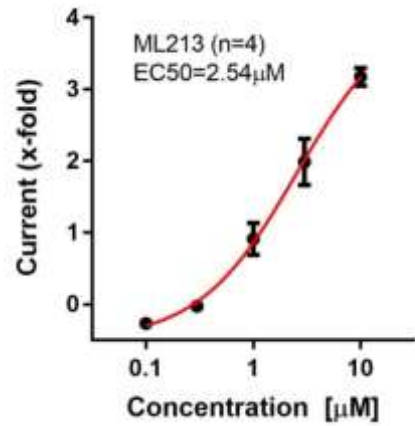


Figure 2. Concentration-dependent effect of ML213 on Kv7.4 currents

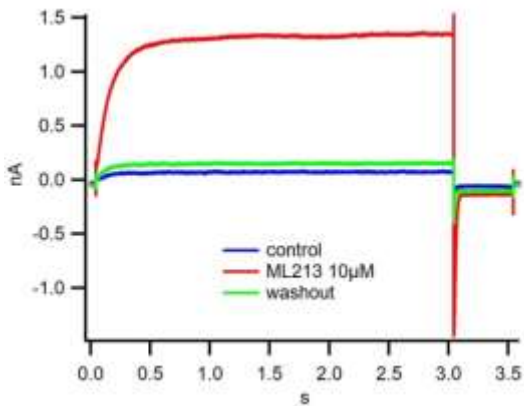


Figure 3. Representative traces of Kv7.4 currents, before and after ML213 application

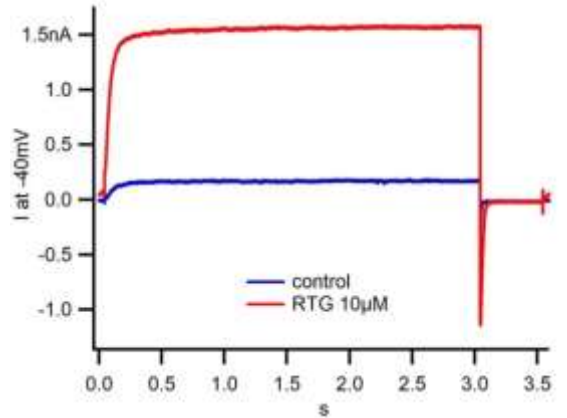


Figure 4. Representative traces of Kv7.4 currents before and after Retigabine application

Kv11.1 Assay Data Sheet

Channel	KV11.1 (hERG,Ikr)
Assay	IC50
Expression system	HEK293 or CHO
Method	whole cell patch clamp
Standard time	1-2 weeks
Reference compound	E4031, cisapride
Target	QT-prolongation, Torsade de Pointe(TdP)

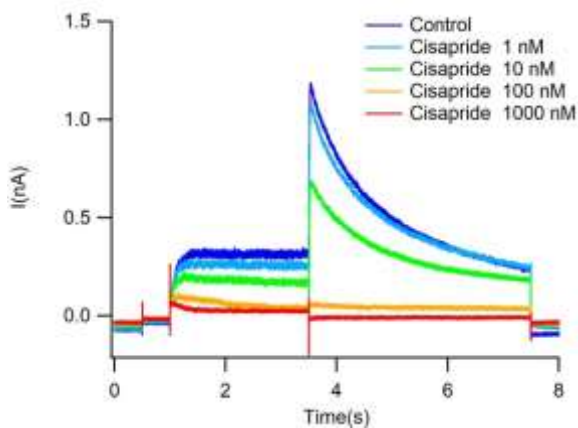


Figure 1. Representative traces of hERG currents, before and after Casapride application at different concentrations

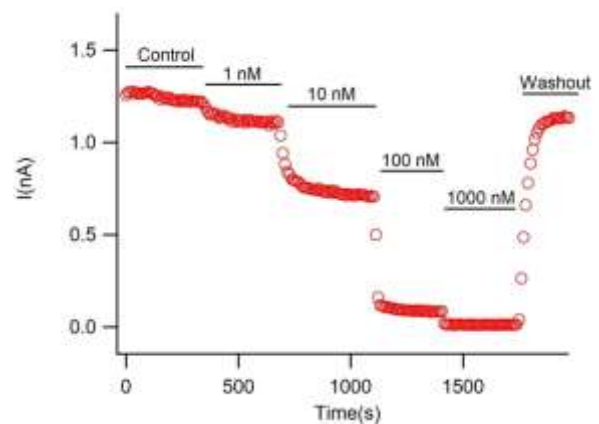


Figure 2. The time course of hERG currents after application of different Casapride concentrations

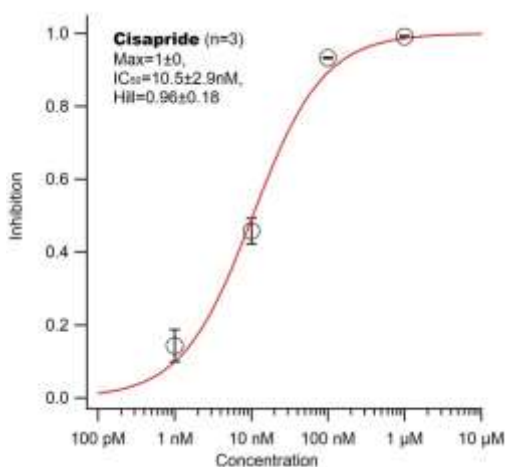


Figure 3. Concentration-dependent effect of hERG on Casapride currents

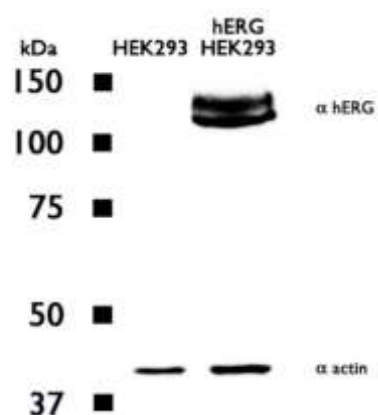


Figure 4. Expression of hERG channel in the HEK293 stable cell line

Further validation data available on request.

KCa1.1 Assay Data Sheet

Channel	KCa1.1 (BKCa, MaxiK)
Gene	KCNMA1(NM_001014797)
Sources	Human
Catalog Reference	ICE-CHO-KCa1.1
Expression system	CHO
Method	whole cell patch clamp
Standard time	2-4 weeks
Reference compound	Iberiotoxin, charybdotoxin, TEA, BMS-204352
Target	stroke, epilepsy, cancer, diabetes, asthma, and hypertension

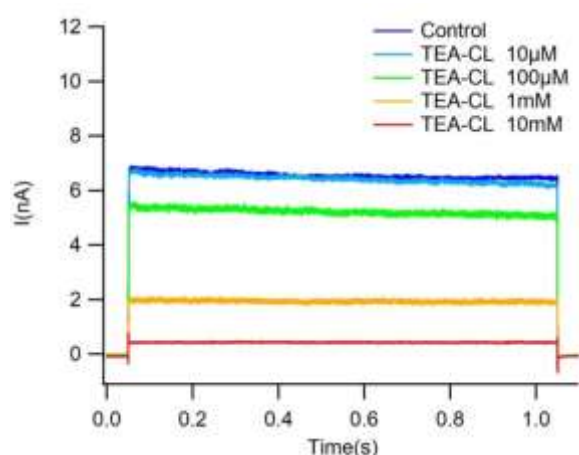


Figure 1. Representative traces of KCa1.1 currents, before and after TEA application at different concentrations

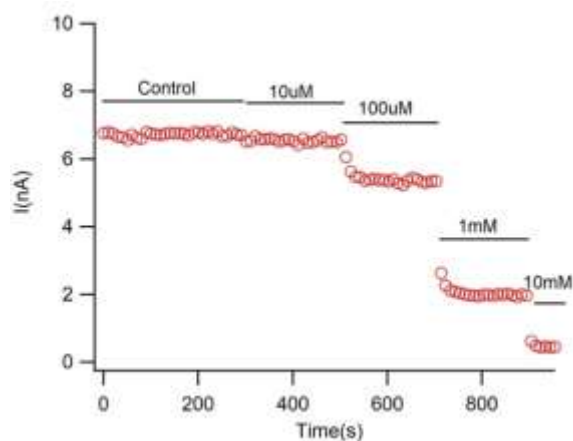


Figure 2. The time course of KCa1.1 currents after application of different TEA concentrations

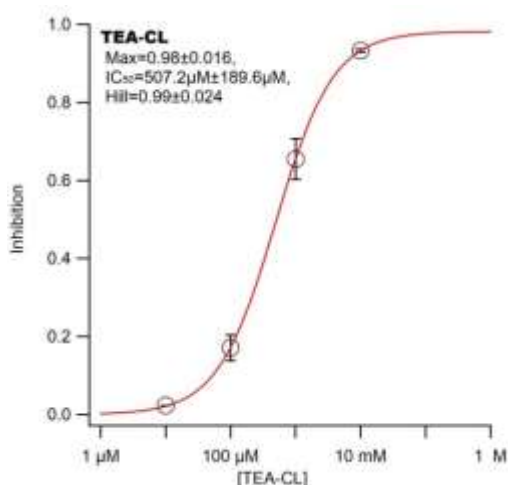


Figure 3. Concentration-dependent effect of TEA on KCa1.1 currents

KCa2.2 Assay Data Sheet

Channel	KCa2.2 (SK2)
Gene	KCNN2 (NM_021614)
Sources	Human
Catalog Reference	ICE-HEK-KCa2.2
Expression system	HEK293
Method	whole cell patch clamp
Standard time	2-4 weeks
Reference compound	Apamin
Target	Atrial fibrillation

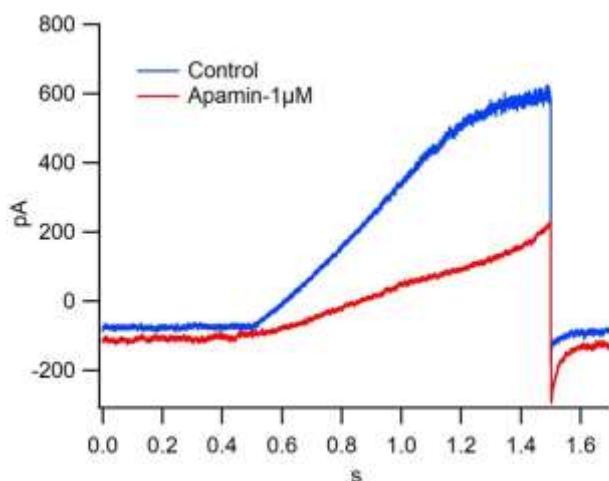


Figure 1. Representative traces of KCa2.2 currents, before and after application of apamin

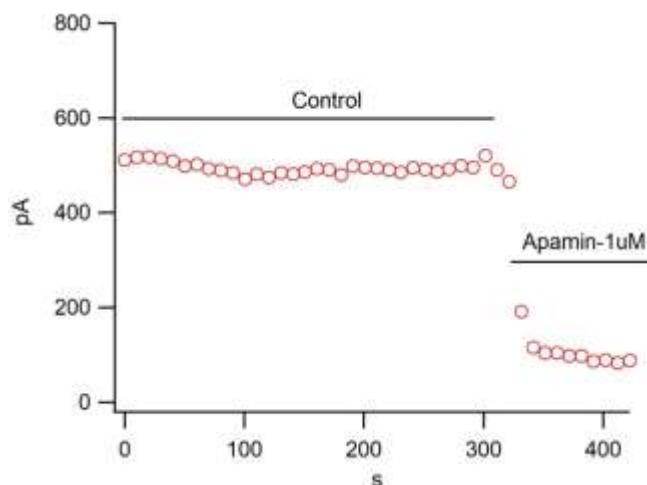


Figure 2. The time course of KCa2.2 currents after application of apamin

Further validation data available on request.

KCa3.1 Assay Data Sheet

Channel	KCa3.1 (IKCa, IK)
Gene	KCNN4 (NM_002250)
Sources	Human
Catalog Reference	ICE-CHO-KC3.1
Expression system	CHO
Method	whole cell patch clamp
Standard time	2-4 weeks
Reference compound	TRAM-34, Senicapoc
Target	Fibrosis, inflammatory disease, cancer

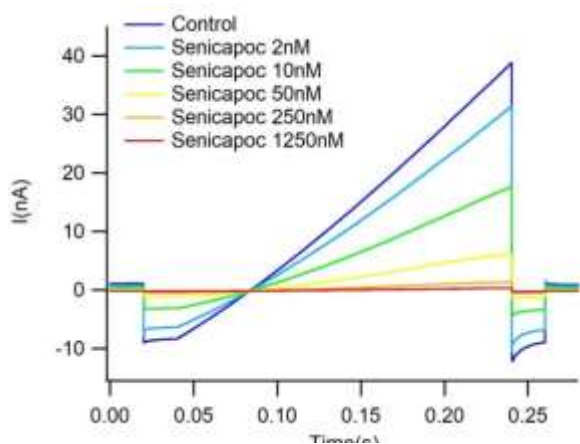


Figure 1. Representative traces of KCa3.1 currents, before and after Senicapoc application at different concentrations

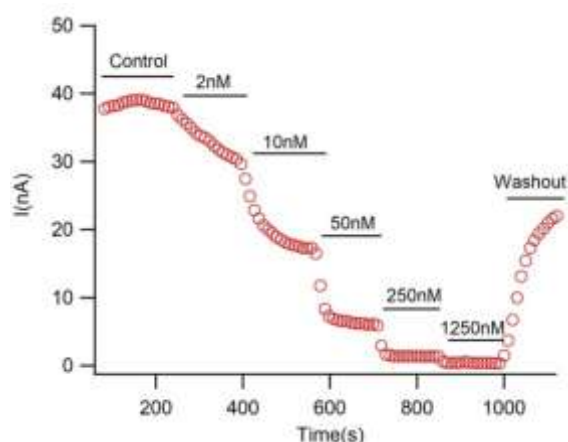


Figure 2. The time course of KCa3.1 currents after application of different Senicapoc concentrations

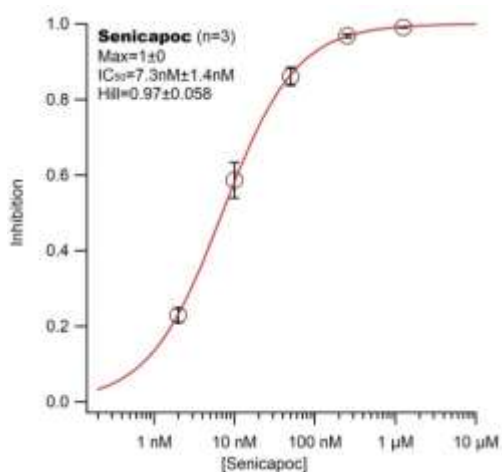


Figure 3. Concentration-dependent effect of Senicapoc on KCa3.1 currents

Further validation data available on request.

Kir2.1 Assay Data Sheet

Channel	Kir2.1
Gene	KCNJ2 (NM_000891)
Sources	Human
Catalog Reference	ICE-HEK-Kir2.1
Expression system	HEK293
Method	whole cell patch clamp
Standard time	2-4 weeks
Reference compound	BaCl ₂
Target	Long QT syndrome, periodic paralysis, cardiac arrhythmias

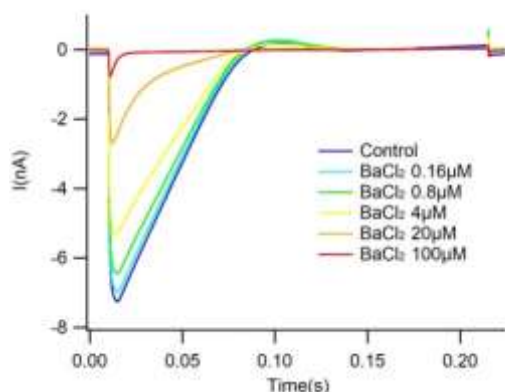


Figure 1. Representative traces of Kir2.1 currents, before and after BaCl₂ application at different concentrations

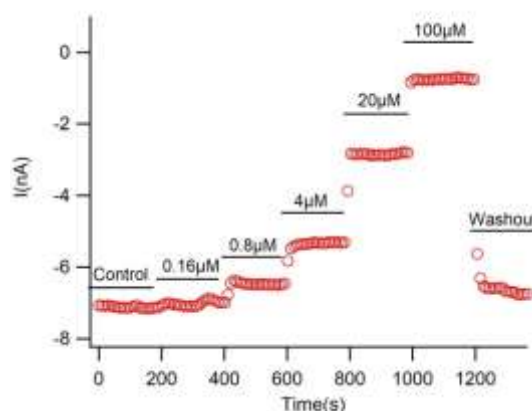


Figure 2. The time course of BaCl₂ currents after application of different BaCl₂ concentrations

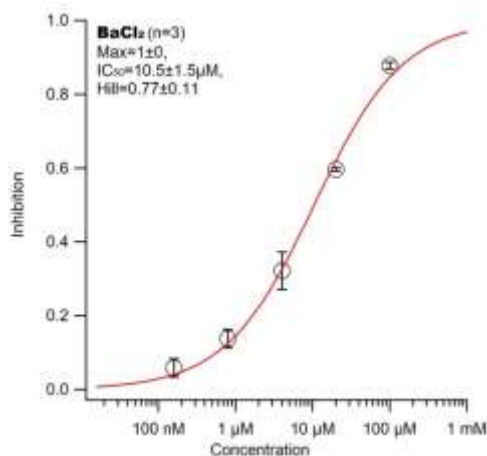


Figure 3. Concentration-dependent effect of BaCl₂ on Kir2.1 currents

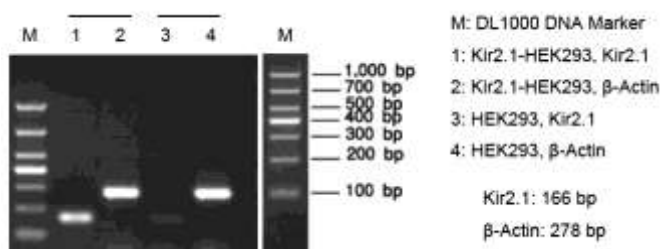


Figure 4. Expression of Kir2.1 mRNA in the stable cell line

Further validation data available on request.

Kir3.1/3.4 Assay Data Sheet

Channel	Kir3.1/3.4 (GirK, KACh)
Gene	KCNJ3(NM_002239)/KCNJ5(NM_000890)
Sources	Human
Catalog Reference	ICE-HEK-GIRK
Expression system	HEK293
Method	whole cell patch clamp
Standard time	2-4 weeks
Reference compound	BaCl ₂
Target	Atrial fibrillation

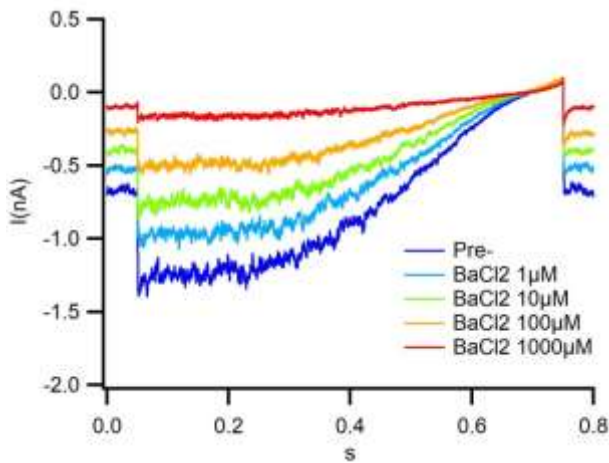


Figure 1. Representative traces of KACh currents, before and after BaCl₂.

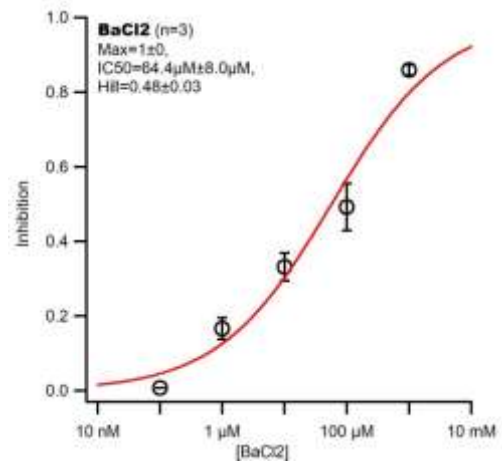


Figure 2. The time course of KACh currents after application of BaCl₂.

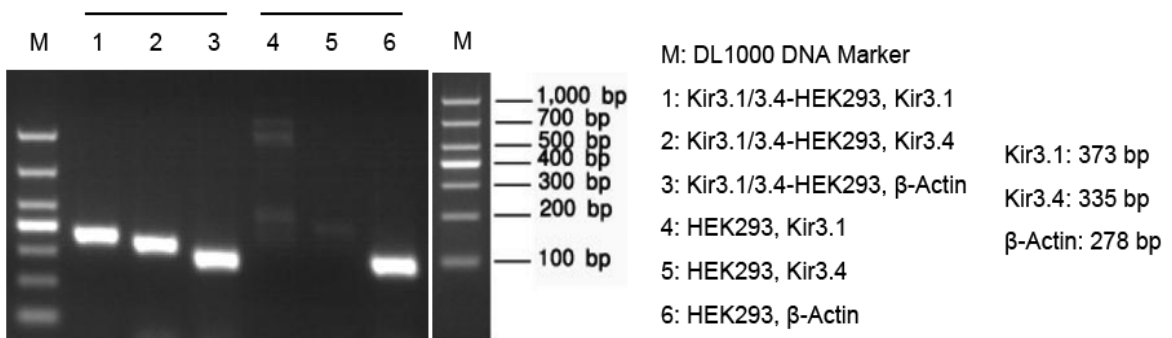


Figure 3. Expression of KACh mRNA in the stable cell line

Further validation data available on request.

Kir6.2/Sur2A Assay Data Sheet

Channel	Kir6.2/Sur2A (KATP)
Gene	KCNJ11 (NM_000525) /ABCC9 (NM_005691)
Sources	Human
Catalog Reference	ICE-HEK-KATP/SUR2A
Expression system	HEK293
Method	whole cell patch clamp
Standard time	2-4 weeks
Reference compound	Glibenclamide, Pinacidil
Target	ischemia

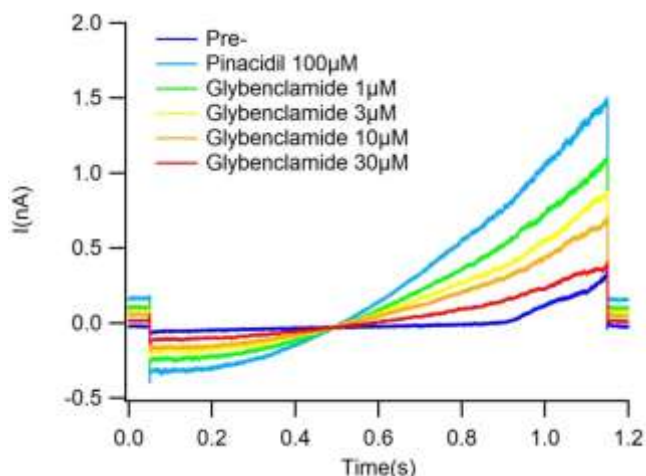


Figure 1. Representative traces of Kir6.2/Sur2A currents, before and after glibenclamide.

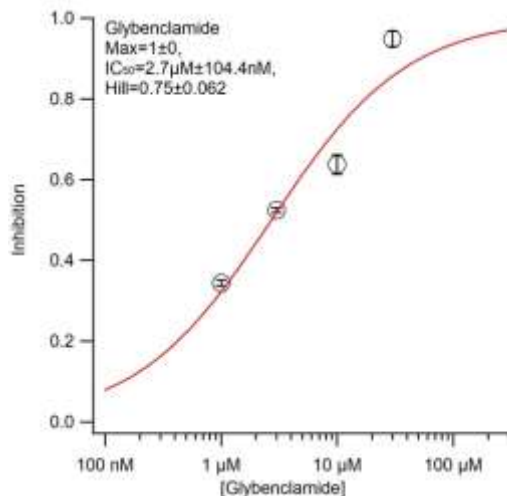


Figure 2. The time course of Kir6.2/Sur2A currents after application of glibenclamide

Kir6.2/Sur1 Assay Data Sheet

Channel	Kir6.2/Sur1 (KATP)
Gene	KCNJ11 (NM_000525) /ABCC8 (NM_000352)
Sources	Human
Catalog Reference	ICE-HEK-KATP/SUR1
Expression system	HEK293
Method	whole cell patch clamp
Standard time	2-4 weeks
Reference compound	Glibenclamide, Pinacidil
Target	ischemia

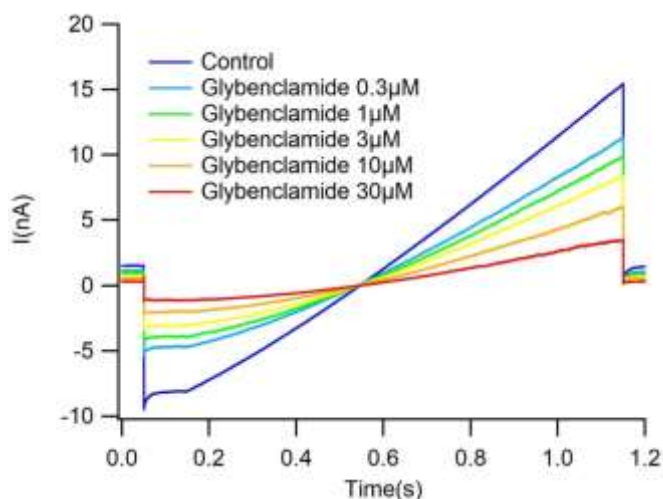


Figure 1. Representative traces of Kir6.2/Sur1 currents, before and after glibenclamide.

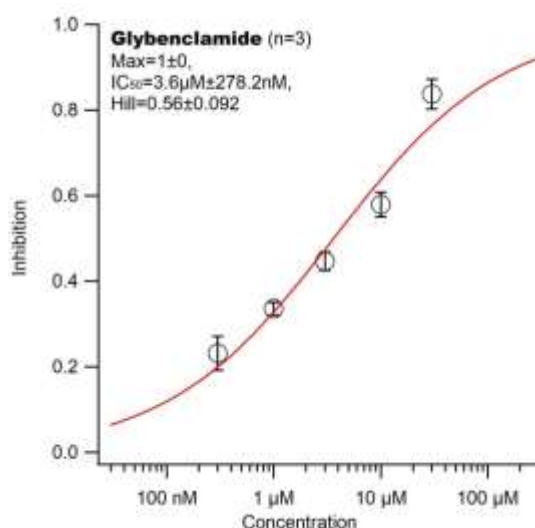


Figure 2. The time course of Kir6.2/Sur1 currents after application of glibenclamide