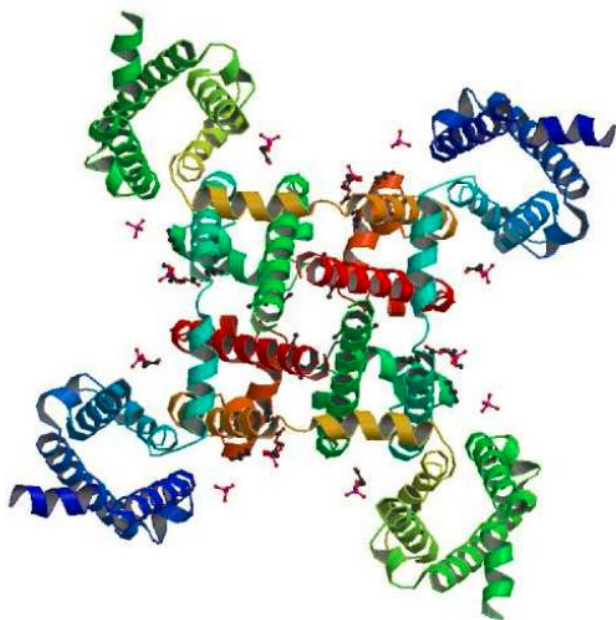




# Voltage Gated Sodium Channel Panel



**ICE Bioscience INC**

**September 2019**

## Voltage Gated Sodium Channels

- Voltage-gated sodium channels (VGSCs) are responsible for the action potential in the membrane of neurons, cardiac myocytes and most excitable cells.
- Sodium channels represent well-precedented drug targets as antidysrhythmics, anticonvulsants and local anaesthetics.
- Nine isoforms of the VGSCs have been discovered (NaV1.1-1.9).

Table 1.1: Na<sub>v</sub> channels can be classified as TTX-sensitive or TTX-resistant.

<i>Channel isoform</i>	<i>Distribution</i>	<i>TTX EC<sub>50</sub> (nM)</i>	<i>TTX sensitivity</i>
Na <sub>v</sub> 1.1	CNS	6 (Clare et al. 2000)	TTX-sensitive
Na <sub>v</sub> 1.2	CNS	12 (Catterall et al. 2005)	TTX-sensitive
Na <sub>v</sub> 1.3	CNS	4 (Chen et al. 2000)	TTX-sensitive
Na <sub>v</sub> 1.4	Skeletal muscle	25 (Chahine et al. 1994)	TTX-sensitive
Na <sub>v</sub> 1.5	Heart	2,000 (Clare et al. 2000)	TTX-resistant
Na <sub>v</sub> 1.6	CNS	2.5 (Burbidge et al. 2002)	TTX-sensitive
Na <sub>v</sub> 1.7	PNS	25 (Klugbauer et al. 1995)	TTX-sensitive
Na <sub>v</sub> 1.8	PNS	60,000 (Akopian et al. 1996)	TTX-resistant
Na <sub>v</sub> 1.9	PNS	200,000 (Rugiero et al. 2003)	TTX-resistant

# Nav1.1 Assay Data Sheet

<b>Channel</b>	Nav1.1
<b>Gene</b>	SCN1A
<b>Sources</b>	human
<b>Catalog Ref.</b>	ICE-CHO-Nav1.1
<b>Expression system</b>	Mammalian (CHO)
<b>Method</b>	whole cell patch clamp
<b>Standard time</b>	2-4 weeks
<b>Reference inhibitor</b>	TTX
<b>Related diseases</b>	Pain, Epilepsy, Anxiety, Depression Related, Degenerative Diseases, Dravet syndrome, West syndrome, familial autism

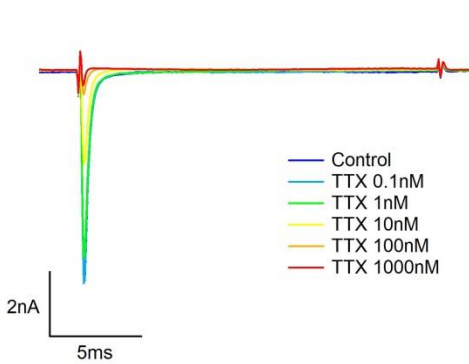


Figure 1. Representative traces of Nav1.1 currents, before and after TTX application at different concentrations

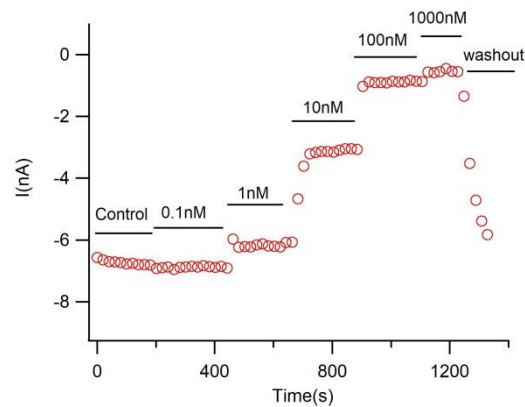


Figure 2. The time course of Nav1.1 currents after application of different TTX concentrations

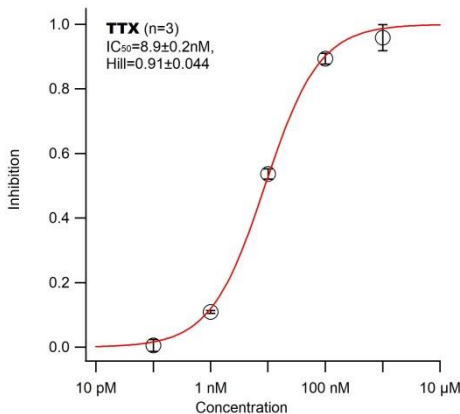


Figure 3. Concentration-dependent effect of TTX on Nav1.1 currents

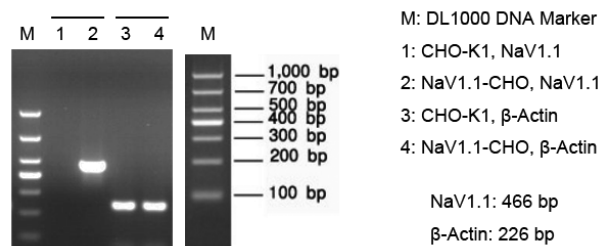


Figure 4. Expression of Nav1.1 mRNA in the stable cell line

*Further validation data available on request.*

# Nav1.2 Assay Data Sheet

<b>Channel</b>	Nav1.2
<b>Gene</b>	SCN2A
<b>Catalog Ref.</b>	ICE-HEK-Nav1.2
<b>Sources</b>	human
<b>Expression system</b>	HEK293
<b>Method</b>	whole cell patch clamp
<b>Standard time</b>	2 weeks
<b>Reference inhibitor</b>	TTX
<b>Target</b>	Pain, Seizure, Epilepsy, Anxiety, Depression Related, Degenerative Diseases

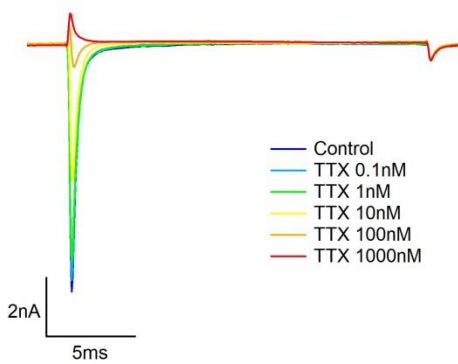


Figure 1. Representative traces of Nav1.2 currents, before and after TTX application at different concentrations

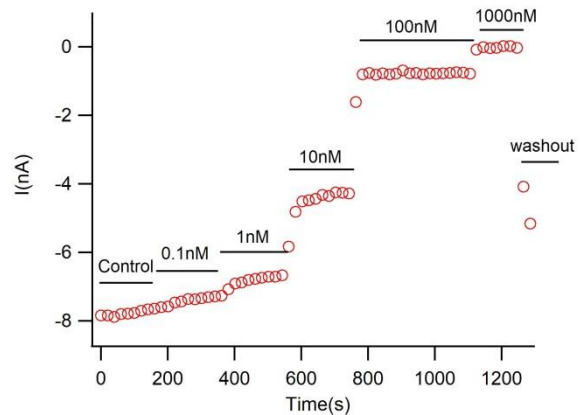


Figure 2. The time course of Nav1.2 currents after application of different TTX concentrations

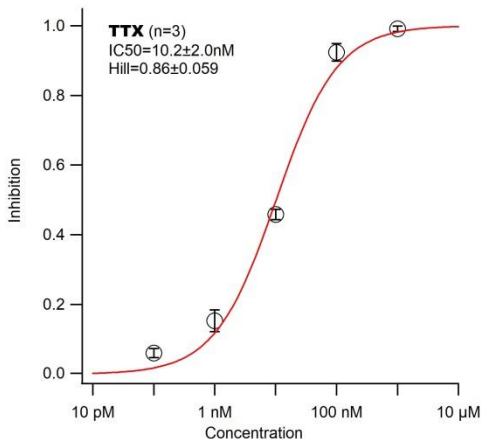


Figure 3. Concentration-dependent effect of TTX on Nav1.2 currents

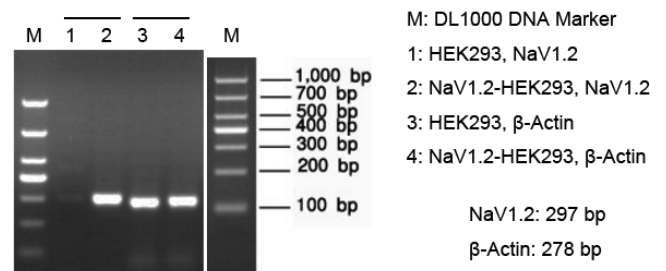


Figure 4. Expression of Nav1.2 mRNA in the stable cell line

Further validation data available on request.

# Nav1.3 Assay Data Sheet

<b>Channel</b>	Nav1.3
<b>Gene</b>	SCN3A
<b>Catalog Ref.</b>	ICE-HEK-Nav1.3
<b>Sources</b>	human
<b>Expression system</b>	HEK293
<b>Method</b>	whole cell patch clamp
<b>Standard time</b>	2 -4 weeks
<b>Reference inhibitor</b>	TTX
<b>Target</b>	Pain, Epilepsy, Anxiety, Depression Related

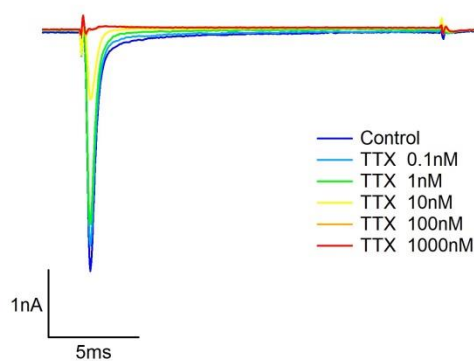


Figure 1. Representative traces of Nav1.3 currents, before and after TTX application at different concentrations

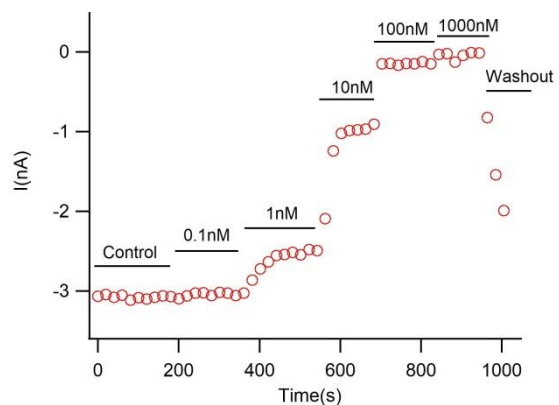


Figure 2. The time course of Nav1.3 currents after application of different TTX concentrations

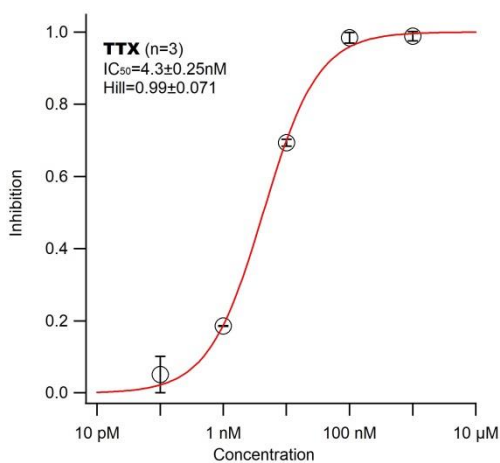


Figure 3. Concentration-dependent effect of TTX on Nav1.3 currents

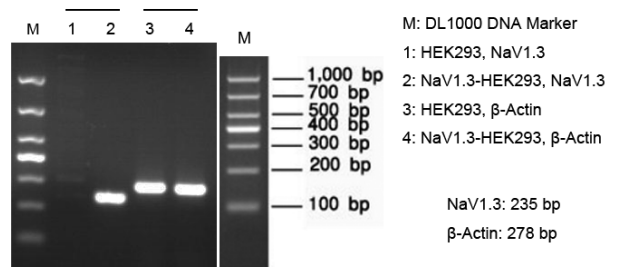


Figure 4. Expression of Nav1.3 mRNA in the stable cell line

*Further validation data available on request.*

# Nav1.4 Assay Data Sheet

<b>Channel</b>	Nav1.4
<b>Gene</b>	SCN4A
<b>Catalog Ref.</b>	ICE-CHO-Nav1.4
<b>Sources</b>	human
<b>Expression system</b>	CHO
<b>Method</b>	whole cell patch clamp
<b>Standard time</b>	2 -4 weeks
<b>Reference inhibitor</b>	TTX
<b>Target</b>	myotonia, periodic paralysis disorders

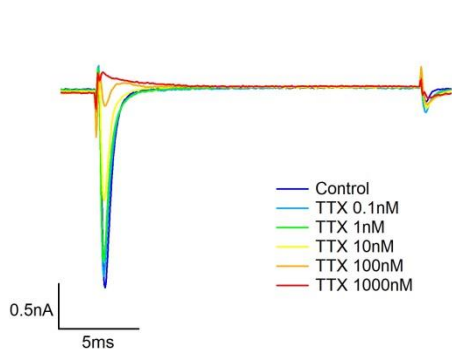


Figure 1. Representative traces of Nav1.4 currents, before and after TTX application at different concentrations

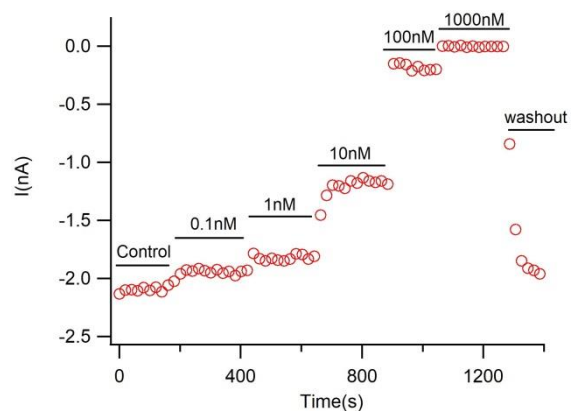


Figure 2. The time course of Nav1.4 currents after application of different TTX concentrations

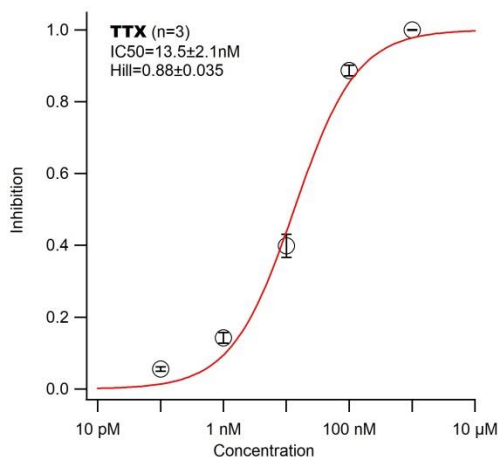


Figure 3. Concentration-dependent effect of TTX on Nav1.4 currents

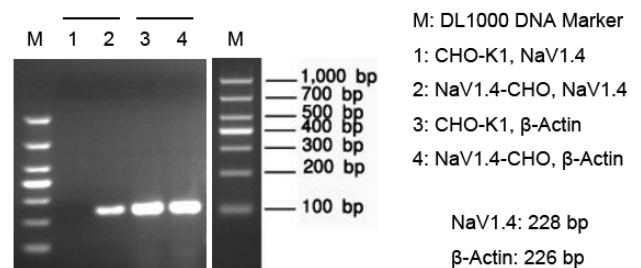


Figure 4. Expression of Nav1.4 mRNA in the stable cell line

*Further validation data available on request.*

# Nav1.5 Assay Data Sheet

<b>Channel</b>	Nav1.5
<b>Gene</b>	SCN5A
<b>Catalog Ref.</b>	ICE-CHO-Nav1.5
<b>Sources</b>	human
<b>Expression system</b>	HEK293
<b>Method</b>	whole cell patch clamp
<b>Standard time</b>	2-4 weeks
<b>Reference inhibitor</b>	TTX
<b>Target</b>	Brugada syndrome, long QT syndrome, progressive cardiac conduction disease ,dilated cardiomyopathy, sick sinus syndrome, Atrial Fibrillation

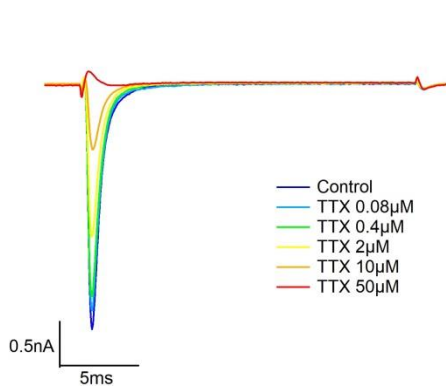


Figure 1. Representative traces of Nav1.5 currents, before and after TTX application at different concentrations

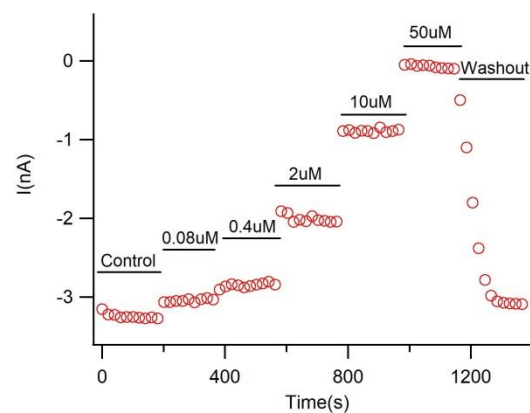


Figure 2. The time course of Nav1.5 currents after application of different TTX concentrations

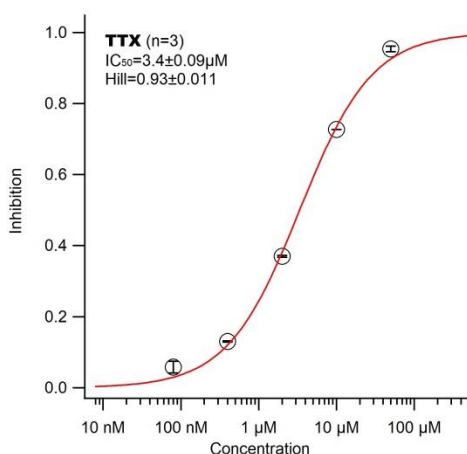


Figure 3. Concentration-dependent effect of TTX on Nav1.5 currents

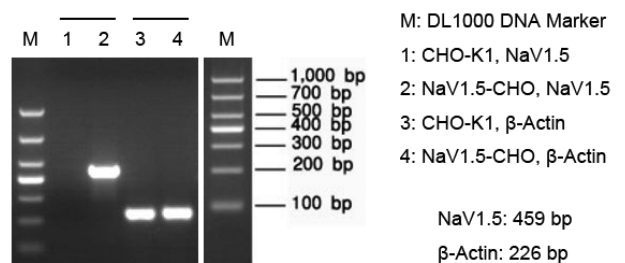


Figure 4. Expression of Nav1.5 mRNA in the stable cell line

*Further validation data available on request.*



# Nav1.6 Assay Data Sheet

<b>Channel</b>	Nav1.6
<b>Gene</b>	SCN8A
<b>Catalog Ref.</b>	ICE-HEK-Nav1.6
<b>Sources</b>	human
<b>Expression system</b>	HEK293
<b>Method</b>	whole cell patch clamp
<b>Standard time</b>	2-4 weeks
<b>Reference compound</b>	TTX
<b>Target</b>	Epilepsy, Degenerative Diseases,

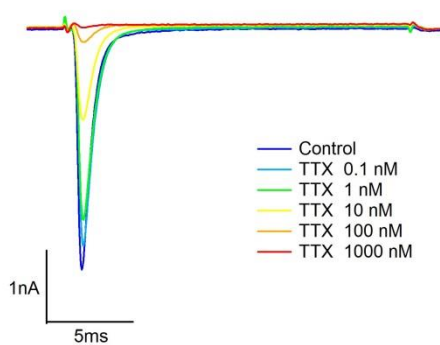


Figure 1. Representative traces of Nav1.6 currents, before and after TTX application at different concentrations

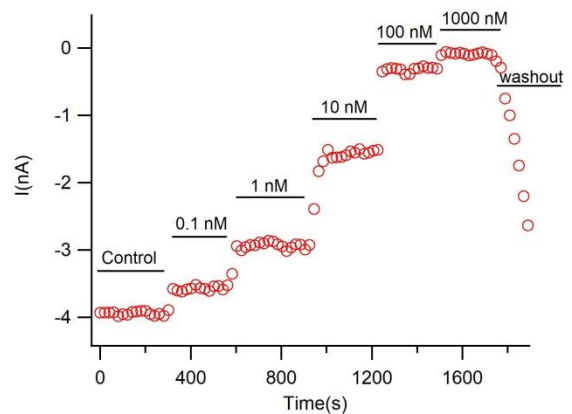


Figure 2. The time course of Nav1.6 currents after application of different TTX concentrations

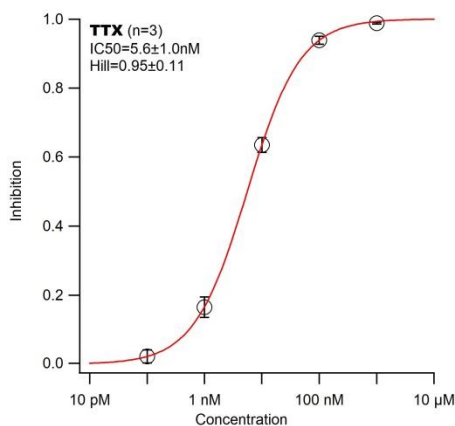


Figure 3. Concentration-dependent effect of TTX on Nav1.6 currents

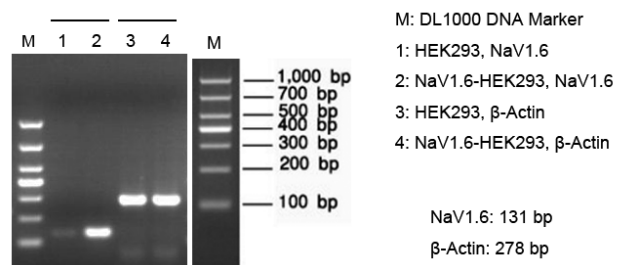


Figure 4. Expression of Nav1.6 mRNA in the stable cell line

*Further validation data available on request.*



# Nav1.7 Assay Data Sheet

Channel	Nav1.7
Gene	SCN9A
Catalog Ref.	ICE-HEK-Nav1.7
Sources	human
Expression system	HEK293
Method	whole cell patch clamp
Standard time	2-4 weeks
Reference compound	TTX
Target	Pain, Anxiety, Depression Related, erythromelalgia

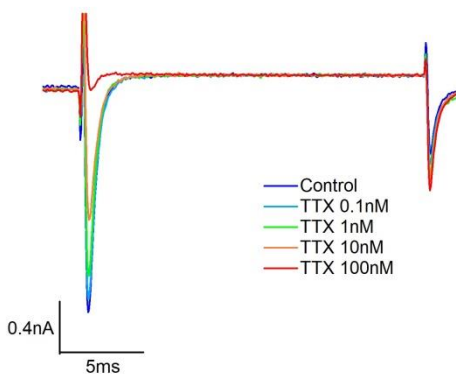


Figure 1. Representative traces of Nav1.7 currents, before and after TTX application at different concentrations

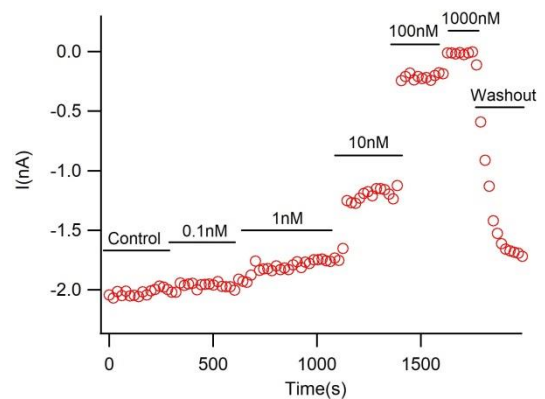


Figure 2. The time course of Nav1.7 currents after application of different TTX concentrations

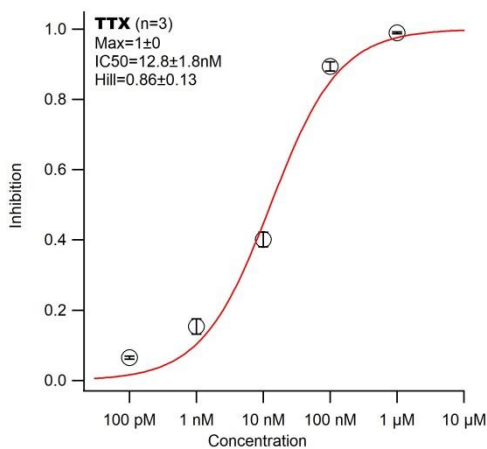


Figure 3. Concentration-dependent effect of TTX on Nav1.7 currents

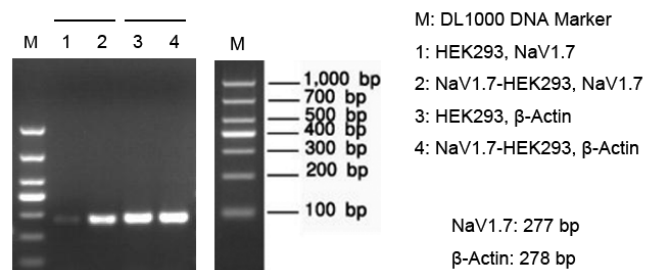


Figure 4. Expression of Nav1.7 mRNA in the stable cell line

Further validation data available on request.

# Nav1.8 Assay Data Sheet

Channel	Nav1.8/ $\beta$ 1
Gene	SCN10A/SCN1B
Catalog Ref.	ICE-CHO-Nav1.8
Sources	human
Expression system	HEK293
Method	whole cell patch clamp
Standard time	2-4 weeks
Reference compound	A-803467
Target	Pain

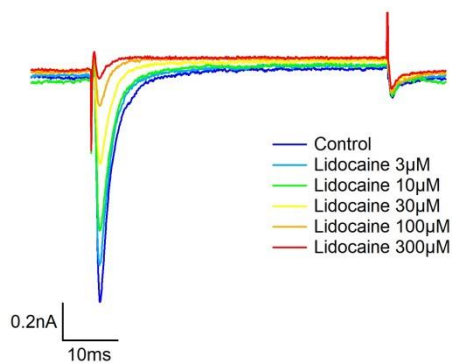


Figure 1. Representative traces of Nav1.8 currents, before and after Lidocaine application at different concentrations

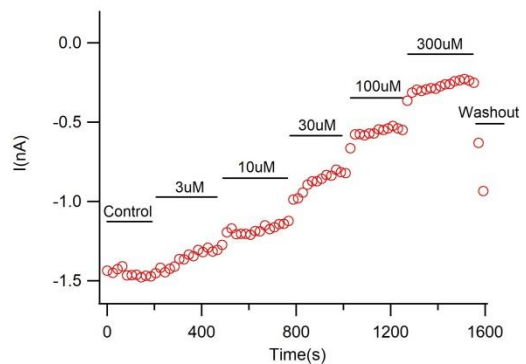


Figure 2. The time course of Nav1.8 currents after application of different Lidocaine concentrations

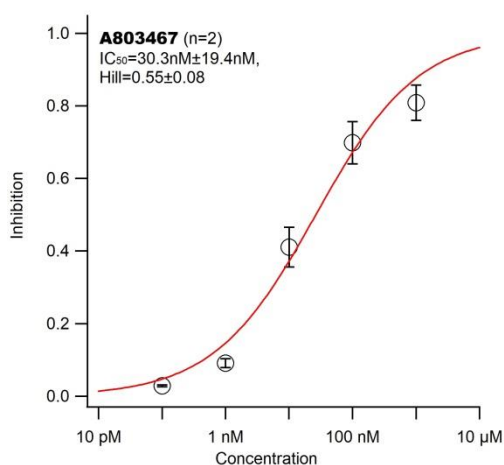


Figure 3. Concentration-dependent effect of TTX on Nav1.8 currents (inactivation state)

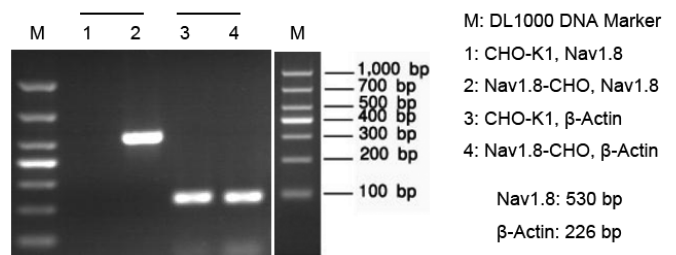


Figure 4. Expression of Nav1.8 mRNA in the stable cell line

Further validation data available on request.