Innovative CRO+Explorer
ICE Bioscience

Electrophysiology Services

Since 2010, our expert electrophysiology team has led the way in early drug discovery, specializing in ion channel screening and cardiac safety assessment. Our reputation is built on comprehensive services from target validation to preclinical candidate identification.

Ion Channel Screening

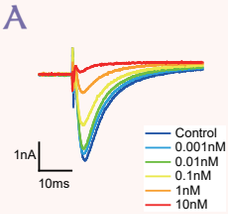
Manual Patch Clamp	Conventional Setup →		The gold standard for ion channel research, with high flexibility and quick response.
Auto Patch Clamp	QPatch II 48X →		The widely accepted and highly desirable auto-patch platform, generating dozens of dose-response curves per day.
Fluorescence Assay	FLIPR® Penta →		The high-throughput platform offering three formats of assays: Ti^{+} influx, Ca^{2+} influx, and membrane potential.

Key Features of Manual Patch Clamp Services

- ◇ **120+** pre-validated assays
- ◇ **100+** dose-response curves weekly
- ◇ **35+** scientists with **5+** years of experience
- ◇ **20%** off for first-time buyers
- ◇ **17** rigs of manual patch clamp
- ◇ **15+** years serving **800+** global clients
- ◇ **High Flexibility** in MoA exploration: Tailoring specific protocols for agonists, antagonists, PAMs, NAMs, use-dependent drugs, etc.

Example Data

A



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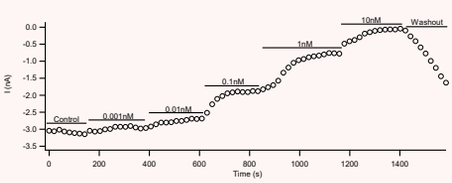
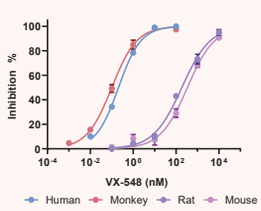


C



Species	IC_{50}
Human	0.2067nM
Cyno Monkey	0.1005nM
Rat	186.4nM
Mouse	339.0nM

Species-Selective Inhibition of Nav1.8 Channels by VX-548

(A) Representative traces of TTX-resistant (TTX-R) whole-cell currents recorded from cyno monkey DRG neurons by a 50 ms step of -10 mV from the holding potential of -80 mV, before (Control) and after the application of various concentrations of VX-548, as indicated.

(B) The time-dependent changes in peak currents in (A) upon exposure to the indicated concentrations of VX-548.

(C) Concentration-response relationship of VX-548 on TTX-R currents in human Nav1.8-CHO stable cell line, as well as in DRG neurons isolated from cynomolgus, rat, and mouse.

Ion Channel Assay List

Ion Channel Family	Subtype	Reference Agonist/Activator	Reference Antagonist/Inhibitor
Sodium Channel	Nav1.1	--	TTX
	Nav1.2	--	TTX
	Nav1.3	--	TTX
	Nav1.4	--	TTX
	Nav1.5	--	TTX / Lidocaine
	Nav1.6	--	TTX
	Nav1.7	--	TTX / PF-05089771
	rNav1.7	--	TTX
	Nav1.8	--	A-803467 / VX-548 / PF-01247324
	rNav1.8	--	A-803467 / VX-548 / PF-01247324
	INa-late	ATXII	Ranolazine
Potassium Channel	hERG (IKr, Kv11.1)	--	Cisapride / E-4031 / Terfenadine
	IKs (KCNQ1/KCNE1)	--	Chromanol 293B
	Kv1.1	--	4-AP
	Kv1.2	--	4-AP
	Kv1.3	--	4-AP / PAP-1 / Psora-4 / Margatoxin
	rKv1.3	--	PAP-1
	mKv1.3	--	PAP-1
	dogKv1.3	--	PAP-1
	Kv1.4	--	4-AP/ Psora-4
	Kv1.5	--	4-AP/ Psora-4
	Kv1.6	--	4-AP
	Kv2.1	--	TEA-Cl
	Kv3.1	--	TEA-Cl
	Kv3.2	--	TEA-Cl
	Kv3.4	--	TEA-Cl
	Kv4.2/KChIP2.2	--	4-AP
	Kv4.3	--	4-AP
	KCNQ2 (Kv7.2)	Retigabine	--
	KCNQ3 (Kv7.3)	Retigabine	--
	KCNQ4 (Kv7.4)	Retigabine / XE1101	--
	KCNQ5 (Kv7.5)	Retigabine / XE1101	--
	KCNQ2/3 (Kv7.2/Kv7.3)	Retigabine / XE1101	--
	rKCNQ2/3 (Kv7.2/Kv7.3)	Retigabine / XE1101	--
	mKCNQ2/3 (Kv7.2/Kv7.3)	Retigabine / XE1101	--
	KCNQ2/4 (Kv7.2/Kv7.4)	Retigabine	--
	KCNQ3/5 (Kv7.3/Kv7.5)	Retigabine	--
	KCa1.1 (BKαβ1)	--	TEA-Cl
	KCa1.1 (BKαβ4)	--	TEA-Cl
	KCa2.1 (SK1)	--	Apamin
	KCa2.2 (SK2)	--	Apamin
	KCa2.3 (SK3)	--	Apamin
	KCa3.1 (IK1)	--	Senicapoc / TRAM-34
	Kir2.1	--	$BaCl_2$
	Kir3.1/3.4 (IKACh)	--	$BaCl_2$
	Kir3.2	--	$BaCl_2$
	Kir4.1	--	$BaCl_2$
	Kir6.2/SUR2A (KATP)	Pinacidil	Glibenclamide
	Kir6.2/SUR1 (KATP)	Pinacidil	Glibenclamide
	TREK1 (K2P2.1)	--	Quinidine
	TASK2 (KCNK5)	--	Quinidine
Calcium Channel	Cav1.2	--	Nifedipine / Verapamil
	Cav1.3	--	--
	Cav2.1	--	$CdCl_2$
	Cav2.2	--	$CdCl_2$ /Cav2.2 blocker 1
	Cav3.2	--	$NiCl_2$
TRP Channel	TRPA1	Cinnamaldehyde / AITC	Ruthenium Red / A-967079
	rTRPA1	AITC	A-967079
	TRPV1	Capsaicine	Capsazepine
	TRPV3	2-APB	Forsythoside B

Ion Channel Family	Subtype	Reference Agonist/Activator	Reference Antagonist/Inhibitor
TRP Channel	TRPV4	GSK1016790A	GSK2193874
	TRPC4	Rosiglitazone	ML204
	TRPC5-WT	Rosiglitazone	ML204 / GFB887
	TRPC5-T478C	Rosiglitazone	ML204
	TRPC6	OAG / Carbachol	SAR7334
	TRPM3	CIM-0216	Isosakuranrtin
	TRPM4/SUR1	A23187	9-Phenanthrol
	TRPM8	Menthol	2-APB
	TRPML1-ΔNC	ML-SA1	ML-SI3
	TRPML1$^{L15/16A\ L577/578A}$	--	--
	TRPML3	ML-SA1	ML-SI3
Chloride Channel	CFTR	Forskolin	CFTR(inh)-172
	TMEM16A (ANO1)	--	T16A(inh)-A01
	TMEM16B (ANO2)	--	--
ASIC (Acid-Sensing Ion Channel)	ASIC1a	pH=6.0	Amiloride / Benzamil
	ASIC1b	pH=5.0	Amiloride / Benzamil
	ASIC3a	pH=5.0	Amiloride / Benzamil
HCN Channel	HCN1	--	Ivabradine
	HCN2	--	Ivabradine
	HCN4	--	Ivabradine
Lysosomal Two-Pore Channel	TPC2	TPC2-A1-N	YM-201636
P2X Receptor	P2X1	ATP / BZ-ATP	NF449
	P2X2	ATP / BZ-ATP	PPADS
	P2X3	αβ-methylene ATP	AF219 / BLU-5937 / S-600918
	rP2X3	αβ-methylene ATP	AF219 / BLU-5937
	gpP2X3	αβ-methylene ATP	AF219 / BLU-5937
	rP2X2/3	αβ-methylene ATP	AF219
	P2X2/3	αβ-methylene ATP	AF219
	gpP2X2/3	αβ-methylene ATP	AF219
	P2X4	ATP / BZ-ATP	BX430
	P2X5	BZ-ATP	PPADS
	P2X7	ATP / BZ-ATP	AZ10606120
	mP2X7	--	--
$GABA_A$ Receptor	$GABA_A$ (α1β2γ2)	GABA / Diazepam / Etomidate / Propofol	Bicuculline / PTX
	$GABA_A$ (α1β3γ2)	GABA	Bicuculline / PTX
	$GABA_A$ (α2β2γ2)	GABA / Diazepam	Bicuculline / PTX
	$GABA_A$ (α2β3γ2)	GABA	Bicuculline / PTX
	$GABA_A$ (α3β2γ2)	GABA / Diazepam	Bicuculline / PTX
	$GABA_A$ (α3β3γ2)	GABA	Bicuculline / PTX
	$GABA_A$ (α4β3γ2)	GABA	Bicuculline / PTX
	$GABA_A$ (α4β3δ)	GABA / Zuranolone (SAGE-217) /Brexanolone (SAGE-547)	Bicuculline / PTX
	$GABA_A$ (α5β3γ2)	GABA	Bicuculline / PTX / α5IA
	$GABA_A$ (α5β2γ2)	GABA / Diazepam	Bicuculline / PTX
	$GABA_A$ (α6β2γ2)	GABA	Bicuculline / PTX
	$GABA_A$ (α6β3γ2)	GABA	Bicuculline / PTX
	GABAA (α6β3δ)	GABA / Brexanolone (SAGE-547)	Bicuculline / PTX
NMDA Receptor	NR1/NR2A	L-Glu+Gly / NMDA+Gly	D-AP5 / Memantine
	rNR1/NR2A	L-Glu+Gly / NMDA+Gly	D-AP5 / Memantine
	NR1/NR2B	L-Glu+Gly / NMDA+Gly	D-AP5 / Memantine
	rNR1/NR2B	L-Glu+Gly / NMDA+Gly	Ifenprodil
	NR1/NR2C	L-Glu+Gly / NMDA+Gly	D-AP5 / Memantine
	NR1/NR2D	L-Glu+Gly / NMDA+Gly	D-AP5 / Memantine
AMPA Receptor	GluA1-TARPγ2	--	--
	GluA1-TARPγ8	L-Glu	NBQX
Glycine Receptor	GlyR α1β	Glycine	Strychnine
nACh Receptor	nAChR α1β1δε	Acetylcholine (ACh)	Adiphenine
	nAChR α3β4	Acetylcholine (ACh)	MLA
	nAChR α4β2	Acetylcholine (ACh)	DHβE
	nAChR α7/RIC3	Acetylcholine (ACh)	MLA
5-HT3 Receptor	5-HT3A	Serotonin (5-HT)	Ondansetron

Comprehensive Study Workflow for Nav1.8 Modulator Development

1 Primary Screening
- Whole-cell Currents Recording by QPatch and Manual Patch Clamp

2 Secondary Screening
- Isoform Selectivity
- Rat/Mouse DRG Neuron TTX-R Currents Recording
- Rat/Mouse DRG Neuron Action Potential Recording

3 ADMET Tier 1
- hERG Cardiac Safety Assessment
- Solubility
- Liver Microsomal Metabolic Stability (LMMS) in Human/Mouse/Rat
- CYP Inhibition

4 PK Tier 1 (Mouse/Rat)
- Exposure
- F%

5 Acute Pain Models
- Acetic Acid Writhing Model in Mouse
- Postoperative Incisional Pain in Mouse, Rat or Dog
- Formalin-induced Inflammatory Pain in Rat
- Complete Freund's Adjuvant-induced Inflammatory Pain in Mouse/Rat
- Hot Plate Test in Mouse/Rat

6 Chronic Pain Models
- Diabetic Peripheral Neuropathy Model in Mouse/Rat
- Bone Metastasis Cancer Pain Model in Mouse/Rat
- Chronic Constriction Injury Model in Mouse/Rat
- Spinal Nerve Ligation Model in Mouse/Rat
- Selective Injury to the Sciatic Nerve Branches Model in Mouse/Rat
- Chemotherapy (paclitaxel, vincristine, etc.) -induced Pain Model in Mouse/Rat
- Arthritis Model in Rat

7 ADMET Tier 2
- Comprehensive In-vitro Proarrhythmia Assay (CiPA)
- Plasma Protein Binding
- Permeability
- LMMS (Dog/Monkey)
- TDI

8 PK Tier 2 (Dog/Monkey)
- CL
- AUC
- $T_{1/2}$
- F%

9 Safety Evaluation
- Brain Tissue Drug Exposure
- ICESTP™ Drug Abuse Safety Panel
- Acute Toxicity (MTD)
- Repeated Dose Toxicity

10 MOA Study
- Activation Curve
- Inactivation Curve
- Use-dependent Assay

11 PCC Selection
- Cyno Monkey DRG Neuron TTX-R Currents Recording
- Cyno Monkey DRG Neuron Action Potential Recording

Specialized Services

1. Cortical and hippocampal neurons from mouse and rat
2. DRG neurons from mouse, rat, dog and cynomolgus
3. Brain slice recording and behavior models
4. Patch clamp recording of lysosomal channels
5. Ventricular and atrial myocytes isolated from mouse, rat, rabbit, and dog

ICE Team

- **E**fficient
- **P**rofessional
- **H**ighly motivated
- **Y**ears of Experience
- **S**ervice Driven