Supplementary Information

Xenopus borealis as an alternative source of oocytes for biophysical and pharmacological studies of neuronal ion channels

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Supplementary Table S1

Comparison of mean values for fast and slow time constants (τ) of deactivation for $K_V10.1$ channels tested in *X. laevis* and *X. borealis* oocytes. There is no evidence of a difference between the two species for all measured parameters (unpaired t-test, $P > 0.05$).

Ion Channel	Tau – deactivation (ms)		*P* value	Reference
$K_V10.1$	*X. laevis*	*X. borealis*		
Slow (–120 mV)	145.9	169.7	0.075	
Slow (–110 mV)	147.6	169.8	0.085	[1]
Slow (–100 mV)	174.4	193.7	0.257	
Slow (–90 mV)	180.0	198.9	0.187	
Fast (–120 mV)	25.6	27.1	0.725	
Fast (–110 mV)	21.9	25.2	0.406	[1]
Fast (–100 mV)	22.4	27.3	0.289	
Fast (–90 mV)	20.5	23.9	0.319	

Supplementary Table S2

Properties of MTS-TAMRA labelled α_1N203C and MTSR labelled α_1R271C human GlyRs. Comparison of EC_{50}, slope, maximal current change (ΔI_{max}), and maximal fluorescence change (ΔF_{max}) values tested in *X. laevis* and *X. borealis* oocytes. Data are mean ± s.e.m. There is no evidence of a difference between the two species for all measured parameters (unpaired t-test, $P > 0.05$). Data are comparable to literature values for α_1N203C [2] and α_1R271C [3].

Ion Channel	EC_{50} (μM)		*P* value
GlyR	*X. laevis*	*X. borealis*	
α_1N203C Δ*I*	145 ± 10	136 ± 8.7	0.69
α_1N203C Δ*F*	548 ± 25	408 ± 51	0.63
α_1R271C Δ*I*	1926 ± 175	1698 ± 104	0.52
α_1R271C Δ*F*	872 ± 58	1006 ± 98	0.46
	Slope		*P* value
	X. laevis	*X. borealis*	
α_1N203C Δ*I*	1.9 ± 0.2	1.5 ± 0.1	0.82
α_1N203C Δ*F*	1.4 ± 0.2	1.8 ± 0.1	0.62
α_1R271C Δ*I*	1.4 ± 0.2	2.0 ± 0.2	0.1
α_1R271C Δ*F*	1.3 ± 0.2	1.0 ± 0.1	0.46
	ΔI_{max} (μA) or ΔF_{max} (%)		*P* value
	X. laevis	*X. borealis*	
α_1N203C Δ*I*	8.4 ± 0.2	8.0 ± 0.8	0.63
α_1N203C Δ*F*	25.9 ± 4.2	27.8 ± 4.4	0.77
α_1R271C Δ*I*	3.4 ± 1.7	2.7 ± 0.5	0.69
α_1R271C Δ*F*	12.2 ± 2.2	9.0 ± 2.2	0.34

Supplementary Table S3

Comparison of half-maximal response and slope values for ion channels tested in *X. laevis* and *X. borealis* oocytes and references to studies reporting similar values for these parameters. Steady-state desensitisation: SSD; Activation: act. There is no evidence of a difference between the two species for any of the measured parameters (unpaired t-test, $P > 0.05$).

Ion Channel	Half-maximal response		*P* value	Slope		*P* value	Reference
	X. laevis	*X. borealis*		*X. laevis*	*X. borealis*		
Voltage-gated potassium channels							
$K_V10.1$	19.7 mV	20.2 mV	0.86	20.8	20.6	0.90	[1]
$K_V11.1$	–24.3 mV	–23.7 mV	0.18	6.98	7.53	0.16	[4]
Voltage-gated sodium channels							
$Na_V1.2$	–22.5 mV	–22.3 mV	0.61	4.74	4.60	0.84	[5]
$Na_V1.5$	–33.5 mV	–33.8 mV	0.49	4.81	4.22	0.08	[6]
$Na_V1.7$	–14.2 mV	–14.8 mV	0.09	5.24	4.88	0.27	[7]
Acid-sensing ion channels							
ASIC1a pH_{act}	pH 6.11	pH 6.06	0.27	1.95	1.86	0.83	[8]
ASIC1a pH_{SSD}	pH 7.19	pH 7.19	0.66	10.39	9.97	0.69	[8]
ASIC1b pH_{act}	pH 5.95	pH 5.97	0.11	3.98	3.36	0.12	[9]
ASIC1b pH_{SSD}	pH 6.78	pH 6.78	0.72	4.17	4.09	0.91	[10]
ASIC2a pH_{act}	Ambiguous fits with sigmoidal non-linear regression model						
ASIC2a pH_{SSD}	pH 5.99	pH 5.98	0.66	2.27	2.37	0.78	[11]
ASIC3 pH_{act}	pH 6.16	pH 6.12	0.13	1.46	1.60	0.40	[9]
ASIC3 pH_{SSD}	pH 7.04	pH 7.02	0.19	8.25	9.04	0.70	[12]
Pc1a:ASIC1a	1.00 nM	1.03 nM	0.63	1.44	1.60	0.34	[13]
APETx2:ASIC3	64.7 nM	51.1 nM	0.05	0.84	0.93	0.37	[14]
$GABA_A$ receptors							
$\alpha_1\beta_2\gamma_{2L}$	25.1 μM	17.9 μM	0.27	0.56	0.60	0.71	[15]
$\alpha_5\beta_2\gamma_{2L}$	5.18 μM	4.71 μM	0.84	0.49	0.74	0.16	[16]
$\alpha_5\beta_3\gamma_{2L}$	3.10 μM	3.92 μM	0.35	0.75	0.93	0.27	[17]

Supplementary Figure S1

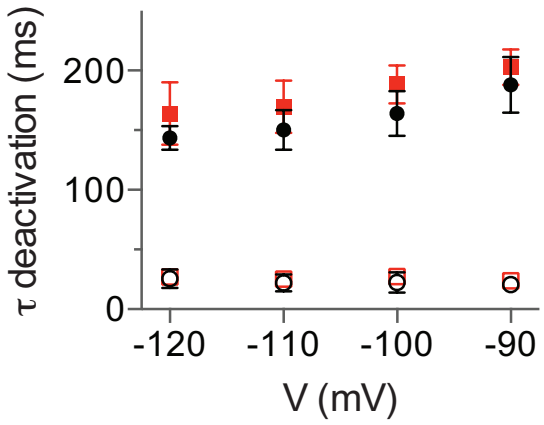

Figure. S1. Deactivation kinetics of Kv10.1 channels expressed in *X. laevis* (●) and *X. borealis* (■) oocytes. Fast (open symbols) and slow (closed symbols) time constants (τ) of deactivation (analysed from the tail current at different voltages following a maximally activating pre-pulse to +80 mV) (n = 12–15). Error bars indicate 95% confidence intervals.

Supplementary References

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