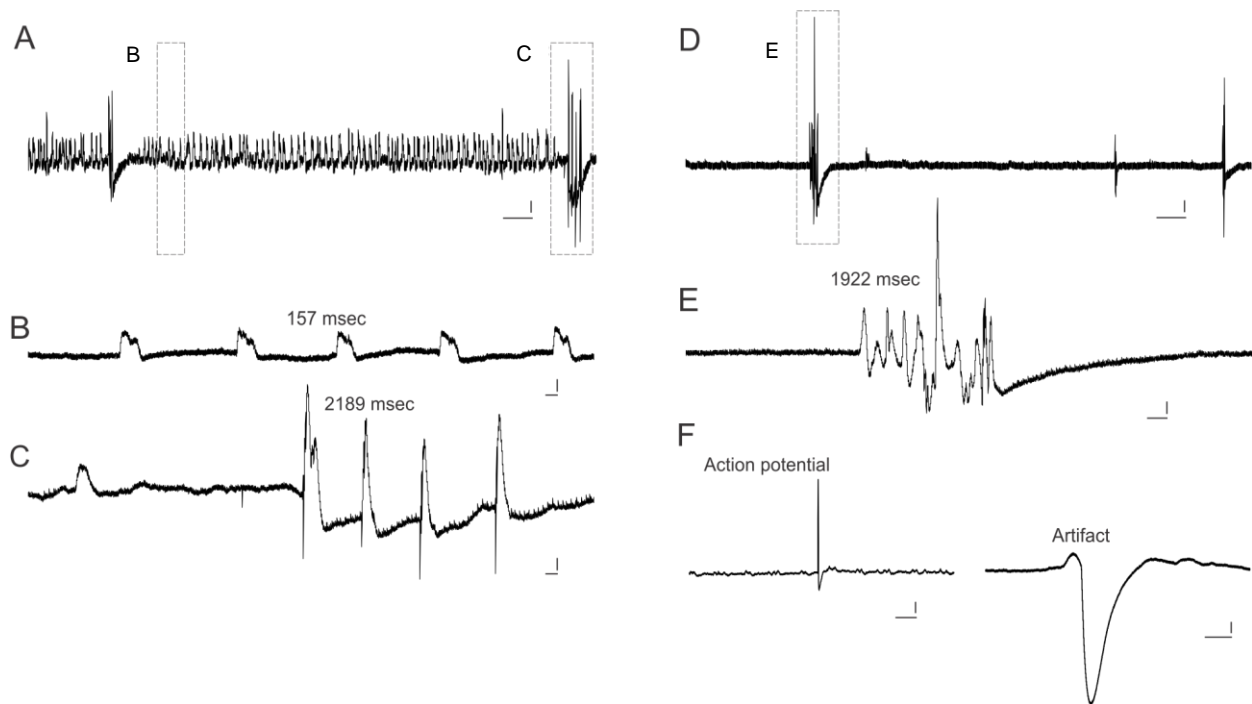


Supplementary Information



Supplementary Figure S1: Electrographic activity in mutant zebrafish at higher resolution

Temporal expansions of electrographic activity are shown for *scn1Lab* mutants at 4 dpf (A) sample trace showing prominent short-duration, small amplitude, high frequency “interictal” like events with long-duration, large amplitude, low frequency multi-spike “ictal” like events. Note the silencing of electrographic discharge following the larger events. (B) temporal expansion of interictal events; typical frequency for one such event is shown. (C) temporal expansion of ictal events; typical frequency for this event is shown. (D) sample trace from a different mutant zebrafish showing prominent ictal burst activity. Panel expansion (E) as in A. (F) Sample intracellular recording of an individual action potential and an example of a twitch artifact (note the slow duration and lack of multi-spike activity in the latter). Scale bars A and D: 1 mv, 1 s; B and C, 1 mV, 100 ms; E and F: 1 mV, 50 ms.

Supplementary Table S1: Drug candidates showing lethality in locomotion assay

acetarsol	carzenide	fendiline HCl	orotic acid
acetyl-L-leucine	cetrimonium bromide	formestane	oxinacic acid
acipomox	chiniofon	fosfosal	paroxypropione
acriflavinium HCl	chlorazanyl hydrochloride	ftaxelide	picolamine
afalanine	chlormidazole	guaiacol	pidolic acid
alexidine HCl	chlorryrifos	hexamethonium bromide	pidotimod
allythiourea	cinchopen	hexetidine	piperonyl butoxide
artemisinin	climbazole	hydroquinidine	pranoprofen
benzyl isothiocyanate	clofibric acid	hydroxytuluic acid	prasterone
beta-ESCIN	clofoctol	idebenone	proflavine hemisulfate
beta-naphthol	coumarin	iproheptine	propoxur
bornyl acetate	cyclandelate	irsogladine maleate	salinomycin
bromopride	dexfosfoserine	kainic acid	securinine
bronopol	dibutyl phthalate	levomentol	sodium tetradecyl sulfate
butylated hydroxytoluene	dichlorophen	mexeneone	strychnine
camylofine dihydrochloride	drofenine HCl	miltefosine	sulfaguanidine
carbarsonne	ebselen	nadifloxacin	talsigel
carglumic acid	efloxate	nitroxoline	tioxolone
carmofur	ethaverine HCl	N-methyl (-)ephedrine [1R, 2S]	tiratricol
carsalam	exalamide	nonivamide	trimetazidine dihydrochloride
			vincamine

List of MicroSource International Drug Collection compounds that were lethal in the locomotion assay at a test concentration of 667 μ M. Drugs lethal in a 1:100 dilution re-trial are indicated in **bold**.

Supplementary Table S2: Primer sequences for qPCR

Gene name	Gene symbol	Gene Bank	Sequence
actin beta	β -act	FJ915059	F, 5' CATCCATCGTTCACAGGAAGTG 3'
			R, 5' TGGTCGTTTCGTTTGAATCTCAT 3'
sodium channel, voltage-gated, type I like, alpha b	scn1lab	NM_001044895	F, 5' GAGCGGTTTGACCCCAATG 3'
			R, 5' GGCAATGCGTAATGGAGGAT 3'
sodium channel, voltage-gated, type VIII, alpha a	scn8aa	NP_571703	F, 5' TGGCTGGATTTTCATGGTCATC 3'
			R, 5' GAATGTGCGCAGAGCTGACA 3'
sodium channel, voltage-gated, type VIII, alpha b	scn8ab	NP_001038648.1	F, 5' GCCGTGGCTCTCTCTTCGT 3'
			R, 5' AGCCAGCGGGTTAATTCGA 3'
hyperpolarization activated cyclic nucleotide-gated potassium channel 1	hcn1	XM_696184	F, 5' CAGATGTCATCGGGTGCATTA 3'
			R, 5' TCTCCTGGAGCCCGTTGA 3'
homer homolog 1	homer1	BC076306.1	F, 5'CGCCGTGGGATCTATTCAGT3'
			R, 5' TTATGAGCAGCGGCATTCTG3'
brain-derived neurotrophic factor	bdnf	FJ915060	F, 5' TCGAAGGACGTTGACCTGTATG 3'
			R, 5' TGGCGGCATCCAGGTAGT 3'
ATPase, Na ⁺ /K ⁺ transporting, alpha 1a.5 polypeptide	atp1a1a.5	NM_178099	F, 5' CCGTGATGCTTGGCTTTACTT 3'
			R, 5' GCGACAATGAGCCCAATAAGA 3'
ankyrin repeat and KH domain containing 1	ankhd1	NM_001199768	F, 5' CCTCCGCCAACGTGTCTTT 3'
			R, 5' AAGGGCAAGCTGAGGATGAG 3'
calsyntenin 1	clstn1	NM_001077784	F, 5' CTGCTGGACCCTCTCTGATAG 3'
			R, 5' TGAATCCTGAAGCCGCAGAT 3'
NMDA receptor regulated 2	narg2	XM_001344415	F, 5' GGAGTCCTTCGGCGAGTCT 3'
			R, 5' TCGGATTAAGCCGGTTGT 3'
transient receptor potential cation channel, subfamily C, member 4 associated protein a	trpc4apa	NM_131569	F, 5' GGTGGAAGTGCTTTACGTGCTT 3'
			R, 5' ACGAAACTCCGCCAACATTT 3'
GTP cyclohydrolase 2	gch2	NM_131667	5' CATGCGTGGAGTGCAGAAG 3'
			R, 5' GGCCTTTGGATCCTCTCTGAA 3'
solute carrier family 24, member 5	slc24a5	NM_001030280	F, 5' GGTGGCCCCGAGAAGGTAAAT 3'
			R, 5' CAGGCCAGACACAGCATATC 3'
amiloride-sensitive cation channel 1	accn1	NM_214788	F, 5' ATGTTTAACGCTGCCGAAGAG 3'
			R, 5' CAACATGATCTCCAGGCCATT 3'
calcium/calmodulin-dependent protein kinase II inhibitor 2	camk2n2	NM_001002642	F, 5' GGCAAAACACGTGGTCATTG 3'
			R, 5' ACACGCCGGGTGATGACTT 3'

neuronal calcium sensor 1a	ncs1a	NM_200465	F, 5' AAACGAGTTGATCGCATCTTTG 3'
			R, 5' GAGCCCTCCTGAAACTCCTGTA 3'
calcineurin B homologous protein 2	chp2	NM_199836	F, 5' TCGACCCAAAGAGCCCAAT 3'
			R, 5' GGCATACAGCTGAAACGCAAA 3'
pro-melanin concentrating hormone-like protein	pmchl	NM_001162488	F, 5' CAGAGCGCAGAGAAGTTGGTT 3'
			R, 5' TCCCACCATGCACCTCATG 3'
desmin b	desmb	NM_001077452	F, 5' TGGCCCTGGATGTGGAGAT 3'
			R, 5' ACGACTGCATGGGCATCAC 3'
somatolactin beta	smtlb	NM_001037674	F, 5' TGTGGTGGTTCTGGTCTGCTT 3'
			R, 5' ACGTCCCTCCAATCTCTTGGT 3'

Real-time qPCR primer sequences and GeneBank accession numbers for the SybrGreen assays.

Primers were designed using Primer Express v3.0 software (Applied Biosystems).

Supplementary Table S3: Primer sequences for RT-PCR

Gene symbol	GeneBank	Sequence
β -act	AF057040	F, 5' GGACTCTGGTGATGGTGTGA 3' R, 5' CACCGATCCAGACGGAGTAT 3'
scn11ab	NM_001044895	F, 5' GCAAAGAGAACTGCCTGTCC 3' R, 5' GCGTTCACTACCACCCTCAT 3' F, 5' GGTCATGGTCATTGGGAATC 3' R, 5' ACTTCCCTCCACGTCAGATG 3' F, 5' CATCTGACGTGGAGGGAAGT 3' R, 5' ACAGCTCGTCGTTGGTGATA 3'
scn8aa	NP_571703	F, 5' CAGCAATCCTCCAGAATGGT 3' R, 5' ACGATCCACAAAGATCACC 3' F, 5' TGAAGAAGCTGTCCGATGTG 3' R, 5' GTCTCCCTTCTCCTCCTGCT 3' F, 5' TGAAGAAGCTGTCCGATGTG 3' R, 5' GCTCTGGAGCTCAGTTTGG 3'
scn8ab	NP_001038648.1	F, 5' TGTGGAAGAGCTGGAGGAGT 3' R, 5' AGCACCCGGAACACAATTAG3' F, 5' GGGCTCAGAGAACGAGTTTG 3' R, 5' TGAACACCAGGTTTCCAACA 3' F, 5' GGCCTCCATCATGAATCAGT 3' R, 5' ACAGAAAGCACCTCCTCGAA 3'
hcn1	XM_696184	F, 5' AATCCTCCCCAGCCTCTTTA 3' R, 5' TGCTTAAGACTGCCGACTCTC 3' F, 5' TGAGTGTCGAAGGGAAGAAGA 3' R, 5' CTGGTGGTTGGGGTAAAGAG 3'

Primer's sequences and GeneBank accession numbers for the investigated genes in conventional RT-PCR.