

Hello Bio, Inc.  
304 Wall St., Princeton, NJ 08540 USA

T. 609-683-7500  
F. 609-228-4994

customercare-usa@hellobio.com



## DATASHEET

### Tetrodotoxin citrate

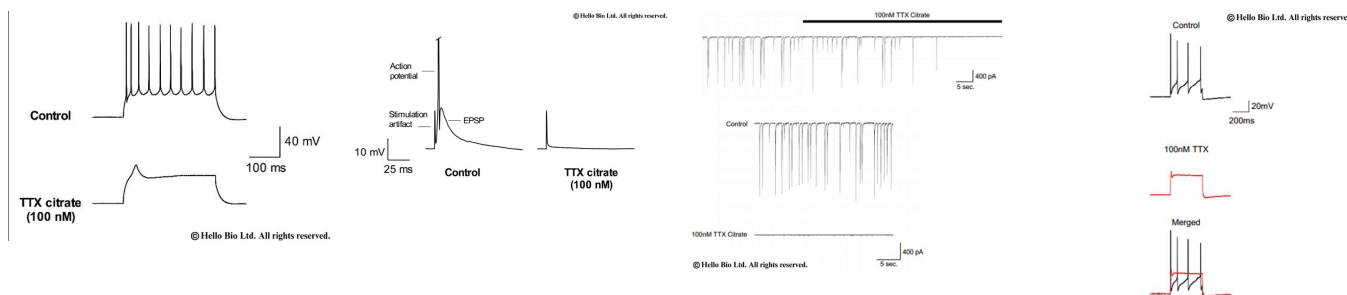
## Product overview

<b>Name</b>	Tetrodotoxin citrate
<b>Cat No</b>	HB1035
<b>Alternative names</b>	TTX TTX citrate
<b>Biological action</b>	Blocker
<b>Purity</b>	>99%
<b>Special requirements</b>	As this product is a toxin, customers are required to complete a short end user declaration when ordering. Our customer care team will be happy to help you with this.
<b>Customer comments</b>	<p><i>Tetrodotoxin citrate from Hello Bio worked perfectly as expected and blocked action potential firing at concentrations of 100 nM and above. I would recommend the use of Tetrodotoxin citrate from Hello Bio for use in electrophysiology recordings. <b>Matt Udakis, PhD student, University of Bath, UK</b></i></p> <p><i>Hello Bio produce very high quality TTX citrate, which fully blocks NaV channels and provides good value for money. <b>Verified customer, The University of Edinburgh</b></i></p> <p><i>Just washed the Tetrodotoxin citrate (TTX) on and it works as expected (it inhibits the fibre volley at 1 <math>\mu</math>M). <b>Verified customer, The University of Bristol</b></i></p> <p><i>I am fully satisfied with Tetrodotoxin citrate (TTX) from Hello Bio <b>Verified customer, UTHSC</b></i></p> <p><i>Just what we expected. We are using TTX (Tetrodotoxin citrate) for many years as our tool compound to block voltage-gated Na currents. TTX citrate from Hello Bio worked perfectly in our laboratory. <b>Verified customer, University of Vigo</b></i></p>

## Description

Potent, selective, use-dependent  $\text{Na}^+$  channel blocker. Citrate Salt.

## Images



“...a very high quality TTX which fully blocks  $\text{NaV}$  channels and is good value for money

Verified Customer, University of Edinburgh

## Biological Data

### Biological description

Potent, selective and reversible, voltage dependent  $\text{Na}^+$  channel blocker. Use dependent. Citrate Salt. Commonly used in electrophysiological preparations to block or reduce excitability.

## Application notes

Tetrodotoxin is commonly used in electrophysiology to block excitability by inhibiting action potential firing within neurons. It is commonly applied at concentrations of 1  $\mu\text{M}$ . Tetrodotoxin from Hello Bio works as expected and blocks action potential firing at concentrations of 100 nM and above (see Fig 1 and 2 above).

### #Protocol 1: Effect of TTX citrate on action potentials in mouse cortical neurons

- Whole cell voltage clamp recordings were obtained from layer V pyramidal neurons of the mouse prelimbic cortex brain slice.
- Neurons were held at the resting membrane potential ( $\sim -70$  mV) and injected with a 500 pA 300 ms current step to induce action potential firing.
- TTX was bath applied for 10 min first at 100 nM then 300 nM, 1  $\mu\text{M}$  and 2  $\mu\text{M}$ . After each drug application a current step was recorded to assess action potential blockade.

### #Protocol 2: Effect of TTX citrate on EPSPs and action potential firing in mouse cortical neurons

- Whole cell voltage clamp recordings were obtained from layer V pyramidal neurons of the mouse prelimbic cortex brain slice.
- Neurons were held at the resting membrane potential ( $\sim -70$  mV) and EPSP were evoked by placing a stimulating electrode close to the recorded the neuron in layer II/III.
- EPSPs and action potentials were evoked by single square (150  $\mu\text{s}$ ) pulse every 10 sec with an intensity that produced both an EPSP and action potential.
- TTX was bath applied for 10 min first at 100 nM then 300 nM, 1  $\mu\text{M}$  and 2  $\mu\text{M}$  whilst continually evoking and recording EPSP/A.Ps.

## Solubility & Handling

### Storage instructions

-20 °C (desiccate)

### Solubility overview

Soluble in water (1 mg/ml). The vial contains 1 mg of TTX and an additional 5 mg of citrate buffer to aid with solubility. For calculations relating to TTX concentration, refer to the molecular weight 319.27 listed on the vial.

### Important

This product is for RESEARCH USE ONLY and is not intended for therapeutic or diagnostic use. Not for human or veterinary use.

## Chemical Data

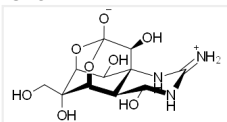
### Chemical name

Octahydro-12-(hydroxymethyl)-2-imino o-5,9:7,10a-dimethano-10aH-[1,3]dioxocino[6,5-d]pyrimidine-4,7,10,11,12-pentol citrate

### Molecular Weight

319.27

### Chemical structure



### Molecular Formula

$\text{C}_{11}\text{H}_{17}\text{N}_3\text{O}_8$

### CAS Number

18660-81-6

### PubChem identifier

54592378

### SMILES

C(C(=O)O)C(CC(=O)O)(C(=O)O)O.C([C@@]1([C@@H]2[C@@H]3[C@H](N=C(N[C@]34[C@@H]([C@H]1O[C@]([C@H]4O)(O2)O)O)N)O)O

### Source

Extracted from fugu

### InChi

InChI=1S/C11H17N3O8.C6H8O7/c12-8-13-6(17)2-4-9(19,1-15)5-3(16)10(2,14-8)7(18)11(20,21-4)2-5;7-3(8)1-6(13,5(11)12)2-4(9)10/h2-7,15-20H,1H2,(H3,12,13,14);13H,1-2H2,(H,7,8)(H,9,10)(H,11,12)/t2-,3-,4+,5-,6-,7+,9+,10+,11+;/m1./s1

### InChiKey

YUJWMDOXROTQCW-WNGAXIQVSA-N

### Appearance

White or colourless solid

## References

**The protective action of tetrodotoxin and (+/-)-kavain on anaerobic glycolysis, ATP content and intracellular Na<sup>+</sup> and Ca<sup>2+</sup> of anoxic brain vesicles.**

Gleitz J *et al* (1996) Neuropharmacology 35(12)

**PubMedID** [9076753](#)

**Antagonistic effects of tetrodotoxin on aconitine-induced cardiac toxicity.**

Ono T *et al* (2013) J Nippon Med Sch 80(5)

**PubMedID** [24189353](#)

**Tetrodotoxin: chemistry, toxicity, source, distribution and detection.**

Bane V *et al* (2014) Toxins (Basel) 6(2)

**PubMedID** [24566728](#)

**Tetrodotoxin for moderate to severe cancer pain: a randomized, double blind, parallel design multicenter study.**

Hagen NA *et al* (2008) J Pain Symptom Manage 35(4)

**PubMedID** [18243639](#)

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