

Product Data Sheet

Product Name: (S)-AMPA

Cat. No.: GC17213

Chemical Properties

Cas. No. 83643-88-3

Chemical Name (S)-2-amino-3-(5-methyl-3-oxo-2,3-dihydroisoxazol-4-yl)propanoic acid

SMILES O=C1NOC(C)=C1C[C@@H](C(O)=O)N

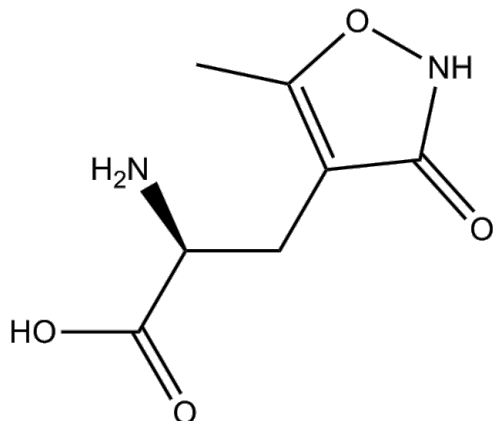
Formula $C_7H_{10}N_2O_4$ M.Wt 186.17

Solubility <18.62mg/ml in Water Storage Store at -20°C

General tips For obtaining a higher solubility, please warm the tube at 37 °C and shake it in the ultrasonic bath for a while. Stock solution can be stored below -20°C for several months.

Shipping Condition Evaluation sample solution: ship with blue ice All other available size: ship with RT, or blue ice upon request.

Structure



Protocol

Cell experiment [1]:	
Cell lines	Hippocampal neurons

Caution: Product has not been fully validated for medical applications. For research use only.

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Preparation Method	Hippocampal neurons were maintained in Neurobasal medium supplemented with 5% FBS, 2% B27, 1% Glutamine at 37°C, 5% CO ₂ . Neurons were treated with (S)-AMPA (50μM) for 15min, then harvested for TAP-MS assay; or treated with (S)-AMPA (25μM) for 30min, then harvested for western blot analysis.
Reaction Conditions	25-50μM; 15-30min
Applications	(S)-AMPA treatment increased UBE3A binding to Kv4.2 in cultured hippocampal neurons and induced Kv4.2 protein loss, which was blocked by pre-treatment of MG132.
Animal experiment [2]:	
Animal models	naive adult male CD1 mice
Preparation Method	Mice were implanted with guide cannulae into the amygdala and infused with (S)-AMPA 10μM in aCSF (2μL) over 2min, then kept in home cage for 30min before behavioral tests including locomotor activity, resident-intruder test, tail suspension test, forced swimming test and sucrose preference test.
Dosage form	10μM in 2μL ; intra-amygdalar infusion; single injection
Applications	(S)-AMPA infusion induced despair-like behavior in tail suspension test and forced swimming test, but did not affect locomotor activity, aggressive behavior or sucrose preference.

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References:[1] Hu JH, Malloy C, Liu Y, et al. Activity-dependent degradation of Kv4.2 contributes to synaptic plasticity and behavior in Angelman syndrome model mice. Cell Rep. 2025 May 27;44:115583.[2] Shimizu K, Kurosawa N, Seki K. The role of the AMPA receptor and 5-HT3 receptor on aggressive behavior and depressive-like symptoms in chronic social isolation-reared mice. Physiol Behav. 2016;153:70-83.

Background

(S)-AMPA is the active S-enantiomer of AMPA. (S)-AMPA is a potent and highly selective AMPA-type ionotropic glutamate receptor agonist. (S)-AMPA activates AMPA receptors to mediate fast excitatory synaptic transmission in the central nervous system. (S)-AMPA is useful for studies on synaptic transmission, neuroplasticity, and excitotoxicity^[1-4].

In vitro, cortical neuron cells were treated with 300μM (S)-AMPA for 5-24h. (S)-AMPA upregulated the transcription of cyclin-dependent kinase 1, cyclin B1, and cyclin D1 genes, induced cell cycle re-entry^[5]. Hippocampal neuron cells were treated with 25-50μM (S)-AMPA for 15-30min. (S)-AMPA increased the binding of ubiquitin ligase E3A to potassium voltage-gated channel subfamily D member 2^[6]. Cortical culture cells were treated with 10μM (S)-AMPA for 30s. (S)-AMPA induced a rapid increase in intracellular free calcium concentration, triggered a transient increase in network discharge frequency^[7].

In vivo, a single intracerebroventricular injection of 1-10nmol per rat (S)-AMPA was administered to rats. (S)-AMPA rapidly induced clonic convulsions. A high dose (10nmol per rat) also induced status epilepticus behaviors including forelimb clonus, rearing, and salivation^[8]. A single intra-amygdalar infusion of 2μL 10μM (S)-AMPA was performed in naive CD1 mice. (S)-AMPA induced despair-like behavior in the tail suspension test and forced swimming test^[9]. A single microinjection of 0.01875-0.075μg (S)-AMPA into the lateral habenula was performed in male Parkinson's disease model Sprague-Dawley rats. (S)-AMPA induced anxiolytic-like behavior, elevated extracellular dopamine and serotonin levels in the basolateral amygdala^[10].

References:

- [1] Oliveira A, Hodges H, Rezaie P. Excitotoxic lesioning of the rat basal forebrain with S-AMPA: consequent mineralization and associated glial response. Exp Neurol. 2003 Feb;179(2):127-38.
[2] Savell KE, Gallus NVN, Simon RC, et al. Extra-coding RNAs regulate neuronal DNA methylation

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dynamics. Nat Commun. 2016 Jul 7;7:12091.

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[4] Voss OP. AMPA receptor potentiators: Mechanisms of Neuroplasticity. PhD Thesis, University of Edinburgh. 2007.

[5] Chen MJ, Ng JM, Peng ZF, et al. Gene profiling identifies commonalities in neuronal pathways in excitotoxicity: evidence favouring cell cycle re-activation in concert with oxidative stress. Neurochem Int. 2013 Apr;62(5):719-30.

[6] Hu JH, Malloy C, Liu Y, et al. Activity-dependent degradation of Kv4.2 contributes to synaptic plasticity and behavior in Angelman syndrome model mice. Cell Rep. 2025 May 27;44(115583):1-18.

[7] Klima S, Brill M, Spreng AS, et al. A human stem cell-derived test system for agents modifying neuronal N-methyl-D-aspartate-type glutamate receptor Ca²⁺-signalling. Arch Toxicol. 2021;95(5):1703-22.

[8] Chiamulera C, Costa S, Valerio E, et al. Domoic acid toxicity in rats and mice after intracerebroventricular administration: comparison with excitatory amino acid agonists. Pharmacol Toxicol. 1992;70(2):115-20.

[9] Shimizu K, Kurosawa N, Seki K, et al. The role of the AMPA receptor and 5-HT₃ receptor on aggressive behavior and depressive-like symptoms in chronic social isolation-reared mice. Physiol Behav. 2016;153:70-83.

[10] Zhang J, Wang X, Bernardi RE, et al. Activation of AMPA receptors in the lateral habenula produces anxiolytic effects in a rat model of Parkinson's disease. Front Pharmacol. 2022 Jan 25;13:821975.

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