

Product Data Sheet

Product Name: CNQX
Cat. No.: GC11799

Chemical Properties

Cas. No. 115066-14-3

Chemical Name 7-nitro-2,3-dioxo-1,2,3,4-tetrahydroquinoxaline-6-carbonitrile

SMILES O=C1NC2=CC([N+](=O)[O-])=C(C#N)C=C2NC1=O

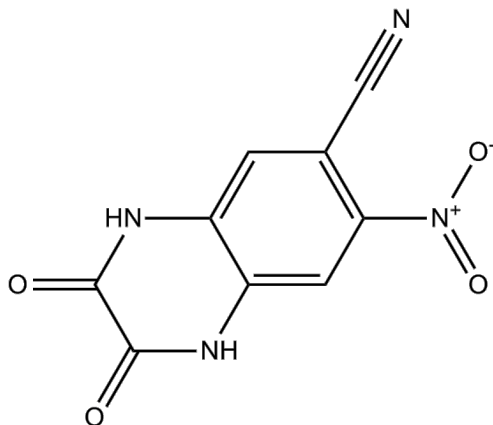
Formula $C_9H_4N_4O_4$ M.Wt 232.16

Solubility $\geq 23.2\text{mg/mL}$ in DMSO 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 Mixed murine cortical cell

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

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Preparation Method Mixed murine cortical cell cultures were exposed to kainate (0-100 mM) in the absence or presence of increasing concentrations of CNQX. Then 20-24 h later, injury was assessed by spectrophotometric measurement of lactate dehydrogenase (LDH) activity and trypan blue.

Reaction Conditions 0-100 mM; 20-24 h

Applications There is a time-dependent increase in neuronal cell death as CNQX concentration increases.

Animal experiment [2]:

Animal models Male ICR mice

Preparation Method CNQX were prepared in 5 % DMSO as vehicle. The i.c.v. administrations of KA, MK-801, and CNQX were performed following the procedure established by Laursen and Belknap (1986). Briefly, each mouse was injected at bregma with a 50 µl Hamilton microsyringe fitted with a 26-gauge needle that was inserted to a depth of 2.4 mm. The injection volume was 5µl. CNQX (0.5 µg) were injected 10 min prior to KA injection.

Dosage form 0.5 µg; i.c.v.

Applications CNQX can block kainic acid-induced pyramidal cell death in the CA3 area of the mouse hippocampus, partially attenuate the increase in p-ERK and the decrease in p-CREB, and inhibit the expression of phosphorylated ERK protein.

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References:

- [1] Uliasz T F , Hewett S J . A microtiter trypan blue absorbance assay for the quantitative determination of excitotoxic neuronal injury in cell culture[J]. Journal of Neuroscience Methods, 2000, 100(1-2):157-163.
- [2] Lee J K , Choi S S , Lee H K ,et al.Effects of MK-801 and CNQX on various neurotoxic responses induced by kainic acid in mice.[J]. Molecules & Cells, 2002, 14(3):339-347.

Background

CNQX is an effective competitive antagonist of AMPA/kainate receptors, with IC₅₀ values of 0.3μM and 1.5μM, respectively[1]. CNQX is a non-NMDA receptor antagonist[2].

In vitro, CNQX (1μM) reduces the frequency of light-induced peak potentials in retinal ganglion cells by 28%±22% and also induces voltage- and magnesium-dependent delayed spike firing[2]. CNQX (0-100 mM; 20-24 h) exhibits dose-dependent toxicity in mixed mouse cortical cells, with neuronal damage effects[3]. CNQX (20 μM) reversibly depolarizes the membrane potential of TRN neurons, inducing smaller depolarizations in thalamic relay neurons in VB[4].

In vivo, CNQX (0.5 μg; i.c.v.) can block hippocampal CA3 pyramidal cell death induced by kainic acid in ICR mice, partially attenuate the increase of p-ERK and the decrease of p-CREB, and inhibit the expression of phosphorylated ERK protein[5]. Bilateral infusion of CNQX (0.5 or 1.25μg) into the amygdala or dorsal hippocampus of rats can block the expression of startle reflex[6].

References:

- [1]TAGE HONORÉ, STEVE N. DAVIES, JØRGEN DREJER, et al. Quinoxalinediones: Potent Competitive Non-NMDA Glutamate Receptor Antagonists[J]. SCIENCE.1988(241):701-703.
- [2] Jeffrey S. Diamond, David R. Copenhagen. The contribution of NMDA and Non-NMDA receptors to the light-evoked input-output characteristics of retinal ganglion cells[J]. Cell Press. October, 1993:725-738.
- [3]Uliasz T F , Hewett S J . A microtiter trypan blue absorbance assay for the quantitative determination of excitotoxic neuronal injury in cell culture[J]. Journal of Neuroscience Methods, 2000, 100(1-2):157-163.
- [4]Sang Hun Lee,G. Govindaiah,and Charles L. Cox. Selective Excitatory Actions of DNQX and CNQX in Rat Thalamic Neurons[J].Journal of Neurophysiology, 2010(4):103.

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[5]Lee J K , Choi S S , Lee H K ,et al.Effects of MK-801 and CNQX on various neurotoxic responses induced by kainic acid in mice.[J]. Molecules & Cells, 2002, 14(3):339-347.

[6]Kim M, Campeau S, Falls W A, et al. Infusion of the non-NMDA receptor antagonist CNQX into the amygdala blocks the expression of fear-potentiated startle. Behav Neural Biol, 1993, 59(1): 5-8.

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