

Product Data Sheet

Product Name: Chlorpyrifos

Cat. No.: GC60108

Chemical Properties

Cas. No. 2921-88-2

SMILES S=P(OCC)(OCC)OC1=NC(Cl)=C(Cl)C=C1Cl

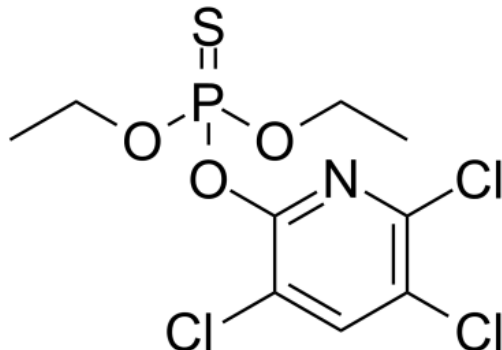
Formula C9H11Cl3NO3PS M.Wt 350.59

Solubility DMSO: 250 mg/mL (713.08 mM) 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	Porcine cumulus-oocyte complexes
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Caution: Product has not been fully validated for medical applications. For research use only.

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Preparation Method	Porcine cumulus-oocyte complexes (COCs) were treated with 0, 5, 10, or 20 μ M Chlorpyrifos for 44h during in vitro maturation (IVM).
Reaction Conditions	0, 5, 10, or 20 μ M; 44h
Applications	The first polar body (PB1) extrusion rate was significantly decreased, and the subsequent developmental competence of the resulting metaphase II (MII) oocytes was also impaired when the concentration of Chlorpyrifos reached 10 μ M.
Animal experiment [2]:	
Animal models	SD rats
Preparation Method	35 male clean grade SD rats were randomly divided into 7 groups according to the observation time point, namely 0.5d, 1d, 2d, 3d, 5d and 7d groups and the control group, with 5 rats in each group. Each observation group was given 81.5mg/kg Chlorpyrifos by gavage, and the control group was given olive oil by gavage. The general conditions and poisoning symptoms of rats were observed continuously after exposure. The expressions of autophagy related proteins Beclin1, P62/SQSTM1 and LC3 in hippocampus were detected by Western blot. The cell morphology and LC3 expression in brain were observed by immunohistochemical staining.
Dosage form	81.5mg/kg; p.o.; once

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Applications	Western blot results showed that compared with the control group, the expression of Beclin1 protein in hippocampal neurons of rats in the 1d, 2d, and 3d groups increased, while the expression of P62/SQSTM1 protein in the 0.5d, 1d, and 2d groups decreased, and the expression of LC3 protein was decreased in the 2d group, and the differences were statistically significant. The results of immunohistochemistry showed that the hippocampal neurons of rats in the 5d group were arranged disorderly, and some nuclei contours disappeared, especially in the 7d group. The LC3 protein was expressed in the cytoplasm, and the expression level gradually increased, reaching a peak on the second day.
References: [1] Jiang Y, et al. Exposure to chlorpyrifos leads to spindle disorganization and mitochondrial dysfunction of porcine oocytes during in vitro maturation. Theriogenology. 2021 Oct 1;173:249-260. [2] Chen QS, Xian XH, Gao HB, et al. Zhonghua Lao Dong Wei Sheng Zhi Ye Bing Za Zhi. 2021;39(9):648-652.	

Background

Chlorpyrifos is a neurotoxic insecticide. Chlorpyrifos inhibits acetylcholinesterase activity, thereby disrupting normal neurotransmitter transmission at neuronal synapses. This interference impairs cell proliferation and differentiation, ultimately affecting neurological functions in insects, humans, and other animals^[1-2].

In vitro, Chlorpyrifos (10µM; 44h) significantly reduced the first polar body (PB1) extrusion rate in porcine cumulus-oocyte complexes and impaired the developmental competence of metaphase II (MII) oocytes^[3]. Chlorpyrifos (62.5-250µM; 24-72h) inhibited the viability of oligodendrocyte CG-4 cells in a dose- and concentration-dependent manner^[2].

In vivo, chlorpyrifos (81.5mg/kg; p.o.; once) exhibited significant neurotoxicity in SD rats, as evidenced by increased expression of autophagy-related proteins in the hippocampus, disorganized

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neuronal arrangement, and abnormal cellular morphology in brain tissue^[4]. Chlorpyrifos (1mg/kg and 5mg/kg; s.c.; once daily for 3 days) affected learning and memory abilities in rats^[5].

References:

- [1] Silva MH. Effects of low-dose chlorpyrifos on neurobehavior and potential mechanisms: A review of studies in rodents, zebrafish, and *Caenorhabditis elegans*. *Birth Defects Res.* 2020;112(6):445-479.
- [2] Saulsbury MD, Heyliger SO, Wang K, Johnson DJ. Chlorpyrifos induces oxidative stress in oligodendrocyte progenitor cells. *Toxicology.* 2009;259(1-2):1-9.
- [3] Jiang Y, et al. Exposure to chlorpyrifos leads to spindle disorganization and mitochondrial dysfunction of porcine oocytes during in vitro maturation. *Theriogenology.* 2021 Oct 1;173:249-260.
- [4] Chen QS, Xian XH, Gao HB, et al. *Zhonghua Lao Dong Wei Sheng Zhi Ye Bing Za Zhi.* 2021;39(9):648-652.
- [5] Icenogle LM, Christopher NC, Blackwelder WP, et al. Behavioral alterations in adolescent and adult rats caused by a brief subtoxic exposure to chlorpyrifos during neurulation. *Neurotoxicol Teratol.* 2004;26(1):95-101.

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