# Tizoxanide

**Cat. No.:** HY-12687

**CAS No.:** 173903-47-4

**Molecular Formula:** $C_{10}H_7N_3O_4S$

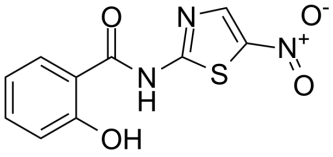
**Molecular Weight:** 265.25

**Target:** Bacterial; Autophagy; HIV; Parasite; IKK; Influenza Virus

**Pathway:** Anti-infection; Autophagy; NF-κB

**Storage:**

| | | |
|---|---|---|
| Powder | -20°C | 3 years |
| | 4°C | 2 years |
| In solvent | -80°C | 2 years |
| | -20°C | 1 year |



## SOLVENT & SOLUBILITY

**In Vitro**

DMSO : 25 mg/mL (94.25 mM; ultrasonic and warming and heat to 60°C)
Ethanol : < 1 mg/mL (ultrasonic;warming;heat to 60°C) (insoluble)

**Preparing Stock Solutions**

| Solvent / Mass / Concentration | 1 mg | 5 mg | 10 mg |
|---|---|---|---|
| 1 mM | 3.7700 mL | 18.8501 mL | 37.7003 mL |
| 5 mM | 0.7540 mL | 3.7700 mL | 7.5401 mL |
| 10 mM | 0.3770 mL | 1.8850 mL | 3.7700 mL |

Please refer to the solubility information to select the appropriate solvent.

**In Vivo**

1. Add each solvent one by one: 15% Cremophor EL >> 85% Saline
   Solubility: 5 mg/mL (18.85 mM); Suspended solution; Need ultrasonic and warming and heat to 60°C
2. Add each solvent one by one: 17% Polyethylene glycol 12-hydroxystearate in saline
   Solubility: 5 mg/mL (18.85 mM); Suspended solution; Need ultrasonic and warming and heat to 60°C

## BIOLOGICAL ACTIVITY

**Description**

Tizoxanide (TIZ) is the active metabolite of Nitazoxanide, which is a thiazolide anti-infective compound against anaerobic bacteria, protozoa, and a range of viruses. Tizoxanide (TIZ) has anti-HIV-1 activities and potent inhibition of both HBV and HCV replication with values $EC_{50}$ of 0.46μM and 0.15 μM, respectively. Tizoxanide also exerts anti-inflammatory effects by inhibiting the production of pro-inflammatory cytokines and suppressing of the activation of the NF-κB and the MAPK signaling pathways in LPS-treated macrophage cells[1][3][4][5].

**$IC_{50}$ & Target**

Tizoxanide (TIZ) has potent inhibition of both HBV and HCV replication with values $EC_{50}$ of 0.46μM and 0.15 μM, respectively [4].

**In Vitro**

Tizoxanide (TIZ) induces mild mitochondrial uncoupling and activate AMPK in hepatocytes[1].
Tizoxanide (TIZ) inhibits hepatitis C virus (HCV) replication in HCV replicon systems[3].
MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Cell Viability Assay[1]

| | |
|---|---|
| Cell Line: | HepG2 cells |
| Concentration: | 1-25 μmol/L |
| Incubation Time: | 24 h |
| Result: | Induced mitochondrial uncoupling and AMPK activation not due to the non-specific cytotoxicity in HepG2 cells at concentrations less than 25 μmol/L. |

Immunofluorescence[1]

| | |
|---|---|
| Cell Line: | HepG2 cells |
| Concentration: | 10 μmol/L |
| Incubation Time: | 24 h |
| Result: | Promoted the nuclear translocation of TFEB by activating AMPK in HepG2 cells. |

RT-PCR[1]

| | |
|---|---|
| Cell Line: | HepG2 cells |
| Concentration: | 1-25 μmol/L |
| Incubation Time: | 24 h |
| Result: | Induced the increase transcription of SQSTM1/P62 in HepG2 cells. |

Western Blot Analysis[1]

| | |
|---|---|
| Cell Line: | HepG2 cells |
| Concentration: | 1-25 μmol/L |
| Incubation Time: | 24 h |
| Result: | Activated AMPK and increased phosphorylation of ACC in HepG2 cells. |

Cell Cytotoxicity Assay[3]

| | |
|---|---|
| Cell Line: | RP7 cells, NTZ-11 and TIZ-9 cell lines |
| Concentration: | The initial drug concentration was 0.02 μM, followed by 0.05, 0.1, 0.5, and 1 μM, and subsequent weekly increases of 1 μM until a final concentration of 11 μM. |
| Incubation Time: | 3 days |
| Result: | Againsted HCV replication in RP7 cells ($IC_{50}$: 0.16), NTZ-11 ($IC_{50}$:1.2) and TIZ-9 cell lines ($IC_{50}$: 1.5) |

**In Vivo**

Tizoxanide (TIZ) (10 mg/kg; i.v.) can pass the BBB and distribute to the brain tissue. Tizoxanide retains in brain is obviously longer than that in plasma[2].
MCE has not independently confirmed the accuracy of these methods. They are for reference only.

| | |
|---|---|
| Animal Model: | Sprague Dawley rats[2] |
| Dosage: | 10 mg/kg |
| Administration: | Tizoxanide (10 mg/kg; i.v.) |
| Result: | Could pass the BBB and distribute to the brain tissue. |

## CUSTOMER VALIDATION

- Acta Pharm Sin B. 17 September 2021.
- EBioMedicine. 2022 Aug;82:104148.
- Virology. 2018 May;518:398-405.
- Biomed Chromatogr. 2020 Feb;34(2):e4716.
- Br J Pharmacol. 2022 Sep 9.

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## REFERENCES


[1]. Fengfeng Li, et al. Anthelmintics nitazoxanide protects against experimental hyperlipidemia and hepatic steatosis in hamsters and mice. Acta Pharm Sin B. 2022 Mar;12(3):1322-1338.

[2]. Sixun Guo, et al. Analysis of tizoxanide, active metabolite of nitazoxanide, in rat brain tissue and plasma by UHPLC-MS/MS. Biomed Chromatogr. 2020 Feb;34(2):e4716.

[3]. Brent E Korba, et al. Potential for hepatitis C virus resistance to nitazoxanide or tizoxanide. Antimicrob Agents Chemother. 2008 Nov;52(11):4069-71.

[4]. Brent E Korba, et al. Nitazoxanide, tizoxanide and other thiazolides are potent inhibitors of hepatitis B virus and hepatitis C virus replication.

[5]. Jiaoqin Shou, et al. Tizoxanide Inhibits Inflammation in LPS-Activated RAW264.7 Macrophages via the Suppression of NF-κB and MAPK Activation. Inflammation. 2019 Aug;42(4):1336-1349.

[6]. Korba BE, et al. Nitazoxanide, tizoxanide and other thiazolides are potent inhibitors of hepatitis B virus and hepatitis C virus replication. Antiviral Res. 2008 Jan;77(1):56-63.

[7]. Ashton LV, et al. In Vitro Susceptibility of Canine Influenza A (H3N8) Virus to Nitazoxanide and Tizoxanide. Vet Med Int. 2010 Aug 12;2010. pii: 891010.

[8]. Korba BE, et al. Potential for hepatitis C virus resistance to nitazoxanide or tizoxanide. Antimicrob Agents Chemother. 2008 Nov;52(11):4069-71.

[9]. Trabattoni D, et al. Thiazolides Elicit Anti-Viral Innate Immunity and Reduce HIV Replication. Sci Rep. 2016 Jun 2;6:27148.





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