

Product Data Sheet

Product Name: Pioglitazone

Cat. No.: GC14948

Chemical Properties

Cas. No. 111025-46-8

Chemical Name 5-[[4-[2-(5-ethylpyridin-2-yl)ethoxy]phenyl]methyl]-1,3-thiazolidine-2,4-dione

SMILES CCC1=CN=C(C=C1)CCOC2=CC=C(C=C2)CC3C(=O)NC(=O)S3

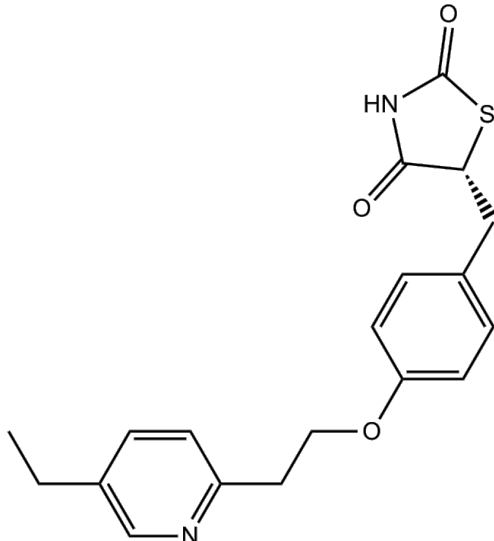
Formula C₁₉H₂₀N₂O₃S M.Wt 356.44

Solubility ≥ 14.3mg/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



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

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Protocol

Cell experiment [1]:

Cell lines INS-1 cells

Preparation Method Cells were treated with pioglitazone (10 μ M), with or without high glucose (30 mM).

Reaction Conditions 10 μ M; 4h

Applications Pioglitazone reversed the decrease in AMPK activity caused by high glucose in INS-1 cells.

Animal experiment [2]:

Animal models ob/ob and adipo^{-/-} ob/ob mice with a C57Bl/6 background

Preparation Method 10-30 mg/kg pioglitazone or vehicle (0.25% carboxymethylcellulose) was administered to mice by oral gavage once daily for 14 consecutive days.

Dosage form 10-30 mg/kg; oral gavage; 14 days

Applications 10 mg/kg pioglitazone can significantly improve insulin resistance and diabetes in ob/ob mice, and administration of 30 mg/kg pioglitazone has better effects.

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References:

- [1]. Karunakaran U, Elumalai S, et.al. Pioglitazone-induced AMPK-Glutaminase-1 prevents high glucose-induced pancreatic β -cell dysfunction by glutathione antioxidant system. Redox Biol. 2021 Sep;45:102029. doi: 10.1016/j.redox.2021.102029. Epub 2021 Jun 3. PMID: 34107382; PMCID: PMC8187239.
- [2]. Kubota N, Terauchi Y, et.al. Pioglitazone ameliorates insulin resistance and diabetes by both adiponectin-dependent and -independent pathways. J Biol Chem. 2006 Mar 31;281(13):8748-55. doi: 10.1074/jbc.M505649200. Epub 2006 Jan 23. PMID: 16431926.

Background

Pioglitazone belongs to the class of glitazones or thiazolidinediones, a series of oral anti-diabetic drugs. Pioglitazone is a ligand for peroxisome proliferator-activated receptor γ (PPAR γ) that acts as a PPAR γ agonist with EC₅₀ of 0.93 and 0.99 μ M for human and mouse PPAR γ [1-2].

Pioglitazone (10 μ M;4h) reversed the decrease in AMPK activity caused by high glucose in INS-1 cells [3]. Pioglitazone (50 μ M;48h) also inhibited tumor cell proliferation in the multicellular tumor spheroid culture system (MCTS) system[4].

Pioglitazone (oral,10 or 30 mg/kg once daily for 14 days) improves insulin resistance and diabetes[5].Four weeks of pioglitazone (10 or 20 mg/kg, daily, from 20- to 24-week-old) treatment alleviated the high-fat diet (HFD)-induced glucose-metabolic dysfunctions, upregulation of ventral hippocampal glial fibrillary acidic protein (GFAP), reduction of the total process lengths and the number of branch points of the ventral hippocampal CA1 GFAP-immunoreactive astrocytes and depressive phenotypes in mice[6]. Pioglitazone (oral gavage;10 mg/kg; once daily for 4 weeks) significantly reduced body weight (BW) myocardial hypertrophy glucose levels and improved associated dyslipidemia[7].

References:

- [1]. Kuwabara K, Murakami K,et.al. A novel selective peroxisome proliferator-activated receptor alpha agonist, 2-methyl-c-5-[4-[5-methyl-2-(4-methylphenyl)-4-oxazolyl]butyl]-1,3-dioxane-r-2-carboxylic acid (NS-220), potently decreases plasma triglyceride and glucose levels and modifies lipoprotein profiles in KK-Ay mice. J Pharmacol Exp Ther. 2004 Jun;309(3):970-7. doi: 10.1124/jpet.103.064659. Epub 2004 Feb 24. PMID: 14982965.

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- [2]. Legchenko E, Chouvarine P, et.al. PPAR γ agonist pioglitazone reverses pulmonary hypertension and prevents right heart failure via fatty acid oxidation. Sci Transl Med. 2018 Apr 25;10(438):eaao0303. doi: 10.1126/scitranslmed.aao0303. PMID: 29695452.
- [3]. Karunakaran U, Elumalai S, et.al. Pioglitazone-induced AMPK-Glutaminase-1 prevents high glucose-induced pancreatic β -cell dysfunction by glutathione antioxidant system. Redox Biol. 2021 Sep;45:102029. doi: 10.1016/j.redox.2021.102029. Epub 2021 Jun 3. PMID: 34107382; PMCID: PMC8187239.
- [4]. Gottfried E, Rogenhofer S, et.al. Pioglitazone modulates tumor cell metabolism and proliferation in multicellular tumor spheroids. Cancer Chemother Pharmacol. 2011 Jan;67(1):117-26. doi: 10.1007/s00280-010-1294-0. Epub 2010 Mar 9. PMID: 20217088.
- [5]. Kubota N, Terauchi Y, et.al. Pioglitazone ameliorates insulin resistance and diabetes by both adiponectin-dependent and -independent pathways. J Biol Chem. 2006 Mar 31;281(13):8748-55. doi: 10.1074/jbc.M505649200. Epub 2006 Jan 23. PMID: 16431926.
- [6]. Lam YY, Tsai SF, et.al. Pioglitazone rescues high-fat diet-induced depression-like phenotypes and hippocampal astrocytic deficits in mice. Biomed Pharmacother. 2021 Aug;140:111734. doi: 10.1016/j.biopha.2021.111734. Epub 2021 May 19. PMID: 34022606.
- [7]. Elrashidy RA, Asker ME, et.al. Pioglitazone attenuates cardiac fibrosis and hypertrophy in a rat model of diabetic nephropathy. J Cardiovasc Pharmacol Ther. 2012 Sep;17(3):324-33. doi: 10.1177/1074248411431581. Epub 2012 Jan 18. PMID: 22261714.

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