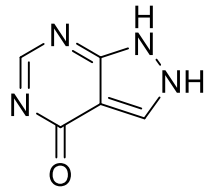
Product data sheet

MedKoo Cat#: 317168 Name: Allopurinol CAS#: 315-30-0 (free) Chemical Formula: $C_5H_4N_4O$ Exact Mass: 136.03851 Molecular Weight: 136.11	
Product supplied as:	Powder
Purity (by HPLC):	≥ 98%
Shipping conditions	Ambient temperature
Storage conditions:	Powder: -20°C 3 years; 4°C 2 years.
	In solvent: -80°C 3 months; -20°C 2 weeks.

1. Product description:
Allopurinol is a structural isomer of hypoxanthine. Allopurinol inhibits the enzyme xanthine oxidase, which converts oxypurines to uric acid. By blocking the production of uric acid, this agent decreases serum and urine concentrations of uric acid, which provvides protection against uric acid-mediated end organ damage in conditions associated with excessive production of uric acid, i.e. the massive cell lysis associated with the treatment of some malignancies.

2. CoA, QC data, SDS, and handling instruction
SDS and handling instruction, CoA with copies of QC data (NMR, HPLC and MS analytical spectra) can be downloaded from the product web page under "QC And Documents" section. Note: copies of analytical spectra may not be available if the product is being supplied by MedKoo partners. Whether the product was made by MedKoo or provided by its partners, the quality is 100% guaranteed.

3. Solubility data

Solvent	Max Conc. mg/mL	Max Conc. mM
DMSO	14.67	107.78
DMSO:PBS (pH 7.2) (1:10)	0.1	0.73
Ethanol	3.0	22.04
Water	1.0	7.35

4. Stock solution preparation table:

Concentration / Solvent Volume / Mass	1 mg	5 mg	10 mg
1 mM	7.35 mL	36.73 mL	73.47 mL
5 mM	1.47 mL	7.35 mL	14.69 mL
10 mM	0.73 mL	3.67 mL	7.35 mL
50 mM	0.15 mL	0.73 mL	1.47 mL

5. Molarity Calculator, Reconstitution Calculator, Dilution Calculator
Please refer the product web page under section of "Calculator"

6. Recommended literature which reported protocols for in vitro and in vivo study
In vitro study

1. Negi M, Mulla MJ, Han CS, Abrahams VM. Allopurinol inhibits excess glucose-induced trophoblast IL-1β and ROS production. Reproduction. 2020 Jan;159(1):73-80. doi: 10.1530/REP-19-0422. PMID: 31705795.
2. Eleftheriadis T, Pissas G, Antoniadi G, Liakopoulos V, Stefanidis I. Allopurinol protects human glomerular endothelial cells from high glucose-induced reactive oxygen species generation, p53 overexpression and endothelial dysfunction. Int Urol Nephrol. 2018 Jan;50(1):179-186. doi: 10.1007/s11255-017-1733-5. Epub 2017 Nov 1. PMID: 29094329.

In vivo study

1. Zeng F, Luo J, Han H, Xie W, Wang L, Han R, Chen H, Cai Y, Huang H, Xia Z. Allopurinol ameliorates liver injury in type 1 diabetic rats through activating Nrf2. Int J Immunopathol Pharmacol. 2021 Jan-Dec;35:20587384211031417. doi: 10.1177/20587384211031417. PMID: 34240649.

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2. Cho IJ, Oh DH, Yoo J, Hwang YC, Ahn KJ, Chung HY, Jeong SW, Moon JY, Lee SH, Lim SJ, Jeong IK. Allopurinol ameliorates high fructose diet induced hepatic steatosis in diabetic rats through modulation of lipid metabolism, inflammation, and ER stress pathway. Sci Rep. 2021 May 10;11(1):9894. doi: 10.1038/s41598-021-88872-7. PMID: 33972568; PMCID: PMC8110790.

7. Bioactivity

Biological target:

Allopurinol (Zyloprim) is a xanthine oxidase inhibitor with an IC50 of 7.82±0.12 μM.

In vitro activity

As shown in Fig. 1A excess glucose (10 mM) significantly increased trophoblast secretion of IL-1β to 135.2 ± 10.6 pg/mL) when compared to glucose at 5 mM (34.0 ± 4.4 pg/mL). This was significantly inhibited by allopurinol at 200 μM (allo 200) to 109.7 ± 9.7 pg/mL and by allopurinol at 400 μM (allo 400) to 87.3 ± 10.2 pg/mL. To determine whether the inhibition of excess glucose-induced trophoblast IL-1β was a result of allopurinol inhibiting inflammasome function, caspase-1 activity was measured. As shown in Fig. 1B, excess glucose significantly increased trophoblast caspase-1 activity to 78.0 ± 3.7 RLU when compared to glucose at 5 mM (54.9 ± 3.7 RLU), and this was significantly inhibited by allopurinol at 400 μM to 53.9 ± 3.1 RLU. Allopurinol at 200 μM had no effect on trophoblast caspase-1 activity under excess glucose conditions. However, both doses of allopurinol significantly reduced trophoblast caspase-1 activity under 5 mM glucose conditions (Fig. 1B).

Reference: Reproduction. 2020 Jan;159(1):73-80. https://pubmed.ncbi.nlm.nih.gov/31705795/

In vivo activity

ALP (Allopurinol) treatment significantly decreased water intake in diabetic rats (D + ALP group), but did not significantly affect their blood glucose levels, food consumption and body weight. The changes of the serum specific markers related to hepatic damage were displayed in Figure 3a and b. Both serum AST and ALT were significantly increased in diabetic group compared with the control group ($P < 0.05$ vs C), and were significantly reduced by ALP treatment ($P < 0.05$ vs D). The above changes indicate that ALP effectively alleviated the histological changes in the liver of diabetic rats. In addition, tissue section TUNEL assay showed that the apoptosis of liver tissue in D group was significantly increased ($P < 0.05$ vs C), while the apoptosis of liver tissue was significantly decreased in diabetic rats with ALP treatment (Figure 4a and b). Moreover, the protein expression of cleave-caspase 3 was significantly increased in D group compared with C group, and its overexpression was significantly decreased in diabetic rats with ALP treatment (Figure 4c).

Reference: Int J Immunopathol Pharmacol. 2021 Jan-Dec;35:20587384211031417. https://pubmed.ncbi.nlm.nih.gov/34240649/

Note: The information listed here was extracted from literature. MedKoo has not independently retested and confirmed the accuracy of these methods. Customer should use it just for a reference only.