Hydroxyurea

Cat. No.: HY-B0313

CAS No.: 127-07-1

Molecular Formula: $CH_4N_2O_2$

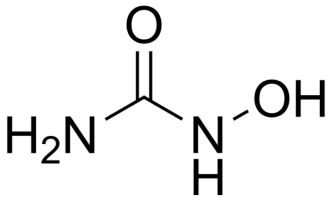
Molecular Weight: 76.05

Target: DNA/RNA Synthesis; Autophagy; Apoptosis; HIV; Orthopoxvirus

Pathway: Cell Cycle/DNA Damage; Autophagy; Apoptosis; Anti-infection

Storage:

Powder	-20°C	3 years
	4°C	2 years
In solvent	-80°C	6 months
	-20°C	1 month



SOLVENT & SOLUBILITY

In Vitro

H_2O : 50 mg/mL (657.46 mM; Need ultrasonic)
DMSO : 50 mg/mL (657.46 mM; Need ultrasonic)

Preparing Stock Solutions

Solvent / Mass / Concentration	1 mg	5 mg	10 mg
1 mM	13.1492 mL	65.7462 mL	131.4924 mL
5 mM	2.6298 mL	13.1492 mL	26.2985 mL
10 mM	1.3149 mL	6.5746 mL	13.1492 mL

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

In Vivo

1. Add each solvent one by one: PBS
   Solubility: 100 mg/mL (1314.92 mM); Clear solution; Need ultrasonic
2. Add each solvent one by one: 10% DMSO >> 40% PEG300 >> 5% Tween-80 >> 45% saline
   Solubility: ≥ 2.5 mg/mL (32.87 mM); Clear solution
3. Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)
   Solubility: ≥ 2.5 mg/mL (32.87 mM); Clear solution
4. Add each solvent one by one: 10% DMSO >> 90% corn oil
   Solubility: ≥ 2.5 mg/mL (32.87 mM); Clear solution

BIOLOGICAL ACTIVITY

Description

Hydroxyurea is a cell apoptosis inducer that inhibit DNA synthesis through inhibition of ribonucleotide reductase. Hydroxyurea shows anti-orthopoxvirus activity.

IC_{50} & Target

HIV-1

In Vitro	Hydroxyurea is used in a number of myeloproliferative, neoplastic, HIV, and non-hematological diseases[1]. Treatment of cells in primary culture with 30 μM hydroxyurea for 96 hours significantly increases the fractional HbF content. The $^{G}\gamma$: $^{A}\gamma$-globin mRNA is induced 0.30- to 8-fold in vitro[2]. Hydroxyurea has been shown to block HIV-1 reverse transcription and/or replication in quiescent peripheral blood mononuclear cells and macrophages[3]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.
In Vivo	Hydroxyurea therapy producs consistent reductions in WBC and ANC without improvement in anemia over 17 weeks. Hydroxyurea at 50mg/kg produces a reduced white blood cell count, absolute neutrophil count and no improvement in anemia compared to vehicle treated sickle cell mice[4]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.

PROTOCOL

Animal Administration [4]	Mice: To determine whether hydroxyurea would improve anemia and/or prevent or diminish the development of organ damage in the absence of HbF induction, hydroxyurea, at doses of 25 mg/kg, 50 mg/kg, and 100 mg/kg, or vehicle is administered five days per week to SCD mice[4]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.

CUSTOMER VALIDATION

- Signal Transduct Target Ther. 2022 Oct 17;7(1):354.
- ACS Nano. 2023 Sep 14.
- Nat Commun. 2022 Aug 16;13(1):4822.
- Cell Death Differ. 2023 Feb 7.
- Proc Natl Acad Sci U S A. 2023 May 16;120(20):e2303479120.

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REFERENCES

[1]. M B Slabaugh, et al. Hydroxyurea-resistant vaccinia virus: overproduction of ribonucleotide reductase. J Virol. 1986 Nov;60(2):506-14.

[2]. Kovacic P, et al. Hydroxyurea (therapeutics and mechanism): metabolism, carbamoyl nitroso, nitroxyl, radicals, cell signaling and clinical applications. Med Hypotheses. 2011 Jan;76(1):24-31.

[3]. Watanapokasin Y, et al. In vivo and in vitro studies of fetal hemoglobin induction by hydroxyurea in beta-thalassemia/hemoglobin E patients. Exp Hematol. 2005 Dec;33(12):1486-92.

[4]. Lori F, et al. Rationale for the use of hydroxyurea as an anti-human immunodeficiency virus drug. Clin Infect Dis. 2000 Jun;30 Suppl 2:S193-7.

[5]. Lebensburger JD, et al. Hydroxyurea therapy requires HbF induction for clinical benefit in a sickle cell mouse model. Haematologica. 2010 Sep;95(9):1599-603.

Tel: 609-228-6898 Fax: 609-228-5909 E-mail: tech@MedChemExpress.com

Address: 1 Deer Park Dr, Suite Q, Monmouth Junction, NJ 08852, USA