

Product Data Sheet

Product Name: N-Phenylthiourea

Cat. No.: GC47805

Chemical Properties

Cas. No. 103-85-5

SMILES NC(NC1=CC=CC=C1)=S

Formula C₇H₈N₂S

M.Wt 152.2

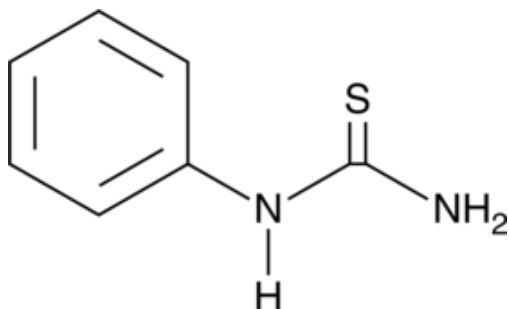
Solubility DMF: 30 mg/ml, DMSO: 30 mg/ml, DMSO:PBS (pH 7.2) (1:3): 0.25 mg/ml

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

MNT-1 melanoma cells

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

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Preparation Method	Human MNT-1 melanoma cells were maintained in MEM medium supplemented with 20% heat-inactivated fetal bovine serum, 10% AIM-V medium, 2mM L-glutamine, 10mM HEPES, 1% NEAA, 1% streptomycin-penicillin solution at 37°C. Cells were treated with 1mM N-Phenylthiourea for 72 hours, followed by determination of melanin content and DOPA oxidase activity of tyrosinase.
Reaction Conditions	1mM; 72h
Applications	N-Phenylthiourea decreased melanin content by 52% and reduced DOPA oxidase activity of tyrosinase by 45% in human MNT-1 melanoma cells.
Animal experiment [2]:	
Animal models	black rats (non-agouti rats)
Preparation Method	Black rats were given 25-55mg/kg/day N-Phenylthiourea dissolved in drinking water (0.05%) from about 2 months of age for 130 or 152 days, with skin/fur observed weekly and fur clipped to assess pigment and hair regrowth; after drug withdrawal, rats were observed for pigment return and new hair growth.
Dosage form	25-55mg/kg/day; p.o.; 130 or 152 days
Applications	N-Phenylthiourea inhibited skin melanin production so regrowing fur became brown then cream-colored, caused pepper-and-salt greying of unclipped fur, and after withdrawal pigment flooded back with regrowth of glossy black fur.

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References:[1] Kleszczynski K, Kim T-K, Bilska B, et al. Melatonin exerts oncostatic capacity and decreases melanogenesis in human MNT-1 melanoma cells. J Pineal Res. 2019 Nov;67(4):e12610.[2] Dieke S, Richter C, Clisby K, et al. Pigmentation and hair growth in black rats, as modified by the chronic administration of thiourea, phenyl thiourea and alpha-naphthyl thiourea. Endocrinology. 1947 Mar;40(3):123-35.

Background

N-Phenylthiourea is a phenoloxidase inhibitor. N-Phenylthiourea inhibits the enzymatic oxidation of dopamine by phenoloxidase ($K_i=0.21\mu\text{M}$). N-Phenylthiourea reduces melanin synthesis to improve imaging transparency in zebrafish embryos. N-Phenylthiourea is used for taste genetics and antimicrobial activity evaluation^[1-4].

In vitro, treatment with 10 μM -1mM N-Phenylthiourea for 5 days decolorized SKMEL-188 cells and decreased tyrosinase activity^[5]. Treatment with 0.5mM N-Phenylthiourea for 1-7 days caused intercellular space formation, perinuclear aggregation of pigment granules, rounding, blebbing, and lysis in CuCl₂-induced KB, B-16, and N-115 cells^[6]. Treatment with 1mM N-Phenylthiourea for 72 hours reduced melanin content and decreased DOPA oxidase activity of TYR in MNT-1 cells^[7].

In vivo, administration of 25-55mg/kg/day N-Phenylthiourea in drinking water to black rats for 130-152 days inhibited skin melanin production, turned regenerating fur cream-colored or brown, caused pepper-and-salt greying, and led to pigment return within 8 days and glossy black fur regrowth within 21 days after withdrawal^[8]. Administration of 60-120mg/kg N-Phenylthiourea in feed to Fischer 344 rats for 78 weeks did not induce chemically related tumors and caused no abnormal clinical signs. Administration of 150-300mg/kg N-Phenylthiourea in feed to B6C3F1 mice for 78 weeks suppressed body weight gain and did not induce chemically related tumors^[9].

References:

- [1] Ha YM, Park YJ, Lee JY, et al. Design, synthesis and biological evaluation of 2-(substituted phenyl)thiazolidine-4-carboxylic acid derivatives as novel tyrosinase inhibitors. Biochimie. 2012 Feb;94(2):533-40.
- [2] Ha YM, Park YJ, Kim JA, et al. Design and synthesis of 5-(substituted benzylidene)thiazolidine-2,4-dione derivatives as novel tyrosinase inhibitors. Eur J Med Chem. 2012 Mar;49:245-52.
- [3] Park KL. Emergence of hydrogen bonds from molecular dynamics simulation of substituted N-

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phenylthiourea-catechol oxidase complex. Arch Pharm Res. 2017 Jan;40(1):57-68.

[4] Huong DQ, Duong T, Nam PC. Experimental and theoretical study of corrosion inhibition performance of N-phenylthiourea for mild steel in hydrochloric acid and sodium chloride solution. J Mol Model. 2019 Jun 27;25(7):204.

[5] Slominski A, Zbytek B, Slominski R. Inhibitors of melanogenesis increase toxicity of cyclophosphamide and lymphocytes against melanoma cells. Int J Cancer. 2009 Mar 15;124(6):1470-7.

[6] Masuda A, Eguchi G, et al. Phenylthiourea enhances Cu cytotoxicity in cell cultures: its mode of action. Cell Struct Funct. 1984;9(1):25-35.

[7] Kleszczynski K, Kim T-K, Bilska B, et al. Melatonin exerts oncostatic capacity and decreases melanogenesis in human MNT-1 melanoma cells. J Pineal Res. 2019 Nov;67(4):e12610.

[8] Dieke S, Richter C, Clisby K, et al. Pigmentation and hair growth in black rats, as modified by the chronic administration of thiourea, phenyl thiourea and alpha-naphthyl thiourea. Endocrinology. 1947 Mar;40(3):123-35.

[9] National Cancer Institute. Bioassay of 1-phenyl-2-thiourea for possible carcinogenicity. Natl Cancer Inst Carcinog Tech Rep Ser. 1978;(148):1-40.

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