

Product Data Sheet

Product Name: Pimonidazole

Cat. No.: GC41338

Chemical Properties

Cas. No. 70132-50-2

Chemical Name α -[(2-nitro-1H-imidazol-1-yl)methyl]-1-piperidineethanol

SMILES OC(CN1CCCCC1)CN2C([N+])([O-])=O=NC=C2

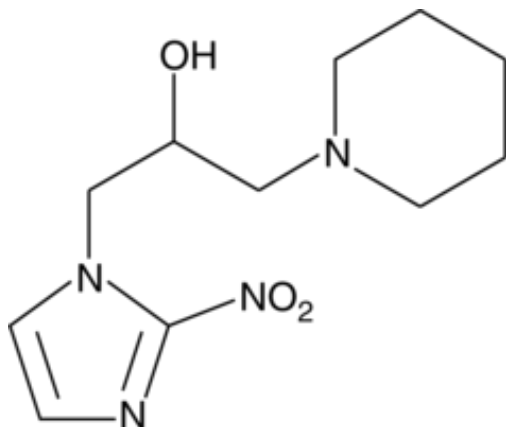
Formula $C_{11}H_{18}N_4O_3$ M.Wt 254.3

Solubility 10mg/mL in ethanol, or DMSO of DMF 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

Preparation of hypoxic section of C6 rat brain glioma [1]:

1. Experimental model of intracerebral glioma: 5 μ L of C6 cell suspension, 10^5 cells, were stereotactically injected 3mm below the dura in the right caudate nucleus of six female Wistar rats (160–180g).

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2. Experiments were carried out by the end of the tumour development (22–25 days after tumour cell implantation).
 3. Rats were injected with a 0.25ml solution of Pimonidazole in phosphate-buffered saline (PBS, pH 7.4) (80mg/kg of body weight).
 4. These markers were administrated intravenously via one of the tail veins, 60 and 1 min before killing, respectively. Brains were quickly removed (less than 3min after the rat death), frozen in liquid nitrogen then stored at -80°C .
 5. For each rat, transversal section (5 μm thick) was cut at mid-tumour (where the tumour was the largest) and analysed on the digital image analysis system.
- This experiment is from the literature, please modify according to the specific situation.

References:

[1]. Zoula S, Rijken PF, et.al. Pimonidazole binding in C6 rat brain glioma: relation with lipid droplet detection. Br J Cancer. 2003 May 6;88(9):1439-44. doi: 10.1038/sj.bjc.6600837. PMID: 12778075; PMCID: PMC2741029.

Background

Pimonidazole is an anoxic marker used in studying intratumoral hypoxia and cell proliferation. Pimonidazole is a 2-nitroimidazole that is reductively activated specifically in hypoxic cells and forms stable adducts with thiol groups in proteins, peptides, and amino acids. The amount of Pimonidazole that is detected is directly proportional to the level of hypoxia within tumors [1-3].

Pimonidazole (80mg/kg; i.p) can be used to study hypoxia near necrosis of C6 rat brain glioma [4]. Pimonidazole can be used as an investigational hypoxia probe in clinical trials. Patients with primary cervical squamous cell carcinoma received a single infusion of Pimonidazole (0.5g/m²; i.v), followed by tumor biopsies 24 hours later. Immunohistochemical staining confirmed hypoxic cells, aiding tumor hypoxia assessment before radiation therapy[5]. 39 intermediate/high risk prostate cancer patients received a single oral dose of Pimonidazole (0.5g/m²) 24h prior to radical prostatectomy surgery. Pimonidazole-defined hypoxia intensity was positively correlated with advanced pathologic stage, tumor invasion, and cribriform and intraductal carcinoma morphology[6]. Pimonidazole can be used as an exogenous hypoxia marker for matrix-assisted laser desorption/ionization (MALDI) MSI. In hypoxic cells, Pimonidazole is reduced and forms reactive products that bind to thiol groups in proteins, peptides, and amino acids. A reductively activated Pimonidazole metabolite can be imaged

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by MALDI-MSI in a breast tumor xenograft model^[7].

References:

- [1]. Varia MA, Calkins-Adams DP, et.al. Pimonidazole: a novel hypoxia marker for complementary study of tumor hypoxia and cell proliferation in cervical carcinoma. Gynecol Oncol. 1998 Nov;71(2):270-7. doi: 10.1006/gyno.1998.5163. PMID: 9826471.
- [2]. Inci ID, Tekin V, et.al. Radioiodination of Pimonidazole as a Novel Theranostic Hypoxia Probe. Curr Radiopharm. 2021;14(1):46-50. doi: 10.2174/1874471013666200331114908. PMID: 32228432.
- [3]. Aguilera KY, Brekken RA. Hypoxia Studies with Pimonidazole in vivo. Bio Protoc. 2014 Oct 5;4(19):e1254. doi: 10.21769/bioprotoc.1254. PMID: 27453908; PMCID: PMC4956402.
- [4]. Zoula S, Rijken PF, et.al. Pimonidazole binding in C6 rat brain glioma: relation with lipid droplet detection. Br J Cancer. 2003 May 6;88(9):1439-44. doi: 10.1038/sj.bjc.6600837. PMID: 12778075; PMCID: PMC2741029.
- [5]. Kennedy AS, Raleigh JA, et.al. Proliferation and hypoxia in human squamous cell carcinoma of the cervix: first report of combined immunohistochemical assays. Int J Radiat Oncol Biol Phys. 1997 Mar 1;37(4):897-905. doi: 10.1016/s0360-3016(96)00539-1. PMID: 9128967.
- [6]. Ci X, Chen S, et.al. Oral pimonidazole unveils clinicopathologic and epigenetic features of hypoxic tumour aggressiveness in localized prostate cancer. BMC Cancer. 2024 Jun 18;24(1):744. doi: 10.1186/s12885-024-12505-1. PMID: 38890593; PMCID: PMC11186205.
- [7]. Mascini NE, Cheng M, et.al. Mass Spectrometry Imaging of the Hypoxia Marker Pimonidazole in a Breast Tumor Model. Anal Chem. 2016 Mar 15;88(6):3107-14. doi: 10.1021/acs.analchem.5b04032. Epub 2016 Feb 29. PMID: 26891127.

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