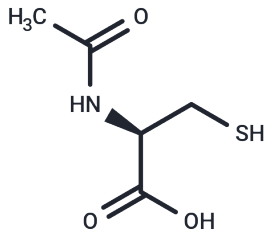
Data Sheet (Cat.No.T0875)

TargetMol

Acetylcysteine

Chemical Properties



CAS No. : 616-91-1

Formula: C5H9NO3S

Molecular Weight: 163.19

Appearance: no data available

Storage: keep away from moisture
Powder: -20°C for 3 years

Biological Description

Description	Acetylcysteine (NAC) is an N-acetyl derivative of cysteine, a ROS inhibitor and mucolytic agent. Acetylcysteine induces apoptosis, can be used to reduce mucus thickness, and has anti-influenza viral activity.
Targets(IC50)	Apoptosis,Ferroptosis,Reactive Oxygen Species,Endogenous Metabolite,Influenza Virus, ROS,TNF
In vitro	**METHODS**: Human bladder cancer cells T24 were treated with Acetylcysteine (5-50 mM) for 24 h. Cell viability was measured by MTT. **RESULTS**: Acetylcysteine dose-dependently inhibited the cell viability of T24 cells with an IC50 of 33.33 mM.[1] **METHODS**: Rat cardiomyocytes H9c2 were treated with Acetylcysteine (2-4 mM) for 12-24 h, and apoptosis was detected by Flow Cytometry. **RESULTS**: Acetylcysteine dose- and time-dependently induced apoptosis in H9c2 cells. [2]
In vivo	**METHODS**: To investigate the effects on apoptotic liver injury in mice, Acetylcysteine (150 mg/kg) was administered intraperitoneally to CD-1 mice as a single injection, and GalN/LPS was used to induce hepatic injury 30 min later. **RESULTS**: Acetylcysteine pretreatment significantly attenuated GalN/LPS-induced hepatocyte apoptosis.Acetylcysteine attenuates GalN/LPS-induced apoptotic liver injury through its potent ROS scavenging and anti-apoptotic effects. [3] **METHODS**: To assay in vivo activity, Acetylcysteine (500 mg/kg) was administered orally to R6/1 transgenic mice with Huntington's disease (HD) once daily for nine weeks. **RESULTS**: Chronic Acetylcysteine administration delayed the onset and development of motor deficits in R6/1 mice and also had antidepressant-like effects in both R6/1 and wild-type mice. [4]
Cell Research	For survival experiments, washed cells are resuspended in RPM1 1640 medium and plated in 0.5 mL at a density of 8-10×105 per well in 24 well plastic culture dishes coated with rat tail collagen. To feed, but to avoid loss of floating cells, fresh medium (0.2 mL) is added to the cultures on days 1, 5, and 10. For experiments involving 'primed' PC12 cells, cultures are pretreated for l-2 weeks with NGF in RPM1 1640 medium supplemented with 1% heat-iN-acetylcysteinetivated horse serum. The cells are then washed and passaged into serum-free RPM1 1640 medium.
Animal Research	Rats are randomly allocated into five groups: sham group (n=5), control group with IIR (n=8) and three groups with IIR who are given N-acetylcysteine in different dosages: 150 mg/kg intraperitoneally 5 min before ischemia (n=8, group N-acetylcysteine 150), 300

	mg/kg i.p 5 min before ischemia (n=7, group N-acetylcysteine 300), and 150 mg/kg i.p 5 min before ischemia plus 150 mg/kg 5 min before reperfusion (n=7, group N-acetylcysteine 150 + 150). After 4 h of reperfusion, the animals are euthanized by exsanguination from the abdominal aorta.[1]

Solubility Information

Solubility	DMSO: 60 mg/mL (367.67 mM),The compound is unstable in solution, please use soon. Ethanol: 31 mg/mL (189.96 mM),Sonication is recommended. H2O: 100 mg/mL (612.78 mM),Sonication and heating are recommended. (< 1 mg/ml refers to the product slightly soluble or insoluble)

Preparing Stock Solutions

	1mg	5mg	10mg
1 mM	6.1278 mL	30.6391 mL	61.2783 mL
5 mM	1.2256 mL	6.1278 mL	12.2557 mL
10 mM	0.6128 mL	3.0639 mL	6.1278 mL
50 mM	0.1226 mL	0.6128 mL	1.2256 mL

Please select the appropriate solvent to prepare the stock solution, according to the solubility of the product in different solvents. Please use it as soon as possible.

Reference

Supabphol A, et al. N-acetylcysteine inhibits proliferation, adhesion, migration and invasion of human bladder cancer cells. J Med Assoc Thai. 2009 Sep;92(9):1171-7.
Tang Y, Song H, Wang Z, et al.Repurposing antiparasitic antimonials to noncovalently rescue temperature-sensitive p53 mutations.Cell Reports.2022, 39(2): 110622.
Yi Y, Gao K, Lin P, et al. Staphylococcus aureus-Induced Necroptosis Promotes Mitochondrial Damage in Goat Endometrial Epithelial Cells. Animals. 2022, 12(17): 2218.
Tang Y, Song H, Wang Z, et al. Repurposing antiparasitic antimonials to noncovalently rescue temperature-sensitive p53 mutations. Cell Reports. 2022, 39(2): 110622
Wu X, Ren Y, Wen Y, et al. Deacetylation of ZKSCAN3 by SIRT1 induces autophagy and protects SN4741 cells against MPP+-induced oxidative stress. Free Radical Biology and Medicine. 2022
Ma X, Tan X, Yu B, et al. DOCK2 regulates antifungal immunity by regulating RAC GTPase activity. Cellular & Molecular Immunology. 2022: 1-17.
Yi Y, Gao K, Zhang L, et al. Zearalenone Induces MLKL-Dependent Necroptosis in Goat Endometrial Stromal Cells via the Calcium Overload/ROS Pathway. International Journal of Molecular Sciences. 2022, 23(17): 10170.
Lin L, Chen Y, Li Q, et al. Isoxanthohumol, a component of Sophora flavescens, promotes the activation of the NLRP3 inflammasome and induces idiosyncratic hepatotoxicity. Journal of Ethnopharmacology. 2021: 114796.
Zhang Y, Zhang C, Li J, et al. Inhibition of AKT induces p53/SIRT6/PARP1-dependent parthanatos to suppress tumor growth. Cell Communication and Signaling. 2022, 20(1): 1-21
Zhang P, Zhang J, Quan H, et al. Effects of butein on human osteosarcoma cell proliferation, apoptosis, and autophagy through oxidative stress. Human & Experimental Toxicology. 2022, 41: 09603271221074346.
Yang C, Wang X, To K K W, et al.Circulating tumor cells shielded with extracellular vesicle-derived CD45 evade T cell attack to enable metastasis.Signal Transduction and Targeted Therapy.2024, 9(1): 84.
Tang G X, Li M L, Zhou C, et al.Mitochondrial RelA empowers mtDNA G-quadruplex formation for hypoxia adaptation in cancer cells.Cell Chemical Biology.2024
Chen T, Leng J, Tan J, et al.Discovery of Novel Potent Covalent Glutathione Peroxidase 4 Inhibitors as Highly Selective Ferroptosis Inducers for the Treatment of Triple-Negative Breast Cancer.Journal of Medicinal Chemistry. 2023
Liu Y, et al. N-acetylcysteine induces apoptosis via the mitochondria-dependent pathway but not via endoplasmic reticulum stress in H9c2 cells. Mol Med Rep. 2017 Nov;16(5):6626-6633.
He Y, Wu P, Jiang W, et al.Methionine deficiency inhibited pyroptosis in primary hepatocytes of grass carp (Ctenopharyngodon idella): possibly via activating the ROS-AMPK-autophagy axis.Journal of Animal Science and Biotechnology.2024, 15(1): 116.
Zeng L, Li Y Q, He S W, et al.The deubiquitinase USP44 enhances cisplatin chemosensitivity through stabilizing STUB1 to promote LRPPRC degradation in neuroblastoma.Neuro-Oncology.2024: noae175.
Ning Y, Chen Y, Tian T, et al.S100A7 Orchestrates Neutrophil Chemotaxis and Drives Neutrophil Extracellular Traps (NETs) Formation to Facilitate Lymph Node Metastasis in Cervical Cancer Patients.Cancer Letters.2024: 217288.
Shao W, Liu F, Zhu L, et al.Ferroportin inhibits the proliferation and migration of fibroblast-like synoviocytes in rheumatoid arthritis via regulating ROS/PI3K/AKT signaling pathway.European Journal of Pharmacology.2024: 177205.
Zhu L, Meng Q, Qian W, et al.LARP3 inhibits the apoptosis of hepatocellular carcinoma via the ROS/PI3K/c-Fos axis.PloS one.2025, 20(1): e0317454.
Wang H, et al. N-acetylcysteine attenuates lipopolysaccharide-induced apoptotic liver damage in D-galactosamine-sensitized mice. Acta Pharmacol Sin. 2007 Nov;28(11):1803-9.
Liu X, Jin J, Wu Y, et al.Fluoroindole chalcone analogues targeting the colchicine binding site of tubulin for colorectal oncotherapy.European Journal of Medicinal Chemistry.2023: 115540.
Wright DJ, et al. N-Acetylcysteine improves mitochondrial function and ameliorates behavioral deficits in the R6/1 mouse model of Huntington's disease. Transl Psychiatry. 2015 Jan 6;5(1):e492.
Li Y, Bao Y, Li Y, et al.RSL3 Inhibits Porcine Epidemic Diarrhea Virus Replication by Activating Ferroptosis.Viruses. 2023, 15(10): 2080.
Liu X, Sun W, Cao J, et al.Acrolein increases the concentration of intracellular $Zn2^{+}$ by producing mitochondrial reactive oxygen species in A549 cells.Toxicology and Industrial Health.2023: 07482337231198350.

Farr SA, et al. J Neurochem, 2003, 84(5), 1173-1183.
Kalimeris K, et al. N-acetylcysteine ameliorates liver injury in a rat model of intestinal ischemia reperfusion. J Surg Res. 2016 Dec;206(2):263-272.
Zhu M, Tang X, Gong Z, et al. TAD1822-7 induces ROS-mediated apoptosis of HER2 positive breast cancer by decreasing E-cadherin in an EphB4 dependent manner. Life Sciences. 2021: 119954
Xu B, Xu J, Cai N, et al. Roflumilast prevents ischemic stroke-induced neuronal damage by restricting GSK3β-mediated oxidative stress and IRE1α/TRAF2/JNK pathway[J]. Free Radical Biology and Medicine. 2020
Xu B, Qin Y, Li D, et al. Inhibition of PDE4 protects neurons against oxygen-glucose deprivation-induced endoplasmic reticulum stress through activation of the Nrf-2/HO-1 pathway. Redox Biology. 2020, 28: 101342
Xu B, Qin Y, Li D, et al. Inhibition of PDE4 protects neurons against oxygen-glucose deprivation-induced endoplasmic reticulum stress through activation of the Nrf-2/HO-1 pathway[J]. Redox Biology. 2020, 28: 101342.
Xu B, Xu J, Cai N, et al. Roflumilast prevents ischemic stroke-induced neuronal damage by restricting GSK3β-mediated oxidative stress and IRE1α/TRAF2/JNK pathway. Free Radical Biology and Medicine. 2020
Xue J, Liao Q, Luo M, et al. Cigarette smoke-induced oxidative stress activates NRF2 to mediate fibronectin disorganization in vascular formation. Open Biology. 2022, 12(4): 210310