

Product Data Sheet

Product Name: Nicotinamide riboside

Cat. No.: GC44401

Chemical Properties

Cas. No. 1341-23-7

SMILES NC(C1=C[N+](C@H)2[C@H](O)[C@H](O)[C@@H](CO)O2)=CC=C1)=O

Formula $C_{11}H_{15}N_2O_5$

M.Wt 255.3

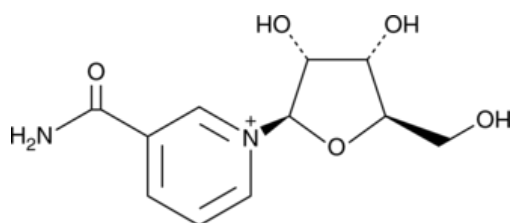
Solubility Water:125mg/ml

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

FHC cells (human normal colon mucosal epithelial cell line), NCM460 cells (human normal colon epithelial cell line), IEC-6 cells (rat intestinal epithelial cell line)

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Preparation Method	FHC, NCM460 and IEC-6 cells were maintained in DMEM or RPMI-1640 medium supplemented with 10% FBS at 37°C, 5% CO ₂ . Cells were irradiated at 8Gy, then treated with Nicotinamide riboside at 0.5mM with or without SIRT1 inhibitor EX527 at 1μM for 24h, after which cell viability, ROS levels, SIRT1/GSDME/cleavedCaspase-3 protein expression, and pyroptosis were assessed. Intestinal crypt-derived organoids from mice were cultured in Organoid Culture ECM and treated with Nicotinamide riboside at 0.5mM with or without EX527 at 1μM for 24h, after which organoid survival was observed.
Reaction Conditions	0.5mM; 24h
Applications	Nicotinamide riboside increased survival of irradiated FHC, NCM460 and IEC-6 cells. Nicotinamide riboside reduced ROS levels in irradiated FHC, NCM460 and IEC-6 cells. Nicotinamide riboside upregulated SIRT1 protein expression in irradiated FHC, NCM460 and IEC-6 cells. Nicotinamide riboside inhibited cleavedCaspase-3 and GSDME-NT (GSDME cleavage fragment) expression in irradiated FHC, NCM460 and IEC-6 cells. Nicotinamide riboside promoted survival of irradiated intestinal crypt-derived organoids. Co-treatment with EX527 blocked Nicotinamide riboside-mediated increase in cell survival and inhibition of GSDME-NT expression.
Animal experiment [2]:	
Animal models	Male Sprague-Dawley rats (200-220g)

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Preparation Method	Rats were anesthetized with 5% isoflurane, intubated and ventilated, and subjected to 30min left anterior descending coronary artery occlusion followed by 2h reperfusion to establish myocardial ischemia-reperfusion (I/R) injury. Nicotinamide riboside was dissolved in normal saline and administered intraperitoneally at 100, 200 or 400mg/kg 3h before ischemia, or at 200mg/kg at the onset of ischemia, 3h before ischemia, or daily for 7 days before ischemia. Separate groups received 3-TYP (5mg/kg, i.v.) 0.5h before Nicotinamide riboside pretreatment. At 2h after reperfusion, rats were euthanized.
Dosage form	200mg/kg; i.p.; single pretreatment
Applications	Nicotinamide riboside administration reduced myocardial infarct area in rats. Nicotinamide riboside decreased serum CK-MB and LDH levels. Nicotinamide riboside improved cardiac function by increasing EF and FS and decreasing LVIDs, LVIDd, LVVs and LVVd. Nicotinamide riboside reduced myocardial necrosis, inflammatory cell infiltration and myofibril disarray. Nicotinamide riboside reduced myocardial MDA content and increased SOD activity. Nicotinamide riboside reduced mitochondrial swelling, vacuolization and cristae disruption on TEM and lowered the proportion of damaged mitochondria. Nicotinamide riboside reduced TUNEL-positive cardiomyocyte number and downregulated Bax, cleaved Caspase-3 and cleaved PARP while upregulating Bcl-2 in myocardium. Nicotinamide riboside increased myocardial NAD ⁺ content and upregulated SIRT3 mRNA and protein in myocardium. Co-administration of SIRT3 deacetylase inhibitor 3-TYP reversed Nicotinamide riboside-induced reduction in infarct area, increase in SIRT3 and SOD2 expression, and reduction in total protein acetylation and mtROS.

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References:

[1] Zhou Q, Liu L, Lin X, et al. Nicotinamide riboside attenuates radiation-induced intestinal injury by suppressing gasdermin E-mediated pyroptosis in intestinal epithelial cells. J Transl Med. 2025 Oct 17;23:1126.

[2] Zhao K, Tang J, Xie H, et al. Nicotinamide riboside attenuates myocardial ischemia-reperfusion injury via regulating SIRT3/SOD2 signaling pathway. Biomed Pharmacother. 2024;175:116689.

Background

Nicotinamide riboside is a vitamin B3/NAD⁺ precursor. Nicotinamide riboside can be converted to NMN and ultimately to NAD⁺ through pathways such as nicotinamide riboside kinase, elevating intracellular NAD⁺ levels, activating SIRT6 and improving mitochondrial function. Nicotinamide riboside exerts protective effects by regulating NAD⁺-consuming enzyme-related cellular metabolism and stress responses. Nicotinamide riboside can be used in research related to neurodegenerative diseases, diabetes, hearing loss, cardiovascular and metabolic diseases, aging and SARS-CoV-2 infection^[1-4].

In vitro, treatment with Nicotinamide riboside (1μM) in BEAS-2B cells with fresh drug-containing medium replaced every 24h for up to 192h caused cell growth arrest and G2/M phase cell cycle arrest, and decreased ATP/ADP and ATP/AMP ratios^[5]. Treatment with Nicotinamide riboside (0.1mM) for 48h in CITRIN-knockout HepG2 cells reduced cytosolic NADH:NAD⁺ ratio, increased glycolytic capacity, glycolytic end-product levels and fatty acid β-oxidation^[6]. Treatment with Nicotinamide riboside (0.5mM) for 24h in 8Gy-irradiated FHC cells, NCM460 cells and IEC-6 cells increased cell viability, upregulated SIRT1 protein expression, and inhibited cleaved Caspase-3 and GSDME-NT expression^[7].

In vivo, SD rats received a single intraperitoneal injection of Nicotinamide riboside at 200mg/kg 3h before myocardial ischemia, Nicotinamide riboside reduced myocardial infarct area, decreased serum CK-MB and LDH levels, improved cardiac ejection fraction and fractional shortening, reduced left ventricular internal diameters in diastole and systole and left ventricular volumes, and alleviated

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myocardial necrosis, inflammatory cell infiltration and myofibril disarray^[8]. C57Bl/6J mice fed a diet supplemented with Nicotinamide riboside at 400mg/kg for 12 consecutive weeks attenuated high-fat diet-induced body weight gain and epididymal fat mass increase, reduced liver triglyceride content, increased oxygen consumption and energy expenditure, and improved insulin sensitivity^[9]. ANT1-deficient C57BL/6 mice fed a diet supplemented with Nicotinamide riboside at 300mg/kg for 8 consecutive weeks increased gastrocnemius NAD⁺ content, prolonged running time to exhaustion, and increased VO₂end/VO₂max ratio^[10].

References:

- [1] Sharma C, Donu D, Cen Y. Emerging Role of Nicotinamide Riboside in Health and Diseases. *Nutrients*. 2022 Sep 20;14(19):3889.
- [2] Mehmel M, Jovanović N, Spitz U. Nicotinamide Riboside—The Current State of Research and Therapeutic Uses. *Nutrients*. 2020 Jun;12(6):1616.
- [3] Tribble JR, Otmani A, Sun S, et al. Nicotinamide provides neuroprotection in glaucoma by protecting against mitochondrial and metabolic dysfunction. *Redox Biol*. 2021;43:101988.
- [4] Kitaoka Y, Sase K, Tsukahara C, et al. Axonal Protection by Nicotinamide Riboside via SIRT1-Autophagy Pathway in TNF-Induced Optic Nerve Degeneration. *Mol Neurobiol*. 2020;57(12):4952-4960.
- [5] Cordeiro EWF, Marzola EL, Maekawa RS, et al. Nicotinamide riboside Induced Energy Stress and Metabolic Reprogramming in BEAS-2B Cells. *Chem Res Toxicol*. 2024;37(7):1246-1268.
- [6] Yau WW, Chen GB, Zhou J, et al. Nicotinamide riboside rescues dysregulated glycolysis and fatty acid β -oxidation in a human hepatic cell model of citrin deficiency. *Hum Mol Genet*. 2023 Jun 1;32(11):1922-1931.
- [7] Zhou Q, Liu L, Lin X, et al. Nicotinamide riboside attenuates radiation-induced intestinal injury by suppressing gasdermin E-mediated pyroptosis in intestinal epithelial cells. *J Transl Med*. 2025 Oct 17;23:1126.
- [8] Zhao K, Tang J, Xie H, et al. Nicotinamide riboside attenuates myocardial ischemia-reperfusion injury via regulating SIRT3/SOD2 signaling pathway. *Biomedicine Pharmacother*. 2024;175:116689.

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[9] Canto C, Houtkooper RH, Pirinen E, et al. The NAD⁺ precursor nicotinamide riboside enhances oxidative metabolism and protects against high-fat diet induced obesity. *Cell Metab.* 2012 Jun 6;15(6):838-847.

[10] Schaefer PM, Huang J, Butic A, et al. Nicotinamide riboside alleviates exercise intolerance in ANT1-deficient mice. *Mol Metab.* 2022;64:101560.

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