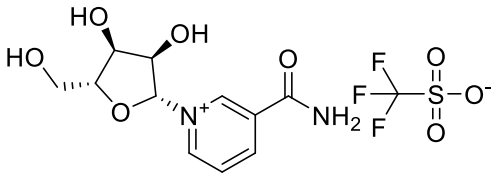
Product data sheet

MedKoo Cat#: 564087 Name: Nicotinamide Riboside Triflate CAS#: 445489-49-6 (Triflate) Chemical Formula: $C_{12}H_{15}F_3N_2O_8S$ Molecular Weight: 404.31	
Product supplied as:	Powder
Purity (by HPLC):	≥ 98%
Shipping conditions	Ambient temperature
Storage conditions:	Powder: -20°C 3 years; 4°C 2 years.
	In solvent: -80°C 3 months; -20°C 2 weeks.

1. Product description:
Nicotinamide Riboside is a precursor of NAD+ and a source of vitamin B3 (niacin). Nicotinamide Riboside increases intracellular and mitochondrial NAD+ content in C2C12.

2. CoA, QC data, SDS, and handling instruction
SDS and handling instruction, CoA with copies of QC data (NMR, HPLC and MS analytical spectra) can be downloaded from the product web page under "QC And Documents" section. Note: copies of analytical spectra may not be available if the product is being supplied by MedKoo partners. Whether the product was made by MedKoo or provided by its partners, the quality is 100% guaranteed.

3. Solubility data

Solvent	Max Conc. mg/mL	Max Conc. mM
DMSO	TBD	TBD

4. Stock solution preparation table:

Concentration / Solvent Volume / Mass	1 mg	5 mg	10 mg
1 mM	2.47 mL	12.37 mL	24.73 mL
5 mM	0.49 mL	2.47 mL	4.95 mL
10 mM	0.25 mL	1.24 mL	2.47 mL
50 mM	0.05 mL	0.25 mL	0.49 mL

5. Molarity Calculator, Reconstitution Calculator, Dilution Calculator
Please refer the product web page under section of "Calculator"

6. Recommended literature which reported protocols for in vitro and in vivo study
In vitro study

1. Wang S, Wan T, Ye M, Qiu Y, Pei L, Jiang R, Pang N, Huang Y, Liang B, Ling W, Lin X, Zhang Z, Yang L. Nicotinamide riboside attenuates alcohol induced liver injuries via activation of SirT1/PGC-1α/mitochondrial biosynthesis pathway. Redox Biol. 2018 Jul;17:89-98. doi: 10.1016/j.redox.2018.04.006. Epub 2018 Apr 5. PMID: 29679894; PMCID: PMC6007172.
2. Godek CP, Cynamon MH. In vitro evaluation of nicotinamide riboside analogs against Haemophilus influenzae. Antimicrob Agents Chemother. 1990 Aug;34(8):1473-9. doi: 10.1128/AAC.34.8.1473. PMID: 2145800; PMCID: PMC171855.

In vivo study

1. Wang S, Wan T, Ye M, Qiu Y, Pei L, Jiang R, Pang N, Huang Y, Liang B, Ling W, Lin X, Zhang Z, Yang L. Nicotinamide riboside attenuates alcohol induced liver injuries via activation of SirT1/PGC-1α/mitochondrial biosynthesis pathway. Redox Biol. 2018 Jul;17:89-98. doi: 10.1016/j.redox.2018.04.006. Epub 2018 Apr 5. PMID: 29679894; PMCID: PMC6007172.
2. Diguet N, Trammell SAJ, Tannous C, Deloux R, Piquereau J, Mougenot N, Gouge A, Gressette M, Manoury B, Blanc J, Breton M, Decaux JF, Lavery GG, Baczkó I, Zoll J, Garnier A, Li Z, Brenner C, Mericskay M. Nicotinamide Riboside Preserves Cardiac Function in a Mouse Model of Dilated Cardiomyopathy. Circulation. 2018 May 22;137(21):2256-2273. doi: 10.1161/CIRCULATIONAHA.116.026099. Epub 2017 Dec 7. Erratum in: Circulation. 2018 May 22;137(21):e690. PMID: 29217642; PMCID: PMC6954688.

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7. Bioactivity

Biological target:

Nicotinamide riboside, also known as NR and SRT647, is a pyridine-nucleoside form of vitamin B3 that prevents muscle, neural and melanocyte stem cell senescence.

In vitro activity

In in vitro experiments, HepG2 cells (CYP2E1 over-expressing cells) were incubated with ethanol ± 0.5 mmol/L NR (nicotinamide riboside). Lipid accumulation and mitochondrial function were compared. Ethanol decreased the levels of NAD+ and ATP in HepG2 cells, which were upregulated by NR (Fig. 5A). The oxygen consumption rate (OCR) in HepG2 cells was abolished by ethanol. The basal OCR and reserve oxidative capacity, which is the FCCP-sensitive OCR, and respiratory capacity, which is the rotenone sensitive OCR, were all decreased by ethanol. These changes were reversed by NR, indicating that NR improved mitochondrial aerobic respiration (Fig. 5B, S5A). Next, a reduction in mtDNA abundance by ethanol was detected and NR increased the mtDNA copies (Fig. 5C). Consistently, the estrogen-related receptor α (ERRα), which mediates many of the downstream effects of PGC-1α on mitochondrial biosynthesis and energy metabolism, was markedly decreased by ethanol, as was the ERRα/PGC-1α target, nuclear respiratory factor-1 (NRF1) and its target, mitochondrial transcription factor A (TFAM), and nuclear respiratory factor-2 (NRF2). NR increased the expressions of ERRα, NRF1, NRF2 and TFAM, promoting mitochondrial biogenesis (Fig. 5D).

Reference: Redox Biol. 2018 Jul; 17: 89–98. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6007172/

In vivo activity

This study aimed to explore the effect of NR (nicotinamide riboside) on ethanol induced liver injuries and the underlying mechanisms. We fed C57BL/6 J mice with Lieber-DeCarli ethanol liquid diet with or without 400 mg/kg·bw NR for 16 days. Liver injuries and SirT1-PGC-1α-mitochondrial function were analyzed. Mice were pair-fed and there were no differences in body weight among the three groups (Fig. S1A, B). Fat accumulated in ethanol group, but only a small number of tiny lipid droplets were observed in NR treated mice as shown in H&E staining and Oil red O staining (Fig. 1A). Ethanol exposure elevated serum ALT and AST and liver triglycerides while NR significantly decreased their levels (Fig. 1B, C). The ratio of liver-to-body weight increased by ethanol compared to controls, while it was slightly reduced by NR (Fig. S1C). The expressions of sterol regulatory element binding protein-lc (SREBP-1c) and peroxisome proliferator-activated receptorγ2 (PPAR-γ2), as well as PPAR-γ mRNA, were markedly elevated by ethanol, which were reduced by NR (Fig. 1D, S1D). Ethanol increased the levels of hepatic MDA and 4-hydroxynonenal, two major products of lipid peroxidation, and NR markedly decreased them (Fig. 1C, D). SirT1 was significantly decreased in liver of ethanol fed mice compared to controls, and NR restored SirT1 to normal (Fig. 1D). There was also a decrease in the hepatic inflammatory transcripts TNF-α and IL-6 in NR-treated mice compared to mice of ethanol group (Fig. S1D).

Reference: Redox Biol. 2018 Jul; 17: 89–98. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6007172/