# **Product data sheet**



MedKoo Cat#: 596512				
Name: Nicotine				
CAS: 54-11-5				
Chemical Formula: $C_{10}H_{14}N_2$				
Exact Mass: 162.1157				
Molecular Weight: 162.236				
Product supplied as:	Powder			
Purity (by HPLC):	$\geq 98\%$			
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:

Nicotine is highly toxic alkaloid. It is the prototypical agonist at nicotinic cholinergic receptors where it dramatically stimulates neurons and ultimately blocks synaptic transmission. Nicotine is also important medically because of its presence in tobacco smoke.

# 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		
DMF	50.0	308.19		
DMSO	30.0	184.92		
Ethanol	50.0	308.19		
PBS (pH 7.2)	1.0	6.16		

# 4. Stock solution preparation table:

Concentration / Solvent Volume / Mass	1 mg	5 mg	10 mg
1 mM	6.16 mL	30.82 mL	61.64 mL
5 mM	1.23 mL	6.16 mL	12.33 mL
10 mM	0.62 mL	3.08 mL	6.16 mL
50 mM	0.12 mL	0.62 mL	1.23 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. Long DD, Zhang YZ, Liu A, Shen L, Wei HR, Lou QQ, Hu SS, Chen DY, Chai XQ, Wang D. Microglia sustain anterior cingulate cortex neuronal hyperactivity in nicotine-induced pain. J Neuroinflammation. 2023 Mar 21;20(1):81. doi: 10.1186/s12974-023-02767-0. PMID: 36944965; PMCID: PMC10031886.

2. Liu Z, Wang F, Huang X, Chen Z, Zhao Y, Wang Y, Luo X, Zhao G. Nicotine Suppresses Phagocytic Ability of Macrophages by Regulating the miR-296-3p-SIRPα Axis. Anal Cell Pathol (Amst). 2023 Feb 15;2023:6306358. doi: 10.1155/2023/6306358. PMID: 36845756; PMCID: PMC9946743.

#### In vivo study

1. Ruan S, Xie J, Wang L, Guo L, Li Y, Fan W, Ji R, Gong Z, Xu Y, Mao J, Xie J. Nicotine alleviates MPTP-induced nigrostriatal damage through modulation of JNK and ERK signaling pathways in the mice model of Parkinson's disease. Front Pharmacol. 2023 Feb 2;14:1088957. doi: 10.3389/fphar.2023.1088957. PMID: 36817162; PMCID: PMC9932206.

2. Yang L, Shen J, Liu C, Kuang Z, Tang Y, Qian Z, Guan M, Yang Y, Zhan Y, Li N, Li X. Nicotine rebalances NAD+ homeostasis and improves aging-related symptoms in male mice by enhancing NAMPT activity. Nat Commun. 2023 Feb 17;14(1):900. doi: 10.1038/s41467-023-36543-8. PMID: 36797299; PMCID: PMC9935903.

# **Product data sheet**



# 7. Bioactivity

#### **Biological target:**

Nicotine is highly toxic alkaloid. It is the prototypical agonist at nicotinic cholinergic receptors where it dramatically stimulates neurons and ultimately blocks synaptic transmission.

### In vitro activity

Nicotine decreased the expression of microRNA (miR)-296-3p, which directly targeted the 3'-untranslated region (3'-UTR) of SIRP $\alpha$  mRNA in macrophage. Furthermore, nicotine inhibited the phagocytic ability of macrophage by regulating the miR-296-3p-SIRP $\alpha$  axis. Moreover, nicotine decreased miR-296-3p expression via increasing c-Myc expression in macrophage.

Reference: Anal Cell Pathol (Amst). 2023 Feb 15;2023:6306358. https://pubmed.ncbi.nlm.nih.gov/36845756/

### In vivo activity

Nic (nicotine) was found to improve neuroapoptosis, enhance tyrosine hydroxylase activity, and reduce the accumulation of the phosphorylated α-synuclein in the substantia nigra and striatal regions of PD mice by TUNEL and immunohistochemical assays. Immuno-fluorescent method for labeling Iba1 and CD68 indicated that Nic remarkably alleviates the activation of microglia which represents the M1 polarization state in the mice brain under MPTP stimulation. No significant difference in the expression of p38/MAPK pathway was found in the nigrostriatal regions, while Nic could significantly inhibit the elevated p-JNK/JNK ratio and increase the declined p-ERK/ERK ratio in the substantia nigra of MPTP-exposed brains, which was further confirmed by the pretreatment of CYP2A5 inhibitor to decline the metabolic activity of Nic.

Reference: Front Pharmacol. 2023 Feb 2;14:1088957. https://pubmed.ncbi.nlm.nih.gov/36817162/

Note: The information listed here was extracted from literature. MedKoo has not independently retested and confirmed the accuracy of these methods. Customer should use it just for a reference only.