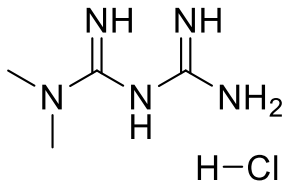
Product data sheet

MedKoo Cat#: 328609 Name: Metformin Hydrochloride CAS#: 1115-70-4 (HCl) Chemical Formula: $C_4H_{12}ClN_5$ Molecular Weight: 165.625	
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:
Metformin Hydrochloride, also known as LA-6023 and Fortamet, is an AMP-activated protein kinase (AMPK) activator that improves glycemic control by improving insulin sensitivity and decreasing intestinal absorption of glucose.

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	2.51	15.15
PBS (pH 7.2)	1.0	6.04
Water	32.5	196.23

4. Stock solution preparation table:

Concentration / Solvent Volume / Mass	**1 mg**	**5 mg**	**10 mg**
1 mM	6.04 mL	30.19 mL	60.38 mL
5 mM	1.21 mL	6.04 mL	12.08 mL
10 mM	0.60 mL	3.02 mL	6.04 mL
50 mM	0.12 mL	0.60 mL	1.21 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. Zhang T, Hu L, Tang JF, Xu H, Tian K, Wu MN, Huang SY, Du YM, Zhou P, Lu RJ, He S, Xu JM, Si JJ, Li J, Chen DL, Ran JH. Metformin Inhibits the Urea Cycle and Reduces Putrescine Generation in Colorectal Cancer Cell Lines. Molecules. 2021 Apr 1;26(7):1990. doi: 10.3390/molecules26071990. PMID: 33915902; PMCID: PMC8038129.
2. Farfan-Morales CN, Cordero-Rivera CD, Osuna-Ramos JF, Monroy-Muñoz IE, De Jesús-González LA, Muñoz-Medina JE, Hurtado-Monzón AM, Reyes-Ruiz JM, Del Ángel RM. The antiviral effect of metformin on zika and dengue virus infection. Sci Rep. 2021 Apr 22;11(1):8743. doi: 10.1038/s41598-021-87707-9. PMID: 33888740; PMCID: PMC8062493.

In vivo study

1. Derkach D, Kehtari T, Renaud M, Heidari M, Lakshman N, Morshead CM. Metformin pretreatment rescues olfactory memory associated with subependymal zone neurogenesis in a juvenile model of cranial irradiation. Cell Rep Med. 2021 Apr 6;2(4):100231. doi: 10.1016/j.xcrm.2021.100231. PMID: 33948569; PMCID: PMC8080112.
2. Moon J, Lee SY, Choi JW, Lee AR, Yoo JH, Moon SJ, Park SH, Cho ML. Metformin ameliorates scleroderma via inhibiting Th17 cells and reducing mTOR-STAT3 signaling in skin fibroblasts. J Transl Med. 2021 May 4;19(1):192. doi: 10.1186/s12967-021-02860-z. PMID: 33947424; PMCID: PMC8097822.

7. Bioactivity

Product data sheet

Biological target:

Metformin hydrochloride (1,1-Dimethylbiguanide hydrochloride) inhibits the mitochondrial respiratory chain in the liver, leading to activation of AMPK, enhancing insulin sensitivity.

In vitro activity

To explore the mechanism of metformin's inhibition of the proliferation of colorectal cancer cells, HCT116 and SW480 cells were treated with increasing concentrations of metformin (0, 10, 20, and 40 mM) for 24 h. The colony-formation results show that metformin decreased the proliferation of HCT116 and SW480 cells (Figure 5b–c) in a concentration-dependent manner. The levels of AMPK, p-AMPK, and proteins in the urea cycle and putrescine generation pathways were assessed by Western blotting to explore the mechanism of metformin's activity. The expression of p-AMPK/AMPK was significantly increased, and the protein levels of ARG1, OTC, and ODC were decreased in both HCT116 and SW480 cells (Figure 5d–e), in a dose-dependent manner.

Reference: Molecules. 2021 Apr; 26(7): 1990. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8038129/

In vivo activity

A complete loss of DCX+Ki67+ neuroblasts in the SEZ (subependymal zone) at 2 days post-IR and a near-complete loss in metformin preTx (pretreatment) mice (Figures 3B and 3C) was observed. DCX+Ki67+ cells were observed in both treated and untreated mice by 30 days post-IR; however, although a significant ~33% reduction persisted in untreated mice, metformin preTx completely rescued this deficit (Figure 3D). A similar rescue of DCX+Ki67+ cells was observed along the RMS (rostral migratory stream) at 30 days post-IR in metformin preTx mice (Figures 3E and 3F). Interestingly, metformin preTx did not significantly alter the total number of neuroblasts (DCX+) or proliferating (Ki67+) cells in the SEZ (Figure S3), suggesting that metformin preTx specifically supported the recovery of proliferating neuroblasts following cranial IR.

Reference: Cell Rep Med. 2021 Apr 20; 2(4): 100231. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8080112/