

# Product data sheet



MedKoo Cat#: 581036 Name: KN-93 (HCl) CAS: 1956426-56-4 (HCl) Chemical Formula: C <sub>26</sub> H <sub>30</sub> Cl <sub>2</sub> N <sub>2</sub> O <sub>4</sub> S Exact Mass: 536.1303 Molecular Weight: 537.496	
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:

KN-93 is an inhibitor of Ca<sup>2+</sup>/calmodulin-dependent protein kinase II (CaMK-II). It inhibits fibroblast CaMK-II activity and cell growth in a dose-dependent manner, reversibly arrests cells in G1 and induces apoptosis.

## 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	10.0	18.60
DMSO	20.5	38.14
Water	0.45	0.84

## 4. Stock solution preparation table:

Concentration / Solvent Volume / Mass	1 mg	5 mg	10 mg
1 mM	1.86 mL	9.30 mL	18.60 mL
5 mM	0.37 mL	1.86 mL	3.72 mL
10 mM	0.19 mL	0.93 mL	1.86 mL
50 mM	0.04 mL	0.19 mL	0.37 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. Tombes RM, Grant S, Westin EH, Krystal G. G1 cell cycle arrest and apoptosis are induced in NIH 3T3 cells by KN-93, an inhibitor of CaMK-II (the multifunctional Ca<sup>2+</sup>/CaM kinase). *Cell Growth Differ.* 1995 Sep;6(9):1063-70. PMID: 8519682.

2. Mamiya N, Goldenring JR, Tsunoda Y, Modlin IM, Yasui K, Usuda N, Ishikawa T, Natsume A, Hidaka H. Inhibition of acid secretion in gastric parietal cells by the Ca<sup>2+</sup>/calmodulin-dependent protein kinase II inhibitor KN-93. *Biochem Biophys Res Commun.* 1993 Sep 15;195(2):608-15. doi: 10.1006/bbrc.1993.2089. PMID: 7690557.

### In vivo study

1. Li J, Wang P, Ying J, Chen Z, Yu S. Curcumin Attenuates Retinal Vascular Leakage by Inhibiting Calcium/Calmodulin-Dependent Protein Kinase II Activity in Streptozotocin-Induced Diabetes. *Cell Physiol Biochem.* 2016;39(3):1196-208. doi: 10.1159/000447826. Epub 2016 Sep 5. PMID: 27595397.

2. Anderson ME, Braun AP, Wu Y, Lu T, Wu Y, Schulman H, Sung RJ. KN-93, an inhibitor of multifunctional Ca<sup>++</sup>/calmodulin-dependent protein kinase, decreases early afterdepolarizations in rabbit heart. *J Pharmacol Exp Ther.* 1998 Dec;287(3):996-1006. PMID: 9864285.

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## 7. Bioactivity

### Biological target:

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KN-93 hydrochloride is a cell-permeable, reversible and competitive inhibitor calmodulin-dependent kinase type II (CaMKII) with a  $K_i$  of 370 nM.

### In vitro activity

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KN-93 also blocked cell growth stimulated by basic fibroblast growth factor, platelet-derived growth factor-BB, epidermal growth factor, and insulin-like growth factor-1. After 3 days of KN-93-induced G1 arrest, cell size and viability decreased and DNA fragmented, indicating apoptosis.

Reference: Cell Growth Differ. 1995 Sep;6(9):1063-70. <https://pubmed.ncbi.nlm.nih.gov/8519682/>

### In vivo activity

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Curcumin and KN93 significantly inhibited the activation of CaMKII/NF- $\kappa$ B signaling induced by diabetes or elevated glucose, and subsequently decreased the expression of VEGF, iNOS and ICAM-1. These changes were associated with a decrease of diabetes-induced retinal vascular leakage in experimental rats.

Reference: Cell Physiol Biochem. 2016;39(3):1196-208. <https://pubmed.ncbi.nlm.nih.gov/27595397/>

*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.*