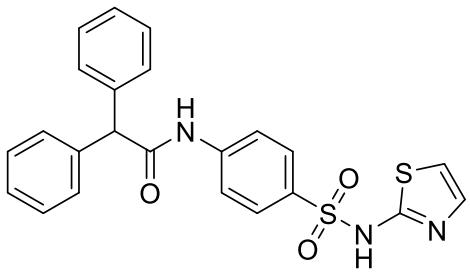
Product data sheet

MedKoo Cat#: 522583 Name: ICA-121431 CAS: 313254-51-2 Chemical Formula: $C_{23}H_{19}N_3O_3S_2$ Exact Mass: 449.0868 Molecular Weight: 449.543	
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:
ICA-121431 is a potent, selective inhibitor of the human Nav1.3 and Nav1.1 voltage gated sodium channels (IC50 = 19 nM) with little or no activity against human Nav1.5 or Nav1.7 channels. Voltage-gated sodium channels initiate action potentials in brain neurons, and sodium channel blockers are used in therapy of epilepsy.

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	44.48	98.93

4. Stock solution preparation table:

Concentration / Solvent Volume / Mass	1 mg	5 mg	10 mg
1 mM	2.22 mL	11.12 mL	22.24 mL
5 mM	0.44 mL	2.22 mL	4.45 mL
10 mM	0.22 mL	1.11 mL	2.22 mL
50 mM	0.04 mL	0.22 mL	0.44 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. Réthoré L, Park J, Montnach J, Nicolas S, Khoury J, Le Seac'h E, Mabrouk K, De Pomyers H, Tricoire-Leignel H, Mattei C, Henrion D, Fajloun Z, De Waard M, Legendre C, Legros C. Pharmacological Dissection of the Crosstalk between NaV and CaV Channels in GH3b6 Cells. Int J Mol Sci. 2022 Jan 13;23(2):827. doi: 10.3390/ijms23020827. PMID: 35055012; PMCID: PMC8775721.
2. Garrison CE, Guan W, Kato M, Tamsett T, Patel T, Sun Y, Pathak TP. Structure-Activity Relationship Evaluation of Wasp Toxin β-PMTX Leads to Analogs with Superior Activity for Human Neuronal Sodium Channels. ACS Med Chem Lett. 2019 Oct 25;11(3):353-357. doi: 10.1021/acsmedchemlett.9b00415. PMID: 32184969; PMCID: PMC7074216.

In vivo study

1. Pineda-Farias JB, Loeza-Alcocer E, Nagarajan V, Gold MS, Sekula RF Jr. Mechanisms Underlying the Selective Therapeutic Efficacy of Carbamazepine for Attenuation of Trigeminal Nerve Injury Pain. J Neurosci. 2021 Oct 27;41(43):8991-9007. doi: 10.1523/JNEUROSCI.0547-21.2021. Epub 2021 Aug 26. PMID: 34446571; PMCID: PMC8549540.
2. Ru F, Pavelkova N, Krajewski JL, McDermott JS, Undem BJ, Kollarik M. Stimulus intensity-dependent recruitment of NaV1 subunits in action potential initiation in nerve terminals of vagal C-fibers innervating the esophagus. Am J Physiol Gastrointest Liver Physiol. 2020 Oct 1;319(4):G443-G453. doi: 10.1152/ajpgi.00122.2019. Epub 2020 Jul 29. PMID: 32726130; PMCID: PMC7654645.

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7. Bioactivity

Biological target:

ICA-121431 is a nanomolar potent and broad-spectrum voltage-gated sodium channel (Nav) blocker, shows equipotent selectivity for human Nav1.1 and Nav1.3 subtypes with IC50 values of 13 nM and 23 nM, respectively.

In vitro activity

ICA-121431 reduced the I_{Na} amplitude in a non-voltage-dependent manner (Figure 3B), and thus did not alter the voltage dependency of activation ($p = 0.06$) (Figure 3C,D). However, ICA-121431 induced a negative shift of 10.3 mV ($p < 0.0001$) of the voltage dependence of inactivation (Figure 3C,E). These data are in agreement with previous data indicating that ICA-121431 preferentially interacts with inactivated $Na_V1.3$ channels.

Reference: Int J Mol Sci. 2022 Jan 13;23(2):827. https://pubmed.ncbi.nlm.nih.gov/35055012/

In vivo activity

The increase in potency was associated with a selective increase in the efficacy of the $Na_V1.1$ channel blocker ICA-121431 and $Na_V1.1$ protein in the ION, but no change in $Na_V1.1$ mRNA in trigeminal ganglia. Importantly, local ICA-121431 administration reversed ION CCI-induced hypersensitivity.

Reference: J Neurosci. 2021 Oct 27;41(43):8991-9007. https://pubmed.ncbi.nlm.nih.gov/34446571/

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.