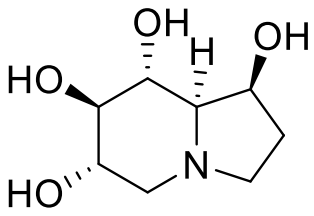
Product data sheet

MedKoo Cat#: 329644 Name: Castanospermine CAS#: 79831-76-8 (free base) Chemical Formula: $C_8H_{15}NO_4$ Exact Mass: 189.1001 Molecular Weight: 189.211	
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:
Castanospermine is an indolizidine alkaloid first isolated from the seeds of Castanospermum australe. It is a potent inhibitor of some glucosidase enzymes and has antiviral activity in vitro and in mouse models. Castanospermine was a lead to celgosivir.

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	100	528.51
Water	100	528.51

4. Stock solution preparation table:

Concentration / Solvent Volume / Mass	**1 mg**	**5 mg**	**10 mg**
1 mM	5.29 mL	26.43 mL	52.85 mL
5 mM	1.06 mL	5.29 mL	10.57 mL
10 mM	0.53 mL	2.64 mL	5.29 mL
50 mM	0.11 mL	0.53 mL	1.06 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. Whitby K, Pierson TC, Geiss B, Lane K, Engle M, Zhou Y, Doms RW, Diamond MS. Castanospermine, a potent inhibitor of dengue virus infection in vitro and in vivo. J Virol. 2005 Jul;79(14):8698-706. doi: 10.1128/JVI.79.14.8698-8706.2005. PMID: 15994763; PMCID: PMC1168722.

2. Clarke EC, Nofchissey RA, Ye C, Bradfute SB. The iminosugars celgosivir, castanospermine and UV-4 inhibit SARS-CoV-2 replication. Glycobiology. 2021 May 3;31(4):378-384. doi: 10.1093/glycob/cwaa091. PMID: 32985653; PMCID: PMC7543591.

In vivo study

1. Whitby K, Pierson TC, Geiss B, Lane K, Engle M, Zhou Y, Doms RW, Diamond MS. Castanospermine, a potent inhibitor of dengue virus infection in vitro and in vivo. J Virol. 2005 Jul;79(14):8698-706. doi: 10.1128/JVI.79.14.8698-8706.2005. PMID: 15994763; PMCID: PMC1168722.

2. Tharappel AM, Cheng Y, Holmes EH, Ostrander GK, Tang H. Castanospermine reduces Zika virus infection-associated seizure by inhibiting both the viral load and inflammation in mouse models. Antiviral Res. 2020 Nov;183:104935. doi: 10.1016/j.antiviral.2020.104935. Epub 2020 Sep 16. PMID: 32949636; PMCID: PMC7492813.

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7. Bioactivity

Biological target:

Castanospermine inhibits all forms of α - and β -glucosidases, especially glucosidase.

In vitro activity

Previous studies suggested that castanospermine, a pharmacological inhibitor of ER α-glucosidases, blocks trimming of N-linked carbohydrates and abrogates DEN-1 infection by preventing proper processing of the envelope glycoproteins. As a first step towards evaluating the utility of castanospermine as a broad-spectrum antiviral against DEN, it was assessed its ability to inhibit the DEN-2 strain 16681, which replicates efficiently in a range of cell lines including BHK-21 and Huh-7 cells. Treatment of cells with castanospermine inhibited the yield of infectious virus in a dose-dependent manner (Fig. 1A, B, and C). A higher concentration of castanospermine was required to inhibit the production of infectious DEN-2 in the Huh-7 human hepatoma cell line (50% inhibitory concentration [IC50], 85.7 μM) than in BHK-21 cells (IC50, 1 μM). The IC50 of castanospermine in BHK-21 cells was relatively independent of the inoculating dose of DEN, as similar values were observed over a broad range of multiplicities of infection (Fig. 1B). As observed previously in Neuro 2a cells, castanospermine treatment efficiently slowed the electrophoretic mobility of DEN prM, one of the glycosylated structural proteins. This difference in size between medium- and castanospermine-treated cells was restored after incubation of both proteins with endo H glycosidase (Fig. 1D).

Reference: J Virol. 2005 Jul;79(14):8698-706. https://www.ncbi.nlm.nih.gov/pmc/articles/pmid/15994763/

In vivo activity

To further evaluate the protective activity of castanospermine, its ability to prevent mortality was assessed in highly lethal DEN and WNV challenge models in mice. A/J mice infected intracranially with 105 PFU of a mouse-adapted DEN-2 strain uniformly developed hind limb paralysis and succumbed to fatal central nervous system infection within 11 days of inoculation (Fig. 5A). A/J mice that were treated with castanospermine for 10 days showed marked reduction in morbidity and mortality. A/J mice treated with 0.2 mg (10 mg/kg of body weight), 1 mg (50 mg/kg), and 5 mg (250 mg/kg) per day had survival rates of 25, 90, and 85%, respectively, whereas mice treated with vehicle had a 0% survival rate (Fig. 5A, $P < 0.0001$ for all three doses). Of note, higher doses of castanospermine (25 mg or 1.25 g/kg) caused adverse effects including diarrhea and weight loss (data not shown). Given its efficacy in preventing lethal DEN infection in mice, we also tested its inhibitory activity, in vivo, against WNV. Based on the in vitro studies, we predicted that castanospermine would not significantly inhibit WNV-induced mortality. Moreover, because WNV infection is more severe in immunocompromised mice, if castanospermine had even a mildly immunosuppressive effect, we would expect increased mortality rates. Interestingly, treatment of mice with several doses of castanospermine had no effect, adverse or beneficial, on mortality after WNV infection (Fig. 5B and data not shown).

Reference: J Virol. 2005 Jul;79(14):8698-706. https://www.ncbi.nlm.nih.gov/pmc/articles/pmid/15994763/