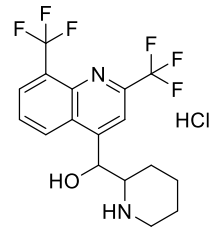
Product data sheet

MedKoo Cat#: 318178 Name: Mefloquine Hydrochloride CAS#: 51773-92-3 (HCl) Chemical Formula: $C_{17}H_{17}ClF_6N_2O$ Molecular Weight: 414.77	
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:

Mefloquine hydrochloride is a phospholipid-interacting antimalarial drug. It is very effective against plasmodium falciparum with very few side effects. When used for prevention it is taken once a week and should be begun one or two weeks before potential exposure and continued for four weeks after potential exposure. It can be used to treat mild or moderate malaria but should not be used to treat severe malaria.

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	20.74	50
Ethanol	41.48	100

4. Stock solution preparation table:

Concentration / Solvent Volume / Mass	**1 mg**	**5 mg**	**10 mg**
1 mM	2.41 mL	12.05 mL	24.11 mL
5 mM	0.48 mL	2.41 mL	4.82 mL
10 mM	0.24 mL	1.21 mL	2.41 mL
50 mM	0.05 mL	0.24 mL	0.48 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. Lundström-Stadelmann B, Rufener R, Hemphill A. Drug repurposing applied: Activity of the anti-malarial mefloquine against Echinococcus multilocularis. Int J Parasitol Drugs Drug Resist. 2020 Aug;13:121-129. doi: 10.1016/j.ijpddr.2020.06.002. Epub 2020 Jul 2. PMID: 32636148; PMCID: PMC7389337.

2. Janowsky A, Eshleman AJ, Johnson RA, Wolfrum KM, Hinrichs DJ, Yang J, Zabriskie TM, Smilkstein MJ, Riscoe MK. Mefloquine and psychotomimetics share neurotransmitter receptor and transporter interactions in vitro. Psychopharmacology (Berl). 2014 Jul;231(14):2771-83. doi: 10.1007/s00213-014-3446-0. Epub 2014 Feb 2. PMID: 24488404; PMCID: PMC4097020.

In vivo study

1. Lundström-Stadelmann B, Rufener R, Hemphill A. Drug repurposing applied: Activity of the anti-malarial mefloquine against Echinococcus multilocularis. Int J Parasitol Drugs Drug Resist. 2020 Aug;13:121-129. doi: 10.1016/j.ijpddr.2020.06.002. Epub 2020 Jul 2. PMID: 32636148; PMCID: PMC7389337.

2. Pacheco-Costa R, Davis HM, Atkinson EG, Dilley JE, Byiringiro I, Aref MW, Allen MR, Bellido T, Plotkin LI. Reversal of loss of bone mass in old mice treated with mefloquine. Bone. 2018 Sep;114:22-31. doi: 10.1016/j.bone.2018.06.002. Epub 2018 Jun 5. PMID: 29879544; PMCID: PMC6056320.

7. Bioactivity

Biological target:

Mefloquine HCl is a blood schizonticide that inhibits hemozoin formation.

In vitro activity

Initially, mefloquine was tested against in vitro grown E. multilocularis metacestodes. After only 2–6 h of incubation of metacestodes in 24 μM mefloquine, a strong detachment of the GL from the LL was apparent as observed by light microscopy and scanning electron microscopy. Transmission electron microscopy confirmed these findings and demonstrated a time-dependent depletion of glycogen storage cells in the GL, and loss of microtriches as well as of the overall structural integrity of the parasite tissue. The PGI-assay revealed that the effects on metacestodes were dose-dependent, with an estimated EC50 for mefloquine of >30 μM, and no difference was observed between the (+)- and the (−) -erythro-enantiomers of mefloquine (Table 1). The IC50 against extracted E. multilocularis GL cells was calculated to be 13.8 μM in the CellTiter Glo assay (Table 1). Further, mefloquine-treated metacestodes from in vitro cultures were injected into Balb/c mice, to assess the viability of the parasite. In all 5 mice that had received E. multilocularis material pre-treated at 24 μM mefloquine for 10 days in vitro, no parasite growth was observed after 5 months of incubation. In contrast, when the parasites were pre-treated only at 12 μM mefloquine, the parasite recovered. The minimal concentration to exert parasiticidal effects in vitro was 50 μM according to the Alamar Blue vesicle viability test (Table 1). It was thereby proven that mefloquine has the potential to act parasiticidally against E. multilocularis metacestodes, although only at comparably high concentration.

Reference: Int J Parasitol Drugs Drug Resist. 2020 Aug;13:121-129. https://www.ncbi.nlm.nih.gov/pmc/articles/pmid/32636148/

In vivo activity

Mefloquine was tested in murine AE models for its efficacy. In the secondary infection model, mefloquine, applied at 25 mg/kg twice per week during 8 weeks by intraperitoneal injection, was as active as the standard ABZ treatment (200 mg/kg/day for 8 weeks), but was not active when applied orally. However, when applied orally at 100 mg/kg twice per week for a duration of 12 weeks, mefloquine efficacy was similar to ABZ treatment of treatment. The reduction in parasite burden was hereby similar to 5 dosages of 200 mg/kg ABZ per week. At lower dosages mefloquine was not active. When re-injecting this parasite tissue into new mice, however, the parasite re-grew, also from the highest dosed treatment group, implying that at a treatment dose of 100 mg/kg twice per week, mefloquine was not fully parasiticidal against E. multilocularis metacestodes. In the primary (egg) infection model, treatment of mice with 100 mg/kg mefloquine twice per week during 12 weeks reduced liver lesion numbers, as assessed by visual inspection and confirmed by PCR. The reduction was slightly lower when mice were treated with 200 mg/kg ABZ for 5 days per week. However, this result should be treated with caution, since in that experiment the infection rate was relatively low. Taken together, treatment with 100 mg/kg mefloquine twice per week led to a reduced parasite mass/liver lesion number in mice, both in the primary as well as the secondary infection model. Therefore, the mefloquine plasma levels were assessed by HPLC and modelled in a standard two compartment pharmacokinetic model with first-order absorption from mice treated with mefloquine at 100 mg/kg twice per week against primary AE. An increase of mefloquine-levels over time was observed in the plasma of all mice, with Cmin of 1.2 μg/mL and Cmax of 2.6 μg/mL being reached to 90% after a treatment over 12 weeks. These levels are close to concentrations achieved in humans during long-term weekly dosage of 250 mg in malaria prophylaxis. Thus, this already licenced drug could possibly be active in treatment against human AE. However, data on cyst penetration and mefloquine concentrations reached in cysts, a major obstacle in the current AE treatment, is lacking to date.

Reference: Int J Parasitol Drugs Drug Resist. 2020 Aug;13:121-129. https://www.ncbi.nlm.nih.gov/pmc/articles/pmid/32636148/