Ganciclovir hydrate

Cat. No.: HY-13637B

CAS No.: 1359968-33-4

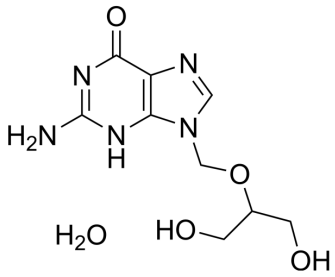
Molecular Formula: $C_9H_{15}N_5O_5$

Molecular Weight: 273.25

Target: Antibiotic; CMV; HSV; Nucleoside Antimetabolite/Analog

Pathway: Anti-infection; Cell Cycle/DNA Damage

Storage: Please store the product under the recommended conditions in the Certificate of Analysis.



BIOLOGICAL ACTIVITY

Description

Ganciclovir (BW 759) hydrate, a nucleoside analogue, is an orally active antiviral agent with activity against CMV. Ganciclovir hydrate also has activity in vitro against members of the herpes group and some other DNA viruses. Ganciclovir hydrate inhibits the in vitro replication of human herpes viruses (HSV 1 and 2, CMV) and adenovirus serotypes 1, 2, 4, 6, 8, 10, 19, 22 and 28. Ganciclovir hydrate has an IC_{50} of 5.2 μM for feline herpesvirus type-1 (FHV-1) and can diffuse into the brain[1][2][3].

IC_{50} & Target	CMV	HSV-1	HSV-2	FHV-1 5.2 μM (IC_{50})

In Vitro

Ganciclovir (BW 759) is an acyclic deoxyguanosine analog structurally similar to acyclovir but with superior activity against CMV. The median Ganciclovir concentration required to inhibit viral replication by 50 percent is 2.15 μM versus 72 μM for acyclovir[4].

The primary mechanism of Ganciclovir action against CMV is inhibition of the replication of viral DNA by ganciclovir-5'-triphosphate (ganciclovir-TP). This inhibition includes a selective and potent inhibition of the viral DNA polymerase. Ganciclovir is metabolized to the triphosphate form by primarily three cellular enzymes: a deoxyguanosine kinase induced by CMV-infected cells; guanylate kinase; and phosphoglycerate kinase[5].

MCE has not independently confirmed the accuracy of these methods. They are for reference only.

In Vivo

Ganciclovir (BW 759) (50 mg/kg; i.p.; twice a day for five injections) significantly decreases white blood cells, red blood cells and platelets in newborn mice, and can diffuse into the brain and the perilymphatic space of the inner ear[3].

Ganciclovir (1-80 mg/kg; i.h.; daily for 5 days) delays murine cytomegalovirus (MCMV)-induced wasting syndrome and mortality[6].

MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Animal Model:	Non-inbred Oncins France 1 (OF1) mice and albino rats non-immunized forMCMV[3]
Dosage:	50 mg/kg
Administration:	Intraperitoneal injection, twice a day for five injections (mice) or 3 days (adult rats) (Pharmacokinetic Study)
Result:	In adult rats, the intracochlear diffusion of Ganciclovir was shown to achieve the same concentration as in blood. In gestating mice, transplacental diffusion was observed, with a fetal-to-maternal blood ratio of 0.5. In newborn mice, the plasma concentration profile of

	Ganciclovir showed a peak at 2 h followed by a gradual decrease. In adult mice, the concentration peaked at 1 h, but became undetectable by 2 h after injection. Significantly decreased white blood cells, red blood cells and platelets in newborn mice.

Animal Model:	Female SCID mice inoculated with MCMV[6]
Dosage:	0, 1, 10, 80 and 160 mg/kg
Administration:	Subcutaneous injection, once daily for 5 days
Result:	Dose dependently delayed the wasting syndrome and mortality in a dose range up to 80 mg/kg per day, whereas a dose of 160 mg/kg per day induced reversible side-effects.

CUSTOMER VALIDATION

- Cell. 2020 Nov 25;183(5):1402-1419.e18.
- Brain Behav Immun. 2019 Aug;80:394-405.
- Sci Data. 2022 Oct 8;9(1):610.
- J Nanobiotechnology. 2022 Jul 20;20(1):340.
- Biochem Pharmacol. 2022 Jan 15;114917.

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REFERENCES

[1]. Faulds D, et al. Ganciclovir. A review of its antiviral activity, pharmacokinetic properties and therapeutic efficacy in cytomegalovirus infections. Drugs. 1990;39(4):597-638.

[2]. Maggs DJ, et al. In vitro efficacy of ganciclovir, cidofovir, penciclovir, foscarnet, idoxuridine, and acyclovir against feline herpesvirus type-1. Am J Vet Res. 2004 Apr;65(4):399-403.

[3]. Boujemla I, et al. Pharmacokinetics and tissue diffusion of ganciclovir in mice and rats. Antiviral Res. 2016;132:111-115.

[4]. Fletcher CV, et al. Evaluation of ganciclovir for cytomegalovirus disease. DICP. 1989 Jan;23(1):5-12.

[5]. Matthews T, et al. Antiviral activity and mechanism of action of ganciclovir. Rev Infect Dis. 1988 Jul-Aug;10 Suppl 3:S490-4.

[6]. Duan J, Paris W, Kibler P, Bousquet C, Liuzzi M, Cordingley MG. Dose and duration-dependence of ganciclovir treatment against murine cytomegalovirus infection in severe combined immunodeficient mice. Antiviral Res. 1998;39(3):189-197.

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