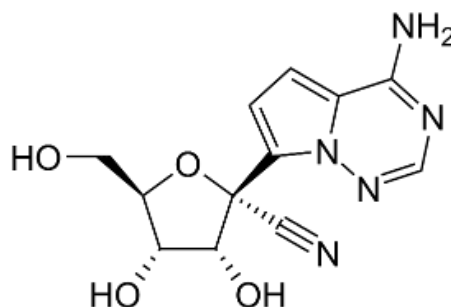




## COMPOUNDED GS-441524 LIQUID ORAL SUSPENSION

### PRODUCT INFORMATION



### DESCRIPTION

GS-441524 is a 1'-cyano-substituted adenine C-nucleoside ribose analogue with broad-spectrum anti-viral activity. It has been shown to strongly inhibit feline infectious peritonitis (FIP).<sup>1</sup>

GS-441524 is the active metabolite of the pro-drug Remdesivir.<sup>2</sup>

### MECHANISM OF ACTION

GS-441524 is phosphorylated intracellularly by cell kinases to a nucleoside monophosphate, which is then further phosphorylated to the active triphosphate metabolite (NTP). This active NTP analog then acts as a competitor to natural nucleoside triphosphate in viral RNA synthesis.<sup>1</sup> When included in the transcription product, GS-441524 disrupts viral RNA replication by incorporating into the nascent viral transcript resulting in premature termination of the RNA chain.<sup>2</sup>

### FORMULATION

**Dosage Form:** Oral Suspension

**Strength:** 50mg/mL

**Available Volumes:** 30 mL and above qualifies for free shipping, but you may order any volume you prefer

**Available Flavours:** Fish or Chicken





## STORAGE

GS-441524 oral suspension should be stored at room temperature.

## CLINICAL USE AND EFFICACY

Various studies using GS-441524 to treat FIP have reported clinical resolution rates of 55.6-96%.<sup>3,4,5,6,7</sup> A large retrospective study of 307 cats treated with compounded GS-441524 and/or Remdesivir (of which GS-441524 is the active ingredient) showed a survival rate of 84.4% after 12 weeks of treatment.<sup>5</sup> FIP is considered to be 100% fatal without treatment.<sup>3</sup>

## DOSAGE

Because of the difficulties in penetrating the blood-brain and blood-eye barriers, cats presenting with ocular and neurological symptoms typically need higher dosages of GS-441524 compared to cats without neurological and ocular symptoms.<sup>8</sup>

Based on studies and clinical experience, International Cat Care has developed the following dosage guidelines:

Feline Infectious Peritonitis Clinical Manifestation	GS - 441524 Daily Oral Dose & Frequency
No ocular or neurological symptoms (With or without effusion)	15 mg/kg q24h (Or 7.5 mg/kg q12h)
FIP with ocular symptoms (with or without effusion)	15-20 mg/kg q24h (Or 7.5-10 mg/kg q12h)
FIP with neurological symptoms (with or without effusion)	10 mg/kg q12h (q24h dosing not recommended)

Dosage chart adapted from International Cat Care recommendations<sup>9</sup>

Unpublished therapeutic dose monitoring (TDM) data suggests that dividing the daily dose and administering twice daily may yield more optimal drug serum concentrations.<sup>9</sup>



It is also important to note that pharmacokinetic studies as well as (unpublished) TDM data shows variance in the oral absorption of GS-441524<sup>(9,10)</sup> as well as in ocular and spinal fluid.<sup>1</sup> It is therefore considered necessary to increase dosages (in increments of 5-10 mg/kg/day) according to clinical response of the patient.<sup>9</sup>

Note that cats being successfully treated for FIP may see significant weight gain during treatment, particularly growing kittens. It is very important to weigh cats weekly and adjust their dose for weight gain. Failure to do so appears to be a common cause for treatment failure.<sup>9</sup>

## TREATMENT DURATION

As of April 2025, nearly all FIP treatment data, published response rates and outcomes are for cats treated for 12 weeks. Recent research<sup>7</sup> suggests that shorter treatment durations may be possible for some cats with effusive FIP whose clinical, haematological and biochemical parameters returned to normal within 28 days. A larger cohort study is currently underway. Until there is further data, a 12 week treatment duration remains recommended for most cats.<sup>9</sup>

## ADMINISTRATION

No study has been published to examine the effects of food on oral GS-441524 absorption. Because the effect of taking this medication with food is unknown, it is recommended to give the medication with only a small treat (if necessary) on an empty stomach.<sup>9</sup>

## DRUG INTERACTION

To date, published research on GS-441524 has not identified any adverse drug interactions with GS-441524.

It is recommended to minimize use of immunosuppressive drugs including corticosteroids in order to avoid inhibiting the immune response to FIP. NSAIDs rather than corticosteroids should be considered if appropriate if an anti-inflammatory agent is needed. However, there are recognized cases where corticosteroid use is necessary and appropriate, such as topical ophthalmic steroids for uveitis, severely neurologic cats, and cats with co-morbid IMHA.<sup>9</sup> If a corticosteroid is deemed necessary it should be used for the minimal duration and dosage required.



## TREATMENT WITH GS-441524 AS A DIAGNOSTIC AID

A treatment trial using GS-441524 can be an appropriate diagnostic tool in cases where a definitive diagnosis of FIP is not possible, or further diagnostics are not feasible for financial or practical reasons. In these cases, a trial treatment with GS-441524 at the recommended dosages can be commenced, using objective measures to evaluate response and identify improvement.

Most cats should see marked improvement within 2-5 days, although a small number of cats may require up to 10 days. Failure to improve on an adequate dosage of GS-441524 indicates that alternative diagnoses should be considered and investigated.<sup>9</sup>

## THERAPEUTIC MONITORING

It is most important to monitor clinical response, especially early in treatment as poor response to treatment may necessitate an increase in dosage. International Cat Care guidelines for FIP treatment recommend the following schedule for monitoring treatment progress:

- 48-72 hours: Verbal check-in with client to assess response to treatment
- 2 weeks: Verbal or in-clinic check in to assess response to treatment
- 6 weeks: Clinical exam, CBC and Biochemistry panels
- 12 weeks (before stopping treatment): Clinical exam, CBC and Biochemistry panels
- 4 weeks post-treatment: Clinical exam, CBC and Biochemistry panels

As noted above, weight should be monitored weekly, with doses adjusted for weight gain. This can often be done at home by the cat owner as long as they have an accurate (cat or baby) scale.<sup>9</sup>



## RESPONSE TO TREATMENT

Typically clinical improvement is seen within 24-72 hours, with some variation depending on specific symptoms and severity at the time of beginning treatment:

- Pyrexia generally resolves within about 12-36 hours from the beginning of treatment.<sup>11</sup>
- Appetite and activity typically improve markedly within 2-7 days.<sup>9</sup>
- Effusions typically resolve within 1-2 weeks,<sup>4</sup> however scant amounts of effusion have been noted to remain even weeks or months after successful completion treatment for FIP without relapse.<sup>5,12</sup>
- Jaundice/hyperbilirubinemia resolves over the course of 2-4 weeks.<sup>11</sup>
- Other haematological and serum anomalies normalize over the course of treatment, with some, such as protein values, taking as long as 8-10 weeks to completely normalize in some cats. Also note that it is not unusual to see a temporary spike in serum globulins several weeks into treatment, often associated with absorption of effusion fluid.<sup>11</sup> A mild hyperglobulinaemia may persist even at the end of successful treatment and does not seem to be associated with a risk of relapse.<sup>9</sup>
- Lymphadenopathy is decreased within the first few weeks of treatment, but in some cases lymph nodes will not return to normal size nor normal ultrasonographic echogenicity. This does not seem to correlate to FIP relapse if the patient is otherwise doing well.<sup>9</sup>
- Ophthalmic/neurologic symptoms will show improvement within the first few days, sometimes within 24 hours.<sup>13</sup>

Note that clinical signs may persist or increase in severity in the first few days of treatment until the medication has taken effect. This may necessitate continuing supportive care. Neurological or ocular signs may also become apparent after treatment has commenced, which indicates that a dosage increase is required.<sup>9</sup>

When evaluating readiness to end treatment, remember that mild persistent hyperglobulinaemia as well as mild lymphadenomegaly and scant persistent effusions are sometimes reported and do not appear to be associated with relapse. In these cases, if the cat is clinically well and all other parameters are normal treatment can be ended as scheduled at 12 weeks.<sup>9</sup>



## ADVERSE EFFECTS

Transient increases in ALT enzyme activity may be seen during FIP treatment. This will generally resolve without treatment and does not require use of hepatoprotectants.<sup>4,9</sup>

Lymphocytosis and eosinophilia are sometimes reported.<sup>4,9</sup>

There have been rare reports of uroliths composed of GS-441524.<sup>14, 15</sup> This may be related to usage of extremely high dosages of black market GS-441524 products.<sup>9</sup> It is however prudent to take the precaution of increasing water intake for cats on high dosages of GS-441524 and consider screening for urolithiasis if a cat should become azotemic or develop symptoms of feline lower urinary tract disease (FLUTD) during treatment with GS-441524.<sup>14</sup>

## REFERENCES

1. Murphy BG, Perron M, Murakami E, et al. The nucleoside analog GS-441524 strongly inhibits feline infectious peritonitis (FIP) virus in tissue culture and experimental cat infection studies. *Vet Microbiol.* 2018;219:226-233. doi:10.1016/j.vetmic.2018.04.026
2. Sheahan TP, Sims AC, Graham RL, et al. Broad-spectrum antiviral GS-5734 inhibits both epidemic and zoonotic coronaviruses. *Sci Transl Med.* 2017;9(396):eaal3653. doi:10.1126/scitranslmed.aal3653
3. Cosaro, E., Pires, J., Castillo, D., Murphy, B. G., & Reagan, K. L. (2023). Efficacy of Oral Remdesivir Compared to GS-441524 for Treatment of Cats with Naturally Occurring Effusive Feline Infectious Peritonitis: A Blinded, Non-Inferiority Study. *Viruses*, 15(8), 1680. <https://doi.org/10.3390/v15081680>
4. Coggins SJ, Norris JM, Malik R, et al. Outcomes of treatment of cats with feline infectious peritonitis using parenterally administered remdesivir, with or without transition to orally administered GS-441524. *J Vet Intern Med.* 2023; 37(5): 1772-1783. doi:10.1111/jvim.16803
5. Taylor SS, Coggins S, Barker EN, et al. Retrospective study and outcome of 307 cats with feline infectious peritonitis treated with legally sourced veterinary compounded preparations of remdesivir and GS-441524 (2020-2022). *J Feline Med Surg.* 2023;25(9):1098612X231194460. doi:10.1177/1098612X231194460
6. Green J, Syme H, Tayler S. Thirty-two cats with effusive or non-effusive feline infectious peritonitis treated with a combination of remdesivir and GS-441524. *J Vet Intern Med.* 2023;37(5):1784-1793. doi:10.1111/jvim.16804
7. Zuzzi-Krebitz AM, Buchta K, Bergmann M, et al. Short Treatment of 42 Days with Oral GS-441524 Results in Equal Efficacy as the Recommended 84-Day Treatment in Cats Suffering from Feline Infectious Peritonitis with Effusion-A Prospective Randomized Controlled Study. *Viruses.* 2024;16(7):1144. Published 2024 Jul 16. doi:10.3390/v16071144





8. Dickinson PJ, Bannasch M, Thomasy SM, et al. Antiviral treatment using the adenosine nucleoside analogue GS- 441524 in cats with clinically diagnosed neurological feline infectious peritonitis. J Vet Intern Med. 2020;34(4):1587-1593. doi:10.1111/jvim.15780
9. Taylor S, Tasker S, Gunn-Moore D, Barker E, Sorrell S. An update on treatment of FIP using antiviral drugs in 2024: growing experience but more to learn. International Cat Care. November 2024. Accessed April 21, 2025. <https://icatcare.org/resources/fip-vet-update-november-2024.pdf>
10. Cook S, Wittenburg L, Yan VC, Theil JH, Castillo D, Reagan KL, Williams S, Pham C-D, Li C, Muller FL, et al. An Optimized Bioassay for Screening Combined Anticoronaviral Compounds for Efficacy against Feline Infectious Peritonitis Virus with Pharmacokinetic Analyses of GS-441524, Remdesivir, and Molnupiravir in Cats. Viruses. 2022; 14(11):2429. <https://doi.org/10.3390/v14112429>
11. Pedersen NC, Perron M, Bannasch M, et al. Efficacy and safety of the nucleoside analog GS-441524 for treatment of cats with naturally occurring feline infectious peritonitis. J Feline Med Surg. 2019;21(4):271-281. doi:10.1177/1098612X19825701
12. Reagan KL, Brostoff T, Pires J, Rose A, Castillo D, Murphy BG. Open label clinical trial of orally administered molnupiravir as a first-line treatment for naturally occurring effusive feline infectious peritonitis. J Vet Intern Med. 2024;38(6):3087-3094. doi:10.1111/jvim.17187
13. Dickinson PJ, Bannasch M, Thomasy SM, et al. Antiviral treatment using the adenosine nucleoside analogue GS-441524 in cats with clinically diagnosed neurological feline infectious peritonitis. J Vet Intern Med. 2020;34(4):1587-1593. doi:10.1111/jvim.15780
14. Allinder M, Tynan B, Martin C, et al. Uroliths composed of antiviral compound GS-441524 in 2 cats undergoing treatment for feline infectious peritonitis. J Vet Intern Med. 2024;38(1):370-374. doi:10.1111/jvim.16954
15. Furbish A, Allinder M, Austin G, et al. First analytical confirmation of drug-induced crystal nephropathy in felines caused by GS-441524, the active metabolite of Remdesivir. J Pharm Biomed Anal. 2024;247:116248. doi:10.1016/j.jpba.2024.116248

