

**Inappropriate use of GS-441524 in an attempt to eliminate
Feline Enteric Coronavirus (FECV) from healthy cats**

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Mutian, the first Chinese company to sell GS-441524 on the unapproved market, has recently advertised that the use of its oral formulation for one (or more?) day will stop feline coronavirus (i.e., FECV) fecal shedding by healthy cats. Certain veterinary researchers are also advocating such an approach. The rationale is to prevent the appearance of FIP-causing mutant virus (FIPV) and thus prevent FIP. Although this approach is attractive at first consideration, it is a greatly misguided use of GS-441524 in cats. Up to this time, GS-441524 has only been recommended for the treatment of cats suffering from FIP. The problems with this approach are many.

Mutian implies in their advertisements that FECV can be easily eliminated using a simple treatment with their oral formulation of GS-441524. They make no mention, however, of the research, if any, that led to this approach. There is no published field research at this time that proves whether chronic FECV shedding by healthy cats, which can be 40% or more of individuals in any multi-cat population, can be permanently cured. Naturally occurring FECV infection occurs initially in kittens and is not associated with any notable disease signs. Shedding lasts weeks, months, and in some cases indefinitely, but in most cats, it will ultimately cease as immunity builds. However, once immunity occurs and shedding stops, antibody levels decrease, and the cats will become susceptible to infection once again. This cycle of primary and secondary infections will occur in many cats throughout their lives. It is highly unlikely that GS-441524 treatment will lead to a more permanent immunity than seen in nature. However, this would not be consequential if FECV was short-lived in the environment and not easily carried on people's clothing, litter, hair and other fomites. FECV will survive for up to 2 weeks in the environment and transmission on fomites has been well documented. Therefore, even if FECV shedders can be cured, the virus will easily return to the population. This has been also documented from experiences of isolating queens and early weaning of their kittens, a somewhat similar strategy for preventing FECV infection.

Even though our current knowledge of FECV infection brings into serious question this approach, there are equally and perhaps more compelling reasons to not treat healthy cats with GS-441525 or any other safe and effective antiviral in the future. It is unlikely that FECV shedding can be stopped for any length of time with a single, or short time, treatment as insinuated and will undoubtedly require a longer period. This will be extremely expensive when applied to a large number of cats in a cattery, shelter, or foster/rescue.

The greatest single reason to resist this approach for FIP prevention, even if proven possible by vigorous peer-reviewed and published laboratory research, is the problem of drug resistance. We already know that some cats with naturally acquired FIP are infected with one or more strains of FIPV resistant to GS-441524. Our field trial with 31 cats found one to be infected with a virus that

was strongly resistant. There is also laboratory research confirming the ease by which resistance can be induced in cell cultures. Drug resistance is also well known in viral diseases such as HIV/AIDS and of hepatitis C virus infected people. The fastest way to achieve drug resistance to any microbe, including viruses, is to overuse drugs where they are not needed. The problem of anti-microbial drug resistance is amply testified by our experience with bacteria in animals and viruses in humans. There is no question that widespread use of drugs like GS-441524 in large populations of healthy cats will lead to positive selection of strains of FECV that are drug resistant, either partially or completely. This resistance will also be seen in FIP-causing mutants (FIPVs) of FECV, making it impossible to use GS-441524 in more and more cats with FIP. Unfortunately, veterinary medicine does not have the resources of human medicine, or the profit incentives, for discovering, testing, and gaining approval for more and more drugs merely to circumvent acquired drug resistance.

I implore well-intentioned cat owners and researchers to reject this use of safe and effective anti-viral drugs in this manner. I cannot do anything about greedy drug makers who put profits above proper science, common sense and the concerns of owners of cats that suffer from FIP now or in the future. There is a common saying - "just because we can do it, does not mean we should." -N. C. Pedersen