FELINE HERPESVIRUS – WHAT IS THE ROLE OF LYSINE SUPPLEMENTATION?

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FELINE HERPESVIRUS

Despite the ready availability of vaccines and antiviral drugs effective against feline herpesvirus type 1 (FHV-1), this virus remains a major, common, and frustrating pathogen of cats worldwide. FHV-1 has been associated with acute, chronic, and recurrent conjunctivitis, ulcerative and stromal keratitis, corneal sequestrum, eosinophilic keratitis, anterior uveitis, dermatitis, and rhinosinusitis. Classically, primary infection with FHV-1 in susceptible kittens is associated with acute upper respiratory and ocular disease with approximately 100% morbidity, particularly in multi-cat environments. Following primary exposure, FHV-1 establishes lifelong neural latency with periodic reactivation in approximately 80% of cats. A small but clinically important subset of carrier cats experiences chronic recurrent herpetic disease. Currently, no medications or vaccines have been demonstrated to reduce establishment of latency or frequency of viral reactivation. In addition, some antiviral drugs are ineffective against FHV-1, toxic to cats, expensive, or impractical, stimulate further viral reactivation through stress, or facilitate transfer of infectious organisms among cats by operators. Bolus administration via twice-daily application of a known quantity of lysine onto the cat’s usual diet may be more practical but is still time consuming and would rely upon complete ingestion twice daily to exert the same bolus effect as that produced by individual tablets or capsules. This led us to investigate whether lysine supplementation of the diet could be done safely and efficaciously with respect to palatability, food intake, and effects on plasma lysine and arginine concentrations in healthy cats. We demonstrated that cats fed a diet supplemented with up to 8.6% (dry matter) lysine showed no signs of toxicity, had significantly elevated plasma lysine concentrations, normal plasma arginine concentrations, and normal food intake. Mean plasma lysine concentration of these cats was increased to levels similar to that achieved with bolus administration.

LYSINE

Lysine limits in vitro replication of many viruses including FHV-1. The antiviral mechanism is unknown; however, many investigators have demonstrated that concurrent depletion of arginine is essential for lysine supplementation to be effective, suggesting that lysine exerts its antiviral effect by antagonism of arginine. We have confirmed this fact for FHV-1. However, cats are exquisitely sensitive to even a single arginine-deficient meal. Therefore, careful investigation of the effect of lysine supplementation in cats was required and application of in vitro data has been cautious. Once-daily oral administration of 400 mg lysine to 14 cats latently infected with FHV-1 was associated with a significant reduction in basal viral shedding compared with placebo-treated cats, and twice-daily oral administration of 500 mg lysine to eight cats beginning 6 hours prior to and continuing for 3 weeks following primary inoculation with FHV-1 reduced severity of conjunctivitis relative to placebo-treated cats. In both studies, plasma lysine concentrations in treated cats were elevated, while plasma arginine concentrations remained in the normal range and no signs of toxicity were observed.

MEANS OF ADMINISTRATION

All in vivo studies of lysine safety and efficacy to date have utilized bolus administration of lysine to experimentally infected cats. Therefore, the applicability of these data in naturally infected cats remains to be tested. Additionally, twice-daily administration of lysine in a tablet or capsule form to individual cats in multicat environments, particularly feline shelters, may be impractical, stimulate further viral reactivation through stress, or facilitate transfer of infectious organisms among cats by operators. Bolus administration via twice-daily application of a known quantity of lysine onto the cat’s usual diet may be more practical but is still time consuming and would rely upon complete ingestion twice daily to exert the same bolus effect as that produced by individual tablets or capsules. This led us to investigate whether lysine supplementation of the diet could be done safely and efficaciously with respect to palatability, food intake, and effects on plasma lysine and arginine concentrations in healthy cats. We demonstrated that cats fed a diet supplemented with up to 8.6% (dry matter) lysine showed no signs of toxicity, had significantly elevated plasma lysine concentrations, normal plasma arginine concentrations, and normal food intake. Mean plasma lysine concentration of these cats was increased to levels similar to that achieved with bolus administration.

FUTURE DIRECTIONS

Much remains to be investigated in this field. To date, data indicate that lysine supplementation decreases in vitro replication of FHV-1, bolus administration of lysine safely reduces basal viral shedding in latently infected cats and disease severity in acutely infected cats, and dietary lysine supplementation of cats appears safe. So far, studies have assessed small populations of specific pathogen-free or random-source cats infected with only two strains of only one of the organisms known to cause upper respiratory disease in cats. Therefore, they may not truly reflect circumstances in larger, clinically important populations, especially multi-cat environments where control of enzootic upper respiratory disease is extremely challenging due to variable vaccination history, intercurrent disease, physiologic stresses, and high turnover of cats of diverse genetic composition and with varied exposure to infectious diseases. Also, to the authors’ knowledge, the effect of lysine on other organisms important in the pathogenesis of infectious upper respiratory disease has not been investigated but also may be clinically important, especially in multi-cat environments where infectious upper respiratory disease is prevalent.

References


3. Maggs DJ, Collins BK, Thorne JG, Nasisse MP. Effects of L-lysine and L-arginine on in vitro...


