Zinc and Lysine in EHV-1

Tara Hembrooke, PhD, MS and Meri Stratton Phelps, DVM, MVPM, DACVIM (LAIM), DACVN

EHV-1 is an important viral infection in the horse population that can cause respiratory illness, abortion in late-term mares, and EHM (equine herpesvirus myeloencephalopathy), the devastating neurologic form of EHV-1.

Recent outbreaks of EHV-1 have prompted clinicians to try to identify ways to help protect horses from developing EHM. During a multi-state outbreak of EHV-1, researchers found that horses supplemented with dietary zinc were less likely to develop EHM compared to non-supplemented horses.[1] This decreased risk of EHM was identified in both the control group of horses, and in horses that had EHV-1 without signs of neurologic disease.[1] Horses naturally infected with EHV-1 had a significantly lower concentration of serum zinc and copper compared to control horses, showing the possible significance of dietary zinc in managing EHV-1.[2]

Zinc is an essential trace metal that has a wide variety of cellular functions, and is important in the maintenance of B and T cell lymphocyte populations and immune system health. A deficiency of zinc can result in fewer circulating cytotoxic T-lymphocytes (CTL), which then has a direct influence on disease. Horses experimentally infected with a neuropathogenic strain of EHV-1 that had a lower concentration of EHV-1 specific CTL precursor cells prior to the EHV-1 exposure were more likely to develop neurologic disease compared to horses that had higher concentrations of EHV-1 specific CTL precursor cells.[3] This finding lead to the conclusion that CTL precursor cells play an important role in protective immunity against EHM.[3]

Lysine is an essential amino acid that has long been recognized for its role as an anti-viral nutrient. *In vitro* work shows that lysine stimulates the enzyme arginase, which then promotes the breakdown of arginine. Because arginine is required for the replication of certain viruses, supplementation with dietary lysine may be an effective way to help manage viral infections caused by herpes viruses.

In 1978, Griffith and coworkers reported that 1.2 grams/day of lysine was effective in reducing the severity and recurrence rate of the herpes simplex virus in people who had previously suffered from frequent outbreaks.[4] When the lysine supplementation was discontinued, outbreaks tended to recur within 1 to 4 weeks. One limitation with this early study was its observational nature. However, placebo-controlled studies have since been conducted. McCune and coworkers completed a cross-over, placebo-controlled study that showed lysine supplementation significantly decreased the recurrence rate of herpes simplex virus outbreaks.[5] It was later shown that a higher dose (3 grams/day) was more effective against the herpes simplex virus by not only preventing recurrences but also in reducing the time to heal and leading to more mild symptoms.[6]

*Platinum Performance® Equine Wellness and Performance Formula

Supplementation with dietary lysine also appears to be beneficial in the management of feline herpes virus infections. Researchers from the University of California, Davis, conducted a placebo-controlled study where all cats were infected with the feline herpesvirus to induce a localized response of conjunctivitis. Half of the cats in the study were supplemented with 500 mg of dietary lysine twice a day, while half received the placebo.[7] Cats supplemented with lysine had a significantly more mild reaction to the viral infection than those on the placebo. A second study showed that cats supplemented with dietary lysine (400 mg, one time per day) had significantly reduced viral shedding episodes, and a delay in the onset of reinfection (although this delay was not statistically significant).[8]

The foundation of a strong immune system begins with a well-balanced ration that provides essential nutrients and ingredients that support immune system health. Provision of both zinc and lysine before and after horses are exposed to EHV-1 can help to prevent dietary deficiencies of these two important nutrients, and the dietary zinc may decrease the risk that a horse will develop EHM after infection with EHV-1. An equine dietary supplement that combines zinc, lysine and blend of vitamins, minerals, antioxidants and omega-3 essential fatty acids* can be fed to optimize the health of companion and performance horses.

Literature Cited

1. Traub-Dargatz JL, Pelzel-McCluskey AM, Creekmore LH, et al. Case-Control study of a multistate equine herpesvirus myeloencephalopathy outbreak. J Vet Intern Med 2013;27:339-346.
2. Yoruk I, Deger Y, Mert H, et al. Serum concentration of copper, zinc, iron and cobalt and the copper/zinc ratio in horses with equine herpesvirus-1. Biol Trace Elem Res 2007;118:38-42.
3. Allen GP. Risk factors for development of neurologic disease after experimental exposure to equine herpesvirus-1 in horses. Am J Vet Res 2008;69:1595-1600.
4. Griffith R, Norins A, Kagan C. A multicentered study of lysine therapy in Herpes simplex infection. Dermatologica 1978;156:257-297.
5. McCune M, Perry H, Muller S, et al. Treatment of recurrent herpes simplex infections with L-lysine monohydrochloride. Cutis 1984;34:366-373.
6. Griffith R, Walsh D, Myrmel K, et al. Success of L-lysine therapy in frequently recurrent herpes simplex infection. Treatment and prophylaxis. Dermatologica 1987;175:183-190.
7. Stiles J, Townsend W, Rogers Q, et al. Effect of oral administration of L-lysine on conjunctivitis caused by feline herpesvirus in cats. Am J Vet Res 2002;63:99-103
8. Maggs D, Nasisse M, Kass P. Efficacy of oral supplementation with L-lysine in cats latently infected with feline herpesvirus. Am J Vet Res 2003;64:37-42.

*Platinum Performance® Equine Wellness and Performance Formula

6 51403 64281 8