

Field Guide to Herpesvirus in Horses

Your horse is likely to encounter these herpesviruses, but you can reduce the chances that they will cause him harm.

By Laurie Bonner

Nearly every animal that has ever been examined for them carries at least one species--sometimes five or six. Horses have five. Humans have eight. You're probably harboring at least one right now, and your horse most likely has two or three. It's a good bet that every creature you've ever known, family and friends included, has carried herpesviruses.

But there's no reason to feel like Typhoid Mary. Herpesviruses are among the most successful viral parasites on Earth, and over the evolutionary ages, most have managed to take up permanent residence in their hosts without causing serious harm. Others are such pathogenic lightweights that they cause disease only in individuals whose immune systems are severely compromised, such as people with advanced AIDS. Some herpesviruses do cause significant human illnesses, though, such as chicken pox and the sexually transmitted disease most people have heard of.



Herpesvirus are readily spread when a new horse carrying a strain of the virus is brought into a group.

In horses, herpesviruses are associated with diseases that range from relatively mild--rhinopneumonitis, roughly equivalent to the common cold in people--to potentially deadly: myeloencephalopathy, inflammation of the blood vessels that supply the spinal cord and brain. This family of viruses is also responsible for a type of equine genital infection, as well as inflammation of the pharynx and eyes. And at least one strain of herpesvirus can cause sudden abortion "storms" that sweep through large breeding farms. Generally, however, these viruses are a silent presence in the horse population.

Yet it's wise to remember that they're out there, says University of Kentucky researcher George Allen, PhD. "The viruses are constantly spreading, and most of the time the infections are mild enough to go unnoticed, but on occasion they will find the right population and the right circumstances to cause serious disease."

Fortunately, by learning a little about how herpesviruses work and how they are spread, you can take precautions to protect your horse from their worst effects.

Forgotten, but not gone

Herpesviruses get their name from the Greek word "herpein"--to creep--a term which was also the root of the word "serpent" (as in "herpetology"), and like snakes, herpesviruses can crawl in unnoticed, under the radar of the immune system, and they may or may not "strike."

When a horse is first infected with a new strain of the respiratory herpesviruses, for example, the organisms penetrate the cells that line his respiratory system, sparking an inflammatory response. It can take anywhere from a day to more than a week for that response to cause outward signs, such as nasal discharge and fever. Just as often, however, the horse never becomes ill. Either way, he is capable of spreading the virus, by nose-to-nose contact as well as by expelling airborne droplets during coughs or snorts.

And once the virus enters a horse's body, it's there to stay. All herpesviruses have a unique characteristic: They can "hide" from the immune system so that it is impossible for the body to clear them entirely away. Instead, the viruses change their outward forms and go "latent" in some hospitable part of the body, such as nearby lymph glands. While latent, the viruses cause no harm, but when the horse is stressed--by weaning, transportation, fatigue--they sometimes revert to a more active state and revive the infection. These later infections tend to produce less severe signs, often so slight that they go entirely unnoticed. Nevertheless, they again cause the horse to shed the active form of the virus, potentially infecting others.

No wonder herpesviruses are so ubiquitous in the horse population. "First exposure to herpesviruses typically happens very early in life," says Allen, "and then horses are constantly reexposed throughout life as they encounter different strains. Some of those strains are more virulent than others and are more likely to cause disease."

So far, researchers have identified nine herpesviruses in equines, but only five are common in domestic horses; the others are found chiefly in other equids, such as zebras, onagers and donkeys. These five viral species fall into two categories, depending on how seriously they affect the horse.

ALPHAHERPESVIRUSES

Taxonomists, the scientists who classify and name all living things, divide herpesviruses into three subfamilies based on how quickly they invade and take over cells inside the body. The fast-growing alpha viruses tend to be the most virulent, and this subfamily includes the three equine herpesviruses (EHVs) that cause the greatest number of problems.

EHV-1 (equine abortion virus): By far the most worrisome equine herpesvirus is EHV-1. Besides attacking the lungs, EHV-1 sometimes spreads by infecting lymphocytes that travel throughout the body so that the virus can gain footholds in places like the epithelial cells that line the uterus and the central nervous system. EHV-1 has been linked to several health problems:

Rhinopneumonitis. EHV-1 is a common cause of respiratory disease in horses. The virus invades the horse's body by penetrating the mucosa of the lungs and upper airways, setting off an inflammatory response. The signs, which include cough, fever, nasal discharge, loss of appetite and general malaise, typically abate within a week or two. Treatment of rhinopneumonitis is limited to rest and supportive care while the infection runs its course. The residual effects of infection may linger for a couple of weeks after the horse is outwardly healthy because it usually takes that long for the respiratory system to repair itself.

Abortion. In a pregnant mare exposed to EHV-1 or one in which a latent organism is reactivated, the virus can multiply and travel from the lungs to infect the cells lining the uterus. The resulting inflammation of the blood vessels supplying the placenta can starve the fetus and cause abortion. If the infection occurs late enough in the pregnancy, the mare's foal may survive but is likely to be weakened. Although some mares exposed to the EHV-1 virus show some respiratory signs, many never appear ill. Abortion can occur as little as two weeks or as long as four months after infection.

Given how easily EHV-1 spreads from horse to horse, the biggest worry with broodmare bands is that if one mare gets it, they are all at risk of contracting the virus and losing their foals. But infection with EHV-1 doesn't always lead to abortion--it depends on how big a dose and what type of the virus the mare receives. Only certain virulent strains of EHV-1 have been shown to cause abortions, and even under study conditions, when mares were intentionally infected with EHV-1 during the last three months of pregnancy, less than half aborted.

Neurological illness. Some rare but virulent strains of EHV-1 cause equine herpesvirus myeloencephalopathy, an inflammation of the blood vessels that supply the brain and spinal cord. The signs can vary, but they tend to be similar to those caused by other neurological problems: altered gaits; staggering; incoordination; a weak, floppy tail; urinary leakage; and penile paralysis. As frightening as these neurological signs may appear, most horses who manage to stay on their feet during the worst of the illness recover fully. However, horses so severely affected that they go down or must be held up by slings are less likely to recover.

Researchers believe that only one or two strains of EHV-1 have the potential to cause neurological problems in horses, but when one of those strains does strike a herd, the results can be devastating.

Fortunately deadly outbreaks are rare, and most horses infected with EHV-1 go through life without serious troubles. Illness associated with EHV-1 usually occurs when the horse's immune function is not up to par either because of youth (immature horses are still building immunity) or stressful conditions. Weaning time on large farms is a prime time for such illnesses to strike, for example. Young race-horses and show horses are also susceptible to EHV-1-related respiratory troubles.

EHV-4 (equine rhinopneumonitis virus): EHV-4 is closely related to EHV-1 and in fact was considered to be a subtype of -1 until the early to mid-1980s, when new DNA analysis techniques enabled researchers to classify it as a separate viral species. Nonetheless the two viruses are so similar that they cause the horse's body to produce nearly identical antibodies, and most tests for detecting these proteins cannot distinguish between the two infections.

Like its cousin, EHV-4 is carried by a majority of horses, and it, too, enters the respiratory tract and causes rhinopneumonitis. In general, however, EHV-4 tends to be less virulent than EHV-1. It doesn't replicate quite as readily, so it affects fewer cells in the lining of the lungs, pharynx and trachea, and the illness it produces is usually less severe. In addition, EHV-4 seems to be unable to infect lymphocytes in the same way that EHV-1 does, and so it doesn't often travel far from the lungs. EHV-4 is implicated in only 1 percent of EHV-induced abortions, and it has never been linked to myeloencephalopathy.

EHV-3 (equine coital exanthema virus): EHV-3, which causes a venereal disease called equine coital exanthema, is the only equine herpesvirus that does not affect the respiratory tract, and it is the only one that is not spread by airborne particles or nasal secretions. Instead, EHV-3 moves from horse to horse via skin-to-skin contact, usually between stallions and mares during mating. The virus can also be passed along via shared equipment or people handling different horses without washing.

An outbreak of coital exanthema causes poxlike pustules to appear on the external genitals of the mare or stallion. Within a few days, the lesions erupt, and over one or two weeks they will heal completely. The disease can also cause eye infections and lesions on the muzzle if one horse rubs against another horse with the disease, and sometimes lesions appear on a mare's teats as well as on the muzzle of her nursing foal.

These signs are unsightly, but the disease is not considered serious. The lesions don't affect the internal reproductive organs, and EHV-3 has never been linked to infertility. EHV-3 lesions can be a nuisance, however, making affected horses, especially stallions, reluctant to breed during an outbreak. Rest is recommended while the horse heals, so an outbreak can disrupt a busy breeding season.

GAMMAHERPESVIRUSES

The gammaherpesviruses are slow to spread, and the diseases they cause typically are mild. In fact, some do not seem to cause overt illness at all. Although researchers are still working to understand how these viruses may affect the health of horses, neither of these equine gammaherpesviruses is known to directly cause disease:

EHV-2 — equine cytomegalovirus: EHV-2 is even more common in horses than is EHV-1 and EHV-4. Different surveys conducted in the United States, Europe, Australia and Asia have found that anywhere from 77 percent to 97 percent of all horses carry EHV-2, and although evidence of the virus has never been found in fetuses, EHV-2 has been isolated in foals as young as 25 days--apparently, youngsters are infected with the virus carried by their mothers or pasturemates soon after birth. Once infected, the foal can continue shedding the virus, at very low levels, for more than three months, allowing plenty of time for the virus to spread.

Researchers are still puzzling out the relationship between EHV-2 and disease. Usually, horses carrying EHV-2 have no clinical signs. But it's possible that the virus is connected with an inflammation of the tissues around the eyes called keratoconjunctivitis. EHV-2 is often isolated from the tears of horses, especially young foals, who have keratoconjunctivitis, which is characterized by excessive tearing and mild opacity. Although more serious complications can occur, the signs generally clear up after treatment with nonsteroidal anti-inflammatory drugs, leaving behind no long-term vision problems. But whether EHV-2 causes the inflammation is unknown, since the virus can also be found in the eye secretions of horses who have no clinical signs.

EHV-2 may also cause a mild respiratory disorder found in young horses. In some cases, the virus is first found in foals soon after they appear to have had mild "colds," with slight nasal discharge and a minor cough.

On the other hand, it's actually difficult to infect a healthy horse with EHV-2 in the laboratory. In one study, for example, Australian researchers reported that when they administered the virus to horses via intra-nasal spray,

the horse's automatic cough response was enough to clear the virus. Only when the horses were sedated (to diminish the cough) and given very high doses of the virus were researchers able to induce EHV-2 infection.

Although they've not yet been able to prove that EHV-2 causes illness, researchers are currently working with one intriguing hypothesis: It's possible that EHV-2 somehow suppresses the horse's immune response-- opening the way for other, more damaging diseases. Some experiments with tissue cultures have suggested that EHV-2 can suppress the activity of disease-fighting white blood cells, and the virus has been shown to be present in horses who fall ill to a number of serious diseases, such as streptococcal infections or bacterial pneumonia.

EHV-5: EHV-5, a close relative of EHV-2, was identified as a separate virus species in the late 1980s, and surveys around the world have found very high rates of EHV-5 infection. In a recent Australian study of seven Thoroughbred and five Standardbred breeding farms, 100 percent of the foals sampled were found to be positive for EHV-5, and a 1999 study of Przewalski's horses in four German zoos found that 93 percent were positive for both EHV-2 and EHV-5. Widespread as it apparently is, at least in those equine populations that have been examined for it, EHV-5 has never been associated with any type of illness in horses.

It's impossible to protect your horse from herpesviruses entirely. But some simple measures from the EQUUS article [Controlling Equine Herpesvirus](#) can minimize the chances that he'll get an infectious dose of EHV-1 and EHV-4, the types most likely to cause trouble.

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