



# Vet Notes

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## EPM

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EPM is an acronym that haunts horse owners around the country. It is a neurologic disease that does not have a rule book. Severity, progression, and signs are widely variable. For this reason, EPM is frequently on our list of possible causes of neurologic deficits in horses.

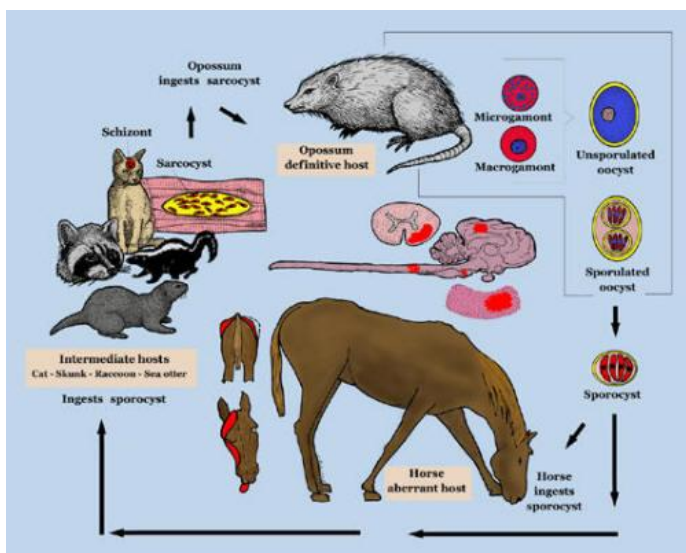
Let's take a step back and break down the name. EPM stands for Equine Protozoal Myeloencephalitis. The **Equine** part simply means that it is a disease affecting horses. Other species may be affected but have different names for the disease. "**Protozoal**" is an adjective meaning the disease is caused by a single-celled organism called a protozoan. In this case, the most common protozoan is called *Sarcocystis neurona*. Similar to the name of the disease, the name of the organism tells a lot about it. We'll get back to that. **Myeloencephalitis** is the damage caused by the protozoa. This is a big word meaning inflammation of the brain and spinal cord. The name itself tells us what is going on within the horse, inflammation of the central nervous system caused by protozoa.

Back to that pesky protozoan. *Sarcocystis neurona* got its name based on its life cycle. Its final stage of maturation occurs in a cyst in the muscle of its host until it is eaten by an opossum. As long as the protozoa are only ingested by the animals normally involved in its life cycle, they do not cause a problem. The issue arises when it is eaten by an animal that is not part of the cycle, an aberrant host. Horses are an aberrant host in which the protozoa end up encysting in the brain and spinal cord instead of the muscle. The protozoa involved in the infection are not able to continue their life cycle. Therefore, the horse is a dead end host.

The life cycle of *Sarcocystis neurona* explains how horses become infected and how it is diagnosed. The replication stage occurs within the digestive tract of opossums after the mature stage is ingested within muscle.

The immature stage is released into the environment in the feces. This is where horses, and other animals, pick up the protozoa. Anything contaminated with opossum feces has the potential to be contaminated with protozoa as well.

After being eaten, the immature protozoa enter the bloodstream of the new host. There are several potential outcomes from there. The immune system may be able to eliminate the infection before any tissues are affected, or the young protozoa may be permitted to encyst in the tissues of the new host. If they find their way to muscle, they mature within the cyst. The host is none the wiser. If they find nervous tissue instead, an inflammatory response causes local damage to the nerves involved.



The signs of EPM are variable due to the unpredictability of where the protozoa will encyst and how strong the inflammatory response will be. The strength of the response determines the severity of the signs from a mild weakness to paralysis. The location of the cyst determines which part of the body is affected. The hind end is the easiest target as the nerves run the length of the horse. Any damage to the central nervous system has the ability to damage the nerves involved with the hindlimbs. However, the front end or brain of the horse can also be affected. Signs can include facial asymmetry, abnormal gait, and muscle wasting. It is important to talk to your veterinarian as soon as abnormalities are noticed.

Testing for EPM is not as simple as we would like. A blood test for the antibody against the protozoa can determine if the horse has ever been exposed before but will not say whether or not EPM is causing the current issue. As previously mentioned, the immune system can sometimes take care of the protozoal infection before it becomes a problem. In some areas, over 90% of horses test positive; however, a survey completed in the '90s showed that only 0.14% of horses actually develop EPM. The blood test can be used as a screening test to rule out EPM as a negative result means the horse has not been exposed, has been exposed and hasn't had time to make antibodies, or is one of the rare horses that doesn't respond by making antibodies. Another helpful test is a done on spinal fluid. The presence of antibodies within the spinal fluid is suggestive of the presence of protozoa. The ratio between the antibody level in the blood and the antibody level in the spinal fluid is the most helpful in determining the likelihood of an active infection. This serum to spinal fluid ratio has been found to be about 96% accurate. Unfortunately, the only definitive diagnostic is a post-mortem evaluation of the spinal cord itself.

Treatment is often multimodal. Our two goals are to kill the protozoa and stop the inflammation so the nerves have a chance to heal. There are several medications that can be used to achieve these goals. An important thing to remember is that treatment and recovery will take a while and may not be complete. The damage to the nerves may be too extensive to heal. Prevention is often the best choice. This is done by keeping feed protected from wildlife and keeping water tanks clean. Pasture contamination will always be a risk. Unfortunately, there is not a vaccine.

EPM is a difficult neurologic disease found throughout the country. Its signs are nonspecific, and progression is unpredictable. If your horse begins behaving or looking abnormally, a thorough neurologic exam and other diagnostics may be needed to determine the likelihood of EPM. The earlier treatment is started, the better the outcome may be.

#### References

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Dr. Nina Stewart was born and raised in central Indiana and attended Purdue University for her Animal Sciences Bachelor's Degree. She then moved to East Lansing to earn her DVM at Michigan State University. Dr. Stewart's passion for equine medicine started in high school when she started trail riding with a geriatric Thoroughbred. She spent as much time as she could during undergrad in the large animal hospital. During her first summer of vet school, she was given the opportunity to spend the majority of the summer riding with an ambulatory equine practitioner. From that point on, Dr. Stewart knew she wanted to build her career in the field.

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