

Latest research sheds light on puzzling horse diseases

By Jamie Rothenburger

Research sometimes has to accumulate incrementally over decades until a cohesive understanding emerges. In other situations, a single study can instantly and fundamentally change the dogma in a profound way. Three such game-changing studies in horses were published this year in the journal *Veterinary Pathology*.

One was research into the devastating disease osteochondrosis. Affected horses can develop swollen joints and lameness, usually at a young age. Their joint cartilage is abnormal and lifts in flaps, cracks or even breaks free to float around the joint. The underlying cause is abnormal growth plates below the joint cartilage. Cartilage growth plates are where bones elongate in growing animals, and this cartilaginous template is normally replaced by bone.

In osteochondrosis, this bone replacement does not occur properly, leaving the overlying joint cartilage without the bony support it needs and predisposes it to injury. For years, veterinarians believed that osteochondrosis led to the formation of bone cysts, which tend to occur in important weight-bearing locations. As a result, they can result in severe lameness and have a poor prognosis for successful treatment.

Dr. Kristin Olstad and colleagues in Norway turned this theory on its head. They examined microscopic tissues from 10 young horses and discovered two ways cysts can form: through abnormal cartilage that is surrounded by bone or by a dilated blood vessel, both of which occur after the blood flow to the area fails. They concluded that true bone cysts originate from abnormal blood vessels and cause osteochondrosis in the overlying joint cartilage rather than the other way around as was previously thought.

Another study looked at a movement syndrome called shivers, which most often affects Warmblood and Thoroughbred breeds. Affected horses have muscle tremors and hind limb muscle spasms, which involuntarily lift their hind legs up. Hence the name “shivers.” Check out YouTube if you haven’t seen this before.

The exact cause of shivers has puzzled veterinarians and horse owners for years. Theories included problems with the muscles, nerves, spinal cord or brain, but until now there was no solid evidence to support any of these.

Dr. Stephanie Valberg and her team of researchers at the University of Minnesota have solved the mystery. By

comparing five horses with shivers to three normal horses, their exhaustive search found damage to the nerves within the cerebellum, which is the part of the brain responsible for fine movement control.

In the other study, Dr. Ninja Karikoski and colleagues from the University of Helsinki in Finland studied a particular form of laminitis, also known as founder, with surprising results. Founder is a disease of the inner hoof structures, in which inflammation and cell death cause the outer hoof wall to separate from the coffin bone.

In this study, researchers examined horses and ponies affected by too much insulin, which is a hormone that regulates blood sugar levels. Insulin levels are too high in horses affected by metabolic syndrome and these horses are prone to foundering.

A key result is that the microscopic membrane separating tissue layers in the hoof remained intact. This differs from grain-overload type laminitis, in which the membrane rapidly breaks down and allows the inner tissues of the hoof to separate.

Research results suggest that high insulin causes chronic damage to these tissues rather than a one-time sudden injury. Researchers also discovered that these horses had multiple hoof rings that were wider apart at the heel compared to the toe. This supports the theory that several, undetected bouts of inflammation and damage to the hoof occur before the horse develops full-blown founder.

The discovery may help prevent laminitis in horses affected by metabolic syndrome and too much insulin. Veterinarians can measure insulin levels with a simple blood test and treat horses accordingly if insulin levels are too high.

These studies focused on the microscopic early changes associated with puzzling horse diseases. Researchers have not yet explored the implications of these findings for prevention and treatment, but it opens up avenues to pursue.

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