

Foal Pneumonia

New Research brings hope to preventing this potentially fatal disease

January 1 ushers in the foaling season for much of the breeding world, signaling hours of preparation and sleep deprivation to bring forth new, healthy lives. Breeders know all too well the myriad of factors that can go awry during and after a foal's birth: malpresentation, failure of passive transfer and sickness, to name just a few. Foals are fragile creatures, prone to disease and accident from before they take their first breaths, but according to the latest research, breeders may one day have one less potential problem to fear. Researchers at Texas A&M University have discovered that gallium, a rare metal, may be instrumental in preventing the devastating foal pneumonia as caused by *Rhodococcus equi* bacteria.

The Disease

Rhodococcus equi is a bacterium that lives and thrives in horse farm soil, feeding off nutrients in manure. It exponentially multiplies in the warm, dry days of late spring and summer, coinciding with the window where foals are most susceptible to disease – 1 to 6 months of age. Although foals receive passive immunity from ingestion of colostrum at birth, this immunity eventually begins to taper off, leaving the foal's still immature immune system open to attack. In addition, during this window, many farms are housing large mare and foal bands in outdoor paddocks, where it becomes easy for one foal to spread the disease to the entire band. While the disease doesn't appear to be directly contagious, foals can infect others by passing *R.equi* bacteria in their manure, which is inhaled with dust particles by their pasture mates who are already suffering from a compromised ability to fight infection. In the busy foaling season, signs of the early onset of this disease may slip by unnoticed until many foals are affected.

Signs, Symptoms and Diagnosis

Foal pneumonia can be a sudden attack or chronic and progressive condition, but most often sick foals appear perfectly normal until the disease is well-established and much more difficult to treat. Early detection, however difficult, is critical. The clinical signs include fever, lethargy, coughing, abnormal breathing, increased pulse, watery eyes, diarrhea and nasal discharge. Daily physical exams of foals and history of the disease on the farm in question are the best starting point of diagnosis. Potentially infected foals can be given blood tests to detect infection and X-rays and ultrasounds to uncover lung abscesses. Fibrinogen levels can be taken to test for inflammation and antibody tests may also indicate illness. Autopsies of foals usually reveal lung lesions – a hallmark of the disease – as well as lesions of the intestines, lymph glands and liver. Many breeders advocate taking foals' temperatures daily; an elevated temperature may unmask sick foals who are masquerading as healthy.

Treatment

Treating *R.equi* pneumonia is both costly and time-consuming, and early detection is critical to its success. Weeks of antibiotic therapy are required, and anti-inflammatories and intravenous fluids are often necessary as well. Add in diagnostic tests, veterinary exams, possible hospitalization, and secondary complications, and you have an expensive undertaking. Even with successful treatment, some foals may sustain permanent lung damage, which could jeopardize an athletic career. However, not all foals are severely affected; some may protract a minor infection. The severity depends on the strength of the bacteria strain pitted against the strength of the foal's immunity.

Prevention

While there is no vaccine for *R.equi*, there are ways to guard against the disease.

1. Hyperimmune Plasma

Plasma is taken from adult donor horses that have been given killed *R.equi* bacteria and developed antibodies against them. The plasma can be given to foals at birth and has shown great success in warding off an *R.equi* infection.

2. Management

Since *R.equi* infections stem from inhalation of bacteria-infested dust, try to house mares and foals in areas that are as well-ventilated and dust-free as possible, and avoid crowding large groups in small paddocks.

3. Observation

Knowing your foals' normal behavior will help you quickly detect abnormal behavior. Carefully observe your foals daily for signs of illness, and consider taking their temperatures daily as well. Isolate sick foals and compost manure to prevent an infection from spreading.

The Latest Discovery

Ronald Martens, DVM at Texas A&M University, released a study in 2006's *Journal of Veterinary Pharmacology and Therapeutics*, documenting gallium's potential in preventing an *R.equi* infection from becoming a full-blown disease. *R.equi* organisms, while circulating in the body, pick up iron in the bloodstream to use in several enzyme systems. Gallium strongly resembles iron, and *R.equi* bacteria mistake one for the other and pick up gallium from the bloodstream instead. However, *R.equi* bacteria can't use gallium in these enzyme systems; therefore, they can no longer multiply and eventually die off. Given this information, in this study, Martens gave mice oral doses of gallium before infecting them with *R.equi*, and a control group of mice was given a non-gallium treatment. The mice who received gallium had significantly lower body wide concentrations of *R.equi* bacteria than the control group six days later after the treatments. Martens believes these encouraging results warrant further investigation in foals. He hypothesizes that oral administration of gallium for short periods after birth could protect against *R.equi* infection until the foal's immune system can control the bacteria on its own. Furthermore, studies have shown that the required amounts of gallium can be safely given to foals.

Although *R.equi* pneumonia is a potentially devastating illness, both to the foal population and financial condition of a breeding farm, prevention is possible. With management strategies in tune to the problem and carefully honed observation skills, breeders can avoid an outbreak while the researchers develop a consistent method to prevent foal pneumonia.