



# EQUINE REPRODUCTION SVC

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## Hyperimmune Plasma and *R. equi* Pneumonia Severity

Ah, the foal's life: Nurse, play, nap, repeat. But it isn't always a walk in the park for youngsters—they are susceptible to a number of unique health conditions, including *Rhodococcus equi* pneumonia, which can mean a rocky start to life.

There's no vaccine to protect foals against this potentially deadly bacterial infection, so veterinarians must try other means to prevent it. One of those methods is administering *R. equi*-specific hyperimmune plasma (HIP), but available research supporting its use is controversial. So researchers recently evaluated the efficacy of one commercially available plasma product (ReSolution, produced by Mg Biologics) for preventing clinical disease in foals.

Macarena Sanz, DVM, MS, PhD, Dipl. ACVIM, an assistant professor of equine internal medicine at Washington State University's College of Veterinary Medicine, presented the results of the study at the 2015 American Association of Equine Practitioners Convention, held Dec. 5-9 in Las Vegas.

Veterinarians administer HIP, which contains antibodies against *R. equi*, with the goal of providing foals with additional immunity to the condition. Still, we don't fully understand the plasma's protective mechanism, Sanz said, and previous studies have yielded conflicting results about its usefulness for preventing disease. These differences could be attributed to foal age, bacterial dose used for the disease challenge, and the plasma product used, she said.

At the start of the study, conducted when she was based at the University of Kentucky's Gluck Equine Research Center, she and colleagues completed a physical exam, thoracic ultrasound, and bloodwork on 18 healthy foals to confirm they were disease-free.

The researchers treated one group of foals with HIP and the other group consisted of untreated controls; HIP foals received plasma intravenously within 48 hours of birth. Then the team challenged all the foals with pathogenic (disease-causing) *R. equi* to determine whether HIP administration would prevent the development of clinical disease.

Sanz said the foals were turned out to pasture and monitored daily for signs of disease. The researchers collected blood samples weekly, along with conducting physical exams, evaluating bronchoalveolar lavage fluid (BALF), and performing ultrasound exams of the foals' lungs. They developed a scoring system to classify lung lesions identified on ultrasound—the higher the score, the more severe the lesions—and monitored the foals for at least eight weeks, or longer if they were treating the foals for clinical disease.

Upon reviewing their results, the team found that:

- None of the treated foals developed adverse reactions to HIP;
- Four of nine control foals and one of nine HIP foals developed clinical pneumonia;
- Treatment foals had significantly lower ultrasound scores, white blood cell counts, and fibrinogen (a protein important in blood clotting; high levels indicate inflammation or infection) levels throughout the study;
- Control foals' ultrasound scores remained higher for a longer period than treatment foals' did;
- Treatment foals had significantly higher levels of some VapA (virulence-associated protein A, which is needed to cause clinical *R. equi* disease) antibodies—IgG, IgGa, and IgGb—than the control foals; essentially, foals that received HIP produced more IgG, IgGa, and IgGb antibodies when challenged than untreated ones;
- IgG and IgGb were significantly higher in treatment foals' BALF than in control foals; and
- On the whole, control foals showed more evidence of disease than did treatment foals.

Sanz said that while these study results suggest HIP has a protective effect, the study had several limitations, including a small number of foals, researchers not being blinded to whether foals were treated or untreated, and the fact that foals were experimentally challenged rather than naturally infected. She also reminded attendees that they only tested one plasma product.

"Not all products are equal," she said. "We can't extrapolate these results to all the available plasma products."

Ultimately, the team determined that the tested HIP did not prevent infection, but it did reduce the severity of *R. equi* pneumonia. Still, Sanz said, this is clinically important because it reduced the number of foals requiring antimicrobial treatment, which in turn might reduce the development of antimicrobial resistance. She said researchers on future studies should delve further into better understanding why HIP provides protection.