

NOVEL METHOD FOR DIAGNOSIS OF NOCARDIOFORM PLACENTITIS

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A sensitive and specific diagnostic test for Nocardioform Placentitis.



Placentitis is the most common cause of late-term abortion in the mare, costing the equine industry millions of dollars in lost revenue every year. Despite the devastation caused by this disease, accurate diagnostic tests for placentitis are not currently available. The tests which are available cannot separate affected mares from non-affected mares, leading missed diagnoses, late-term abortions and sick foals. In our previous work, we have developed a diagnostic tool for Nocardioform placentitis which is accurate and sensitive. In this proposal, we are promoting the expansion of this work to include a prospective study to better understand when disease forms and how it progresses, as well as the strengths and limitations of this diagnostic test.

Additionally, we will work to understand why these bacteria are capable of causing disease and how they communicate and interact with the mare during disease. Initial work will be focused on characterizing the proteins and lipids which the bacteria produce in isolated culture as well as when they are infecting the placenta. Our early work shows that these bacteria will modify the mare's fatty acids to create lipoglycans which are integrated into the bacterial cell wall. As similar lipoglycans cause an immune response as well as drive the progression of disease, identifying these molecules will help create a better understanding of the mechanisms of disease. In the process, we will uncover which specific molecules cause a response of the hosts' immune system as well as work to improve our diagnostic test while evaluating its strengths and limitations. In total, this work should increase understanding of the proteins and lipids which drive disease and illicit an immune response by the mare. Additionally, we should have a better understanding of when disease starts and how it progresses which should help us improve the focus of future research into Nocardioform placentitis.

Importance to the Equine Industry: Nocardioform placentitis is a devastating reproductive disease affecting equine populations worldwide. It is characterized by focal sites of infection which are frequently covered by a thick brown exudate. If Nocardioform placentitis isn't diagnosed in a timely manner, mares will frequently abort their foals or give birth to small, runty foals. Despite its profound impact, diagnosing Nocardioform placentitis remains challenging, often relying on clinical signs such as premature udder development which are nonspecific and may only become apparent late in disease. As such, many farms treat their high-risk mares with antibiotics on a monthly basis whether there are signs of disease or not. Through the development and refinement of a sensitive and specific diagnostic test, we are able to minimize late-term abortion and stunted neonates while working to minimize this unnecessary antibiotic use. This will not only improve the health of pregnancies but will also help prevent the increasing problem of antibiotic resistant strains of bacteria. Moreover, through a more comprehensive understanding of how the disease originates and progresses, researchers working in this area will have better tools available to focus their research in ways to produce better results and better improve the health of the horse.

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