

Rhodococcus Equi Pneumonia In Foals



Down on the Farm

by **HEATHER SMITH THOMAS**

There are several pathogens that can cause pneumonia in foals, but one of the most common and devastating infections is due to *Rhodococcus equi*, a type of bacteria that is often present in the environment. Lais Costa, DMV, MS, PhD, Diplomate ACVIM (large animal) and Diplomate ABVP (Equine), Assistant Professor in Large Animal Medicine at Tufts University, says that even though most of these foals don't develop clinical signs of pneumonia until they are three or four months old, they actually encounter the bacteria very soon after birth, within the first month of life. *R. equi* is a type of bacteria that can become endemic on a farm. If you send a mare to be bred on a farm that has a problem, there is high likelihood that the mare will pick up bacteria from the environment (and her foal may get *Rhodococcus pneumoniae*), since the mare will shed the bacteria for awhile even though she herself does not get sick. Adult horses rarely become ill, but can shed the bacteria into the environment, resulting in exposure and possible infection of foals, explains Costa.

"The bacteria are present in the environment, and readily picked up when the foal is nibbling dirt, eating his dam's manure, etc. The foal becomes exposed early on by ingesting bacteria, and for some reason the foal's gut is a very good place for *R. equi* to multiply. Foals serve as amplifiers of the bacteria population."

Interestingly, however, not all of the *R. equi* bacteria are virulent. Only the ones that contain a plasmid called virulence-associated plasmid (VAP) can cause disease, she explains. "The plasmid facilitates the survival of the bacteria within the alveolar macrophages (the major cells that defend the lungs). Since the bacteria that contain the plasmid are the ones that cause infection and clinical disease, merely culturing (and finding) the bacteria without identifying whether they carry the plasmid will not tell you whether the foal is at risk for *R. equi* pneumonia. If your vet cultures a sample from soil or from feces, the bacteria discovered in that sample might not be virulent—not the type that can cause disease. But if you do a tracheal wash on a foal and get *R. equi* that are proliferating in the lungs, this is the virulent form of the bacteria, that contain the VAP," she says.

By contrast, if you were trying to see if these bacteria are in the foal's envi-

ronment, and culture samples of feces of animals or of soil, you will find a lot of farms will have these bacteria but they are not the virulent one. "So it is important to realize there is a difference—that if you are culturing fecal or soil samples you have to assay for the presence of the virulence factor, not just culture the bacteria," she says.

"The foal picks up bacteria in the environment and from the feces of the mare if she was recently exposed (such as at another farm, to be bred). It seems that the foal's gut is a better environment for *R. equi* to multiply, than the mare's gut. The multiplication of *R. equi* is tenfold greater in the foal's gut compared to the mare's gut. The bacteria can multiply a little in the mare's gut, then the foal eats her manure, and amplifies it much more," explains Costa.

Mode Of Infection

The bacteria can be ingested or inhaled. "The bacteria can be inhaled while the foal is eating or rummaging around on the ground or in the stall eating the dam's manure. They might inhale bacteria from soil, via the dust from dry manure. When inhaled, the bacteria can go directly to the lungs. Most cases of clinical infection in foals are in the lungs, but if foals are breathing bacteria they are also eating them. Experimentally, researchers have given foals *R. equi* bacteria via either route, aerosolized or ingested, but in a natural infection the foal is probably exposed to both," she says.

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