presence of \(erm(46)\) as detected by PCR in 124 isolates of \(R.\ equi\). Expression of \(erm(46)\) in a macrolide-susceptible strain of \(R.\ equi\) induced high level resistance to macrolides, lincosamides, and streptogramins B, but not to other classes of antimicrobial agents. Transfer of \(erm(46)\) from resistant to susceptible strains of \(R.\ equi\) was confirmed and occurred at a transfer frequency of up to \(2 \times 10^3\). This is the first molecular characterization of macrolide, lincosamides and streptogramins B resistance in \(R.\ equi\). Resistance is caused by a novel \(erm\) gene, \(erm(46)\), which is transferrable likely by conjugation.

**071 Chloroquine inhibits Rhodococcus equi multiplication in murine (J774A.1) and foal alveolar macrophages**

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Rhodococcus equi is a facultative intracellular pathogen that primarily infects macrophages causing pyogranulomatous pneumonia and many other extrapulmonary disorders in young foals. The ability of \(R.\ equi\) to multiply in alveolar macrophages (AMs) coupled with increased prevalence of antimicrobial resistance are the major obstacles for disease control. There is a consensus that iron is a micronutrient essential for all microorganisms; however, its availability also influences intracellular replication and expression of virulence genes of \(R.\ equi\). Control of iron availability by host cells is a component of nutritional immunity in vertebrates. Similarly, the drug chloroquine (CQ), an aminouquinoline, has been used against intracellular pathogens to limit iron availability inside phagocytic cells. Our hypothesis was that CQ would suppress the growth of \(R.\ equi\) inside macrophages. We evaluated the \(R.\ equi\) killing capacity of murine (J774A.1) and foal AMs exposed to CQ (incubated 24 h prior to infection) with or without saturated transferrin (HTF). CQ prevents the accumulation of iron in cells, whereas HTF is a source of iron to \(R.\ equi\), enhancing the bacterium ability to survive and replicate intracellularly. Thus, we investigated whether HTF would revert the inhibition by CQ of intracellular survival of \(R.\ equi\). We observed a significant (\(P < 0.05\)) inhibition of \(R.\ equi\) proliferation in both murine J774A1 and foal AMs exposed to 10 and 20 \(\mu\)M CQ for 24, 48, and 72 hours post-infection. HTF (6 mg/ml) did not reverse CQ inhibition of \(R.\ equi\) intracellular survival, suggesting that CQ impairs the iron uptake by \(R.\ equi\) cells via HTF, as observed in other intracellular pathogens, such as Legionella pneumophila and Paracoccidioides brasiiensis. We conclude that CQ suppresses \(R.\ equi\) growth in both murine J774A1 and foal AMs. Further research is warranted to confirm its purported mechanism of iron-deprivation, as well as its therapeutic potential against \(R.\ equi\) infection of foals in vivo.

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**Bibliography**


**072 Oxidative stress and Rhodococcus equi pneumonia**

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Oxidative stress (OS) is defined as an imbalance between oxidants and antioxidants. OS has been shown to play roles in various equine respiratory diseases, specifically in association with various inflammatory airway conditions. The role of OS with respect to infectious respiratory diseases of horses has been relatively poorly explored. The significant of OS in the pathogenesis Rhodococcus equi pneumonia in foals is unknown. The object of these studies was to measure and relate respiratory and systemic biomarkers of OS to the pathology of \(R.\ equi\) pneumonia and to the risk of developing this disease. An initial case-control study compared various OS biomarkers from blood and exhaled breath condensate (EBC) samples collected from 26 foals (n=12, cases and n=14, controls) residing on farms endemically affected with the disease. Foals were defined as cases (positive) or controls (negative) based on ultrasonographic evidence of pulmonary abscessation (>15 mm in diameter). Haematology testing was also performed on bloods collected. Comparison of biomarkers between the groups was performed using two-sample t-tests. The following season a prospective case-control study was performed on 74 foals (n=27, cases and n=47 controls) in which systemic OS was evaluated from blood samples collected within 24 hours of birth and related to future diagnosis of \(R.\ equi\) pneumonia as defined in the previous study. The initial case-control study showed reactive oxygen metabolites in blood (d-ROMs) to be significantly greater in case foals (\(P=0.027\)) whilst the oxidative stress index (OSI) was also highest in case foals (\(P=0.014\)). Hydrogen peroxide (\(H_2O_2\)) concentrations in EBC was also significantly greater in cases (\(P=0.002\)). In the prospective case-control study, foals that developed disease had a significantly lower biological antioxidant potential in blood (\(P=0.049\)) within 24 hours of birth compared to those which didn’t develop disease. These findings suggest that OS plays a role in the pathogenesis of \(R.\ equi\) pneumonia and antioxidant capacity may contribute to the innate risk of disease development in the neonatal foal. These findings open up the potential use of OS biomarker assays in the diagnosis of \(R.\ equi\) pneumonia and potentially the identification of ‘at risk’ foals at birth. These results also open up the potential application of antioxidant therapeutics to aid in the clinical management of foals with \(R.\ equi\) pneumonia and as a non-antimicrobial prophylactic in reducing risk of the neonatal foal developing disease.