

Effect of Time of Day of Vaccination in Quarter Horse Mares on Pro-Inflammatory Cytokine Gene Expression

Author: Gabrielle M Ruble

Co-Presenters:

Major: Animal Sciences

Research Advisor: Dr. Kimberly Cole

Vaccines are widely used in animal health to stimulate humoral and cell-mediated immune responses. The cell mediated immune response uses specific cells which communicate through messenger molecules, such as cytokines, with other cells to elicit the immune response. Previous studies suggest that Th1 cytokine expression should be increased with antigen exposure occurring in the evening, due to the influence of a circadian rhythm on the horse's immune response. The purpose of this study was to determine if the time of day of vaccination influenced the gene expression of interferon gamma (IFN- γ), a Th1 cytokine, in the blood of horses. Eight Quarter Horse mares (10.5 \pm 5.8 yrs) were randomly assigned to one of two vaccination groups: AM or PM. All horses received mixed grass hay and water ad libitum and were housed in outdoor paddocks with access to shelter throughout the study. Horses in the AM and PM vaccination groups were vaccinated intramuscularly against Eastern and Western encephalomyelitis, rhinopneumonitis (EHV-1 and EHV-4), influenza (type A2), tetanus and West Nile Virus at 0700 and 1900 h, respectively. Blood samples were collected via jugular venipuncture immediately prior to vaccination (d 0) and on d 7, 14 and 21 post-vaccination. RNA was extracted using the PAXgene Blood RNA Kit and subjected to reverse transcription and quantitative real-time PCR to determine IFN- γ gene expression levels. IFN- γ gene expression was increased in the AM vaccination group compared the PM group ($P > 0.05$) for d 7, 14, and 21 post-vaccination. IFN- γ expression in the AM vaccination group was greater on d 7 and 14 compared to d 0 ($P > 0.05$). IFN- γ expression did not increase post-vaccination in horses in the PM vaccination group. The increased IFN- γ expression in the AM vaccination group suggests that an AM vaccination may be associated with a cell-mediated response.