

Effect of Time of Day of Vaccination on Interleukin 10 Gene Expression in Horses

Author: Erin B Connell

Co-Presenters:

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Research Advisor: Kimberly Cole

Vaccines are routinely used to enhance an animal's immune response and reduce the severity and duration of disease. Previous studies have shown that immune responses can be affected by the concentration of various cytokines circulating in the blood and that cytokine production fluctuates throughout the day. Therefore, it may be possible to increase immune responses simply by changing the time of day that a vaccine is administered. It has been hypothesized that immune response can be The objective of this study was to determine if time of day of vaccination can influence the expression of IL-10, an anti-inflammatory cytokine, in horses. Eight Quarter Horse mares (10.5 ± 5.8 yrs) and six Miniature Horse geldings (7.0 ± 2.6 yrs) were randomly assigned into an AM or PM vaccination group. 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 from the blood samples using the PAXgene Blood RNA Kit and subjected to reverse transcription and quantitative real-time PCR to determine IL-10 gene expression levels. IL-10 expression increased post-vaccination in all horses. In addition, IL-10 expression was increased in the AM vaccination groups compared to the PM vaccination groups ($p > 0.05$). These results support the hypothesis that an animal's immune response may be influenced by time of day of vaccination.