Reliability of whole blood as a means of monitoring LPS response in bovines: A comparison to the use of fibroblasts and blood monocytes

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Mastitis, an inflammation of the mammary tissue, can be caused by the innate immune system’s response to bacterial invasion. Current methods of studying this system, such as the use of fibroblasts and blood monocytes, are time consuming and expensive. Therefore, the purpose of this study was to examine the reliability of whole blood as a means of studying LPS responsiveness in bovines. This was done through four separate experiments, the first being to examine responsiveness at two, four, and six months of age. The second experiment sought to determine if whole blood can be stored for 24 hours at 4°C with the results of analysis being consistent with those of immediately processed blood. The purpose of the third experiment was to determine if LPS-stimulated whole blood analysis, conducted on samples obtained three weeks after an in vivo LPS challenge, reveals differences between calves that have been challenged or not in early life. Finally, the objective of the fourth experiment was to determine if LPS-stimulated whole blood analysis reveals differences in responsiveness pre- and post-partum. It was determined that whole blood cannot be stored for 24 hours at 4°C with no effect on cytokine production due to the significant differences in IL-6 production by the immediately processed and stored blood. However, no significant difference was found in IL-6 levels between calves administered LPS or saline three weeks prior nor in IL-6 levels of cows pre- versus post-partum. Thus, although IL-6 production by LPS stimulated whole blood was found to significantly increase from two to six months of age, it was concluded that whole blood cannot be used as a reliable means of monitoring LPS responsiveness due to the considerable variation in IL-6 production among animals. Consequently, established methods should continue to be used to study the innate immune response of bovines.