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Jay Reddy
University of Nebraska - Lincoln, jayreddy@unl.edu

Bruce N. Wilkie
University of Guelph

Bonnie A. Mallard
University of Guelph

Soren Rosendal
University of Guelph

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Reddy, Jay; Wilkie, Bruce N.; Mallard, Bonnie A.; and Rosendal, Soren, "Cytokines in Pigs Bred Selectively for High and Low Immune Response [abstract only]" (1996). *Jay Reddy Publications.* Paper 12.
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Cytokines in Pigs Bred Selectively for High and Low Immune Response

N.R. Jayagopala Reddy, Bruce N. Wilkie, Bonnie A. Mallard, and Soren Rosendal
Department of Veterinary Microbiology and Immunology,
Ontario Veterinary College, University of Guelph, Guelph, Ontario, Canada

Abstract

Yorkshire pigs have been bred for high (H) and low (L) immune response based on selection for multiple antibody (Ab) and cell mediated immune response traits. High responders have better production and larger litter size when compared with controls and low responders. The ability of high and low line pigs to resist *M. hyorhinis* infection has been tested. The high responders had more rapid and higher Ab response and the severity of the disease was less, as judged by clinical and postmortem signs. However, arthritis was found to be relatively more severe in high responders. We hypothesized that the immune response differences between genetically different lines could be attributed to either dominant or differential cytokine expression.

To test the above hypothesis, quantitative RNA PCR (Q.RNA PCR), to quantitate the porcine cytokines at the mRNA level, was developed by constructing an internal control. Two synthetic oligos, namely 5′ construct (FPC) and 3′ construct (TPC), were designed based on the nt sequences of porcine cytokine genes. FPC represented the upstream primer sequences of nine cytokines sequentially in the order IL-1, IL-4, IL-6, IL-8, IL-2, IL-1O, TNF-α, TNF-β and IFN-γ, and TPC, the downstream primer sequences in the same order. The primers were designed such that when cRNA and target RNA were amplified, they give two non-overlapping products. FPCs and TPCs were constructed by overlapping and the extension method of PCR amplification utilizing six oligos for each, and were cloned into pSP 64 poly A vector. The application of Q.RNA PCR has been tested for determining quantitatively the cytokines in peripheral blood mononuclear cells in H-L line pigs. Preliminary study indicated differential expression of cytokines, namely IL-1, IL-6, IL-1O, TNF-α and IFN-γ, in naive animals. Expression of other cytokines, namely IL-2, IL-4, IL-8 and TNF-β, was absent in the pigs tested. Future studies involve the determination of cytokines in the context of immunization to the antigens (HEWL, BCG, etc.) as well as during infection (ex: *M. hyorhinis*) in conjunction with cytokine expression regulation strategies, namely MAbs and/or antisense ODNs or gene therapy.