Distinct expression of TLR1 gene in broiler and layer chick skeletal myoblasts

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Background: \*

Genetic selection has promoted muscle development of broiler chickens. Multinuclear muscle myofibers grow through the fusion of myogenic precursor cells, myoblasts. Recently, the inflammation in well-developed broiler breast muscles is increasingly reported but the reason of this serious disorder has been still unclear. Toll-like receptors (TLRs) are essential for innate immune defense including inflammation. Chicken has ten TLR genes and their ligands strongly resemble those of mammals. However the roles of TLRs in chick myoblasts have not been reported.

Objectives: \*

Investigation of the expression of TLR genes in broiler and layer chick myoblasts and the inflammatory responses to TLR ligands.

Materials Methods:

Skeletal muscle myoblasts were isolated from E10 embryos of broiler (UK Chunky) and layer (White Leghorn) chickens. Myoblasts were maintained in growth medium and stimulated with TLR ligands. Gene expression levels of TLRs and inflammatory cytokines were quantified by qPCR.

Results: \*

All TLR mRNAs were detected in layer myoblasts but TLR1A was not detected in broiler myoblasts. And the expression level of TLR1B in broiler myoblasts was <10% compared with layer myoblasts. The results suggest that TLR1 is not functional in broiler myoblasts. Next, chick myoblasts were stimulated with TLR ligands; lipopolysaccharide (LPS), triacylated lipopeptide (Pam3CSK4), and diacylated lipoprotein (FSL-1). We confirmed the induced expression of TLR-dependent inflammatory cytokines such as interleukin 1 beta in the myoblasts stimulated with TLR ligands.

Conclusions: \*

Distinct TLR expression patterns between broiler and layer chick myoblasts may be involved in the TLR-dependent muscle inflammation.