Molecular characterization, expression, and functional analysis of NOD1 in Qingyuan partridge chicken

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ABSTRACT. Nucleotide-binding oligomerization domain-containing protein-1 (NOD1) is a cytoplasmic pattern recognition receptor (PRR) and a key member of the NOD-like receptor (NLR) family. It has been reported that NLRs recognize a variety of microbial infections to induce the host innate immune response via modulation of NF-κB signaling. However, no reports on chicken NOD1 have been reported to date. In the current study, the full-length cDNA sequence of NOD1 was cloned. The complete open reading frame of NOD1 contains 2856 bp and encodes a 951 amino acid protein. Structurally, it is comprised of one caspase recruitment domain at the N-terminus, seven leucine-rich repeat regions at the C-terminus, and one NACHT domain between the N and C-termini. Phylogenetic analyses showed that chicken NOD1 clusters with duck and turkey. Furthermore, tissue-specific expression analyses of chicken NOD1 were performed using quantitative reverse
transcription-PCR. NOD1 is widely distributed in various tissues, with the highest expression observed in testes. Finally, induced expression of chNOD1 and its associated adaptor molecule receptor-interacting protein 2, as well as the effector molecule NF-κB, was observed following S. enterica serovar Enteritidis infection. These findings highlight the important role of chicken NOD1 in response to pathogenic invasion. The present study is the first report of the cloning, expression, and functional analysis of chicken NOD1 and provides the foundation for future research on the structure and function of chicken NOD1.

**Key words:** Chicken; Receptor-interacting protein 2; Full-length cDNA; Nucleotide-binding oligomerization domain-containing protein -1; NF-κB