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Abstract

Expression Profiles of NOD-Like Receptors in Salmonid Cells after Infection with Infectious Pancreatic Necrosis Virus (IPNV) †

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Abstract: Infectious pancreatic necrosis virus (IPNv) is a worldwide etiologic agent of one disease that causes severe economic losses in several species of fish, mainly in young salmonids. Its genome consists of two linear double-stranded RNA segments that encode five viral proteins. Teleost fish respond to infectious agents, mainly through the components of innate immunity. This response to viral infections is initiated, conducted, and coordinated by pathogen recognition receptors (PRRs), which can detect the presence of microorganisms through the identification of molecular patterns associated with pathogens (PAMPs). Heterologous PRR molecules have been found in salmonids, even in teleost fish. NOD-like receptors (NLRs) are a multigenic family of cytoplasmic molecules involved in immunity and apoptosis; these receptors have been little studied in fish. However, they have recently been linked to antiviral defense. There is no information that relates the expression of NOD-like receptors with IPNv infection. Thus, the objective of this study was to analyze the gene expression of several members of subfamily A of the NLRs (NOD1, NOD2, NLR-C3, NLR-C5, and NLR-X1) in response to IPNv infection by real-time quantitative PCR (RT-qPCR) and cellular models used in vitro and ex vivo. The expression analysis revealed that CHSE-214 cells, infected with IPNv, show a positive regulation of the NLRs, with the NLRX1 gene being the one with the highest expression. A similar result was obtained when primary cultures of head kidney of rainbow trout were infected with IPNv, but in this case, the most stimulated receptor was found to be NLR-C5. Overall, the results suggest that NLRs could play a key role in the regulation of defense mechanisms of salmonids against viral pathogens and justify the exploration of the precise molecular mechanism related to the immune system of the NLRs in these fish.

Keywords: teleost fish; NODs; gene expression; viral infection