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Identification and characterization of C1 inhibitor in Nile tilapia (*Oreochromis niloticus*) in response to pathogenic bacteria

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ABSTRACT

C1 inhibitor (C1INH) is a multi-functional serine protease inhibitor in plasmatic cascades, not only inactivating various proteases, but also regulating both complement and contact system activation. In this study, we described the identification and characterization of a C1INH ortholog from Nile tilapia (*Oreochromis niloticus*) at molecular, protein and cellular levels. The full-length cDNA of *Oreochromis niloticus C1INH (OnC1INH)* consisted of 1788 bp of nucleotide sequence encoding polypeptides of 596 amino acids. The deduced protein possessed a serpin domain at the C-terminal domain, and two Ig-like domains in the N-terminal domain with significant homology to teleost. Expression analysis revealed that the *OnC1INH* was extremely highly expressed in the liver; however, much weakly exhibited in other tissues including spleen, kidney, blood and heart. After the *in vivo* challenges of the lipopolysaccharide (LPS) and *Streptococcus agalactiae*, the expression of *OnC1INH* was significantly up-regulated in liver and spleen at the late phase, which was confirmed at the protein level with immunohistochemical analysis. The up-regulation of *OnC1INH* expression was also demonstrated in head kidney monocytes/macrophages *in vitro* stimulated with LPS, *Aeromonas hydrophila* and *Streptococcus agalactiae*, which was positively correlated with the protein expression pattern in the culture media. Taken together, the results of this study indicated that OnC1INH might be involved in the immune response of Nile tilapia against to bacterial challenge.

Key words: *Oreochromis niloticus*; C1 inhibitor; Immune response; *Streptococcus agalactiae*; Monocytes/macrophages