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Conservation of Structural and Interactional Features of CD28 and CD80/86 Molecules from Nile Tilapia (*Oreochromis niloticus*)

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Abstract

Interaction of CD28 with CD80 or CD86 molecules provides a costimulatory signals required in T cell activation. In this study, we cloned and analyzed a CD28 gene (On-CD28) and a CD80/86 gene (On-CD80/86) from Nile tilapia (*Oreochromis niloticus*). Sequence analysis revealed the typical characteristics of On-CD28 protein; for instance, the proline-based motif (^{117}TYPPPL^{122}) is essential in binding of CD28 to CD80/86 ligands. Moreover, an extracellular Ig domain was found in On-CD80/86; this domain is responsible in binding of CD28 to CD80/86 receptors. Subcellular localization analysis showed that both On-CD28 and On-CD80/86 were distributed predominantly in the cytomembrane. Yeast two-hybrid assay showed that On-CD28 directly interacted with On-CD80/86. On-CD28 and On-CD80/86 transcripts were detected in all the examined tissues of healthy Nile tilapia, and the highest expression levels of On-CD28 and On-CD80/86 were detected in the brain and heart, respectively. Following a bacterial challenge using *Streptococcus agalactiae* in vivo, On-CD28 and On-CD80/86 were upregulated in head kidney, spleen, intestines, and brain. However, they showed different expression profiles in response to stimulation with inactivated *S. agalactiae* in vitro. These findings indicated that the interaction of On-CD28 with On-CD80/86 provides a costimulatory signals that possibly play an important role in