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Spleen tyrosine kinase from Nile tilapia (*Oreochromis niloticus*): Molecular characterization, expression pattern upon bacterial infection and the potential role in BCR signaling and inflammatory response

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ABSTRACT

Spleen tyrosine kinase (SYK), a member of non-receptor tyrosine kinase family, plays an important role in immune responses against pathogen infection, which is capable of activating B cells signaling pathway and regulating inflammatory response. In this study, Nile tilapia (*Oreochromis niloticus*) ortholog (*OnSYK*) was identified and characterized at expression pattern against bacterial infection, function in B cells activation pathway and inflammatory response. The cDNA of *OnSYK* ORF contained 1851 bp of nucleotide sequence encoding polypeptides of 616 amino acids. The deduced OnSYK protein was highly homologous to other species SYK, containing two SH2 domains and a TyrKc domain. Spatial mRNA expression analysis revealed that *OnSYK* had wide tissue distribution and was highly expressed in the liver. After challenge of *Streptococcus agalactiae* (*S. agalactiae*) *in vivo*, mRNA expression of *OnSYK* was significantly up-regulated in the head kidney, spleen and liver. The up-regulation of *OnSYK* transcript was also displayed in the head kidney and spleen leukocytes stimulation with *S. agalactiae* and LPS *in vitro*, which was confirmed at protein level in the head kidney leukocytes by FACS analysis. In addition, after induction with mouse anti-OnIgM monoclonal antibody *in vitro*, the expressions of *OnSYK* and its downstream molecules (*OnLYN*, *OnBLNK* and *OnAP-1*) were