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A novel toll-like receptor from *Mytilus coruscus* is induced in response to stress

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Abstract: Toll-like receptor (TLR) is considered to be an evolutionarily conserved transmembrane protein which promotes the Toll signal pathway to active the expression of transcription factors in the innate immunity of the organism. In this study, a full length of TLR homologue of 2525bp in *Mytilus coruscus* (named as McTLR-a, GenBank accession no: KY940571) was characterized. Its ORF was 1815 bp with a 5'untranslated region (UTR) of 128 bp and a 3'UTR of 582 bp, encoding 602 amino acid residues with a calculated molecular weight of 70.870 kDa ($pI = 6.10$). BLASTn analysis and phylogenetic relationship strongly suggested that this cDNA sequence was a member of TLR family. Quantitative real time RT-PCR showed that constitutive expression of McTLR-a was occurred, with increasing order in hemocyte, gonad, mantle, adductor, gill and hepatopancreas. Bacterial infection and heavy metals stimulation up-regulated the expression of McTLR-a mRNA in hepatopancreas with time-dependent manners. The maximum expression appeared at 12 h after pathogenic bacteria injection, with approximately 22-fold in *Aeromonas hydrophila* and 17-fold in *Vibrio parahaemolyticus* higher than that of the blank group. In heavy metals stress group, they all reached peaks at 3d, while the diverse concentration caused the maximum expression were different. The highest expression reached approximately 7-fold higher than the blank in low concentration of Pb^{2+} exposure. In Cu^{2+} treated group, it reached the peak (approximately 12-fold higher than the blank) in middle concentration. These results indicated that McTLR-a might be involved in the defense response and had a significant role in mediating the environmental stress.

Key words: TLR; *Mytilus coruscus*; Innate immunity; *Vibrio parahaemolyticus*; *Aeromonas hydrophila*; heavy metals

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