

MIRNAS FROM SHRIMP *PENAEUS MONODON* AND ITS POSSIBLE ROLE IN INNATE IMMUNITY

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ABSTRACT

MicroRNAs (miRNAs) are short noncoding RNAs of the RNA interference pathways that regulate gene expression through partial complementary base pairing to target mRNAs. Here, miRNAs that are expressed in the white spot syndrome virus (WSSV)-infected *Penaeus monodon* hemocyte, were identified by next generation sequencing. Forty-six miRNA homologs were identified. Of those, the expression of 16 miRNAs in response to WSSV infection was analyzed by stem-loop real-time PCR. Eleven out of sixteen miRNAs were differently expressed upon WSSV infection. Two miRNAs, pmo-miR-315 and pmo-miR-750, were highly responsive upon WSSV infection. From the miRNA target prediction, miRNAs were targeted at 5'UTR, ORF, and 3'UTR of several immune-related genes involved in apoptosis, antimicrobial peptides, prophenoloxidase system, proteinase and proteinase inhibitor. To characterize the miRNA function, the highly conserved miRNA homolog, pmo-bantam, was further analyzed. A highly conserved miRNA, pmo-bantam was predicted to target the 3'UTR of an immune gene, Kunitz-type serine protease inhibitor (KuSPI). Binding of pmo-bantam to the target sequence of KuSPI gene was confirmed by luciferase reporter assay. Also, correlation of pmo-bantam and KuSPI expression was revealed in lymphoid organ of WSSV-infected shrimp suggesting that the regulatory role of pmo-bantam in shrimp lymphoid organ. These results implied that miRNAs might play roles as immune gene regulators in shrimp antiviral response.

KEYWORDS

Penaeus monodon; microRNA; WSSV; bantam; antiviral response

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