Accepted Manuscript

Different roles of a novel shrimp microRNA in white spot syndrome virus (WSSV) and *Vibrio alginolyticus* infection

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PII: S0145-305X(17)30405-6

DOI: 10.1016/j.dci.2017.10.002

Reference: DCI 2998

To appear in: *Developmental and Comparative Immunology*

Received Date: 28 July 2017

Revised Date: 30 September 2017

Accepted Date: 2 October 2017

Please cite this article as: Wang, Z., Zhu, F., Different roles of a novel shrimp microRNA in white spot syndrome virus (WSSV) and *Vibrio alginolyticus* infection, *Developmental and Comparative Immunology* (2017), doi: 10.1016/j.dci.2017.10.002.

Different roles of a novel shrimp microRNA in white spot syndrome virus (WSSV) and *Vibrio alginolyticus* infection

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Abstract

In this study, *Marsupeneaus japonicus* microRNA-S5 (miR-S5) was found to be up-regulated 24 h post white spot syndrome virus (WSSV) or *V. alginolyticus* infection. The loss of function using an anti-microRNA oligonucleotide (AMO-miR-S5) showed that expression levels of multiple innate immune-related genes were affected. The expression of p53 and tumor necrosis factor-α (TNF-α) were significantly down-regulated, expression of myosin was significantly up-regulated. The miR-S5 knockdown delayed WSSV-induced death for 48 h, but the final mortality was not affected, while *V. alginolyticus*-induced mortality was increased by 30 %. The effect of miR-S5 knockdown on phagocytosis and apoptosis rates showed that miR-S5 knock down significantly decreased phagocytosis rate of WSSV from 27.8 % to 7.0 %, and phagocytosis rate of *V. alginolyticus* from 27.2 % to 21.4 %, separately. WSSV-induced apoptosis decreased from 60.83% to 51.25%, but no effect on *V. alginolyticus*-induced apoptosis (43.72 % to 45.04 %). We concluded that miR-S5 could be used by WSSV via regulating hemocyte phagocytosis and apoptosis processes, but helps to defend against bacterial infection by regulating the proPO system, superoxide dismutase activity and phagocytosis.