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Immune response of *Exopalaemon carinicauda* infected with an AHPND-causing strain of *Vibrio parahaemolyticus*

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ABSTRACT To investigate the immune response of *Exopalaemon carinicauda* infected with an AHPND-causing strain of *Vibrio parahaemolyticus* (VP_{AHPND}), three-generation breeding of shrimp selected for their survival to VP_{AHPND} infection was applied to explore the relationship between immune parameters and AHPND-resistant capacity of *E. carinicauda*. In this study, the LD_{50} dose of 48 h and survival rates at 144h of shrimp to VP_{AHPND} increased from $10^{6.0}$ to $10^{6.6}$ cfu ml^{-1} and from 26.67% to 36.67% by three successive generations selection, respectively, while there was no significant difference between the first and second generation ($p > 0.05$). Then the immune parameters including vibrio density, total hemocyte counts (THCs), hemocyanin (HEM) concentration, antibacterial activity, activities of four immune enzymes, and expressions of eight immune-related genes were determined in the shrimp of the first (G1) and the third selective generation (G3). The results showed that the shrimp in G1 and G3 generation cleared most of VP_{AHPND} infecting hepatopancreas during 24 h and 6 h post injection, respectively. The levels of THCs, HEM concentration, antibacterial activity, immune enzymes including lysozyme (LZM) activity, alkaline phosphatase (AKP) activity in cell-free hemolymph, and the expression levels of Tollip, ALF, cathepsin B in hemocytes and hepatopancreas, crustin, LZM, SR in hepatopancreas and LGBP in hemocytes were higher in G3 generation than in G1 generation after infection with VP_{AHPND}, suggesting that these

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