Immunomodulatory effects of parasitic dinoflagellate Hematodinium on crustacean hemocytes

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The parasitic dinoflagellate Hematodinium spp. is an endoparasitic dinoflagellatet. It could infect more than 40 species of marine

crustaceans, leading to Hematodinium epizootics.

Hematodinium spp. mainly resides and proliferates in hosts' hemolymph or hemocoel, causing tissue damage and malfunction of infected organs and eventually leading to hosts' mortality in late stages of infection.

Recently, a research team led by Prof. Li Caiwen from the Institute of Oceanology of the Chinese Academy of Sciences (IOCAS) provided novel insights into the immunomodulatory effects of Hematodinium perezi (H. perezi) on crustacean host immunity.

The study was published in *Fish and Shellfish Immunology* on May 5.

The researchers systematically explored the host-parasite interaction between hemocytes from Portunus trituberculatus and H. perezi.

They found that H. perezi could affect the miRNome and proteome profiles of hemocytes from challenged hosts, regulate the host's immune response at post-transcriptional and translational levels, and result in post-transcriptional regulation to the crustacean host immunity.

Multiple key immune-related pathways were influenced by H. perezi. Through modulating the host miRNome, the host immune responses of nodulation, prophenoloxidase activation and antimicrobial peptides were suppressed significantly.

The host's cellular homeostasis was imbalanced with the phagosome and peroxisome pathways dysregulated post-transcriptionally. "Cellular structure and communication were impacted via post-transcriptional downregulation of extracellular matrix-receptor interaction and focal adhesion pathways," said Dr. Li Meng, first author of the study.

"Studies on immunomodulatory effects of H. perezi on crustacean

immunity will provide better understanding of the molecular mechanism of particular host-parasite interactions, as wells as the parasitic strategy of the parasitic dinoflagellate," said Prof. Li.

More information: Meng Li et al, Integrative omics analysis highlights the immunomodulatory effects of the parasitic dinoflagellate hhematodinium on crustacean hemocytes, *Fish & Shellfish Immunology* (2022). DOI: 10.1016/j.fsi.2022.04.050

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