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## The oyster immunity

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### Abstract

Oysters, the common name for a number of different bivalve molluscs, are the worldwide aquaculture species and also play vital roles in the function of ecosystem. As invertebrate, oysters have evolved an integrated, highly complex innate immune system to recognize and eliminate various invaders via an array of orchestrated immune reactions, such as immune recognition, signal transduction, synthesis of antimicrobial peptides, as well as encapsulation and phagocytosis of the circulating haemocytes. The hematopoietic tissue, hematopoiesis, and the circulating haemocytes have been preliminary characterized, and the detailed annotation of the Pacific oyster *Crassostrea gigas* genome has revealed massive expansion and functional divergence of innate immune genes in this animal. Moreover, immune priming and maternal immune transfer are reported in oysters, suggesting the adaptability of invertebrate immunity. Apoptosis and autophagy are proved to be important immune mechanisms in oysters. This review will summarize the research progresses of immune system and the immunomodulation mechanisms of the primitive catecholaminergic, cholinergic, neuropeptides, GABAergic and nitric oxidase system, which possibly make oysters ideal model for studying the origin and evolution of immune system and the neuroendocrine-immune regulatory network in lower invertebrates.

**Key Words:** Oyster; Innate immune system; Hematopoiesis; Immune priming; Apoptosis and Autophagy; Neuroendocrine-immune regulation

### 1. Introduction

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