

# FIRST EVIDENCE FOR A *Vibrio* STRAIN PATHOGENIC TO *Mytilus edulis* ALTERING HEMOCYTE IMMUNE CAPACITIES

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## ABSTRACT

Unlike other bivalve species, *Mytilus edulis* is not known to be particularly affected by any major bacterial disease<sup>i</sup>. Nevertheless, since 2010, abnormal mortality events touch farmed blue mussels (juveniles and adults) in France, where different bacterial strains were isolated.

In this context, we performed 1) for a first time, an evaluation of virulence and a genetic characterization of bacterial strains isolated from *Mytilus edulis*, 2) a construction and validation of two stable GFP-tagged *V. splendidus*-related strains for their use in flow cytometry, and 3) a description of functional activity of mussel hemocytes challenged by virulent and non virulent bacteria or by their extracellular products.

Experimental infections allowed the selection of two isolates affiliated to *V. splendidus*/*V. hemicentroti* type strains: a virulent 10/068 1T1 (76,6% and 90% mortalities in 24h and 96h) and an innocuous 12/056 M24T1 ( 0% and 23,3% in 24h and 96h). These two strains were GFP-tagged and validated for their growth characteristics and virulence as genuine models for exposure. Then, host cellular immune responses to the microbial invaders were assessed. In the presence of the virulent strain, hemocyte motility was instantaneously enhanced but markedly slowed down after 2h exposure. At the same time interval, 10/068 1T1 invaded hemocytes and was more rapidly internalized than the innocuous strain. Extracellular products (ECPs) prepared from 10/068 1T1 cultures significantly inhibited phagocytic activity. Furthermore, the pathogenic strain and its ECPs inhibited oxidative burst contrary to 12/056 M24T1 strain/ECPs which enhanced ROS production. The pathogenic *V. splendidus*-related strain affected also the stability of lysosomal membrane and inhibited phagolysosome generation.

Taken together, our results suggest that the mussel pathogen 10/068 1T1 may escape immune response by altering hemocytes functions.

## KEYWORDS

Innate immunity, molluscs, cell-mediated immune response, bacterial infections

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