Zebrafish as a model host for studies of *Piscirickettsia salmonis* and its outer membrane vesicles

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Abstract

The intracellular bacterium *Piscirickettsia salmonis* is the etiologic agent of salmonid rickettsial septicaemia (SRS), a bacterial disease that over the last decades has had a devastating effect on the Chilean aquaculture. Although *P. salmonis* has been recognized as a major fish pathogen for several years, there is still a lack in knowledge in regard to the bacterium pathogenesis. As outer membrane vesicles (OMVs) has been reported to be important for the infection of several bacteria species, the present study established a zebrafish infection model for studies of *P. salmonis* and the role of the bacterium's OMVs during infection. The *P. salmonis* derived vesicles were, shown to be internalized by cell cultures and OMVs injected into adult zebrafish revealed an upregulation of several pro-inflammatory genes, indicating a modulating effect on the immune system. Comparison of OMVs from three strains of *P. salmonis*, isolated from salmonids in Norway (NVI 5692), Canada (NVI 5892) and Chile (LF-89) did, further, reveal several strain-specific differences related to higher virulence capability for LF-89, and stronger similarities between NVI 5692 and NVI 5892. In summary, the present study is the first in-depth analysis of *P. salmonis* derived OMVs, highlighting strain-specific factors able to contribute to adaptations and virulence.

Keywords

Outer membrane vesicles, OMVs, *Piscirickettsia salmonis*, virulence, fish infection