Exploring the potential of oral and DNA vaccines for the iridovirus major capsid protein to induce protective immunity in largemouth bass(*Micropterus salmoides*)

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Outline

Abstract

Largemouth bass iridovirus (LMBV) can cause high mortality and lead to heavy economic loss in the cultivation of largemouth bass, but there was no effective treatment. The present study constructed a recombinant Pichia pastoris expressing LMBV major capsid protein (*MCPD*). The recombinant GS115-pW317-*MCPD* was then used to immunize largemouth bass via oral administration. Serum antibody levels were measured by ELISA, neutralizing antibody titers were determined by serum neutralization test (SNT), antigen presentation-related gene expressions were detected by RT-PCR, and the histopathological characteristics of immunized fish were assessed after challenging with 0.1 ml $10^{7.19}$ $TCID_{50}$/ml LMBV. The relative percentage survival (RPS) was also determined. Our results showed that the RPS of fish orally immunized with 1.0×10^8 CFU/g GS115-pW317-*MCPD* was reached up to 41.6% after challenge with 0.1 ml $10^{9.46}$ $TCID_{50}$/ml LMBV. Moreover, orally immunizing with GS115-pW317-*MCPD* can relieve the pathological damage caused by LMBV. On the other hand, a DNA vaccine, named pCDNA3.1(+)-MCP-Flag, was constructed by inserting the cloned LMBV major capsid protein (MCP) gene into the pCDNA3.1(+)-Flag plasmid. The expression of the recombinant plasmid was confirmed by Western blot (WB) and RT-PCR. The largemouth bass in the DNA vaccine group were immunized with the pCDNA3.1(+)-MCP-Flag plasmid by pectoral fin base injection, and the relative percent survival (RPS) of fish challenged with LMBV was 63%. In conclusion, GS115-pW317-*MCPD* showed a promising potential against LMBV. And the recombinant plasmid expressing LMBV MCP induced significant immune responses in largemouth bass, and might represent a potential LMBV vaccine candidate for largemouth bass.

Reference

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