The Composition of Capsid Proteins and Development of Subunit Vaccine of Waterfowl Parvoviruses

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Waterfowl parvovirus infection is caused by goose parvovirus (GPV) and Muscovy duck parvovirus (MDPV) and might lead to severe economic losses. The conventional method for the detection of waterfowl parvovirus was using polymerase chain reaction (PCR) combined with restriction fragment length polymorphism (RFLP) or nucleotide sequence to distinct GPV from MDPV (3-5). In this study, we designed primers that can directly differentiate GPV from MDPV using a single PCR reaction. Although live vaccine is available for the control of GPV and the vaccine can elicit neutralized antibody against the virus, it is still impossible to differentiate field-infected from vaccinated animals. To enable this, the capsid protein (VP3) and the N-terminal of protein VP1 (VP1N), and nonstructural proteins (NS1) of GPV and MDPV were expressed in *E. coli*. These recombinant proteins were used as subunit vaccine to vaccinate adult ducks and the serum of vaccinated ducks was used in passive immunization of ducklings. This result showed that these sera were not able to provide any protection against the challenge of MDPV. It was found previously by monoclonal antibody that the fourth capsid protein (VP4) with MW 65 kDa, was the most antigenically reactive (1) and could be a subunit vaccine. In this study, monoclonal antibody was prepared by GPV recombinant capsid protein VP3, and then used in Western blotting assay to analyze the composition of GPV capsid protein. The capsid protein VP1, VP2, VP3 and a protein about 50 kDa were recognized by the monoclonal antibody. The size of this protein with MW of 50 kDa was much smaller than the VP4 with MW of 65 kDa found in GPV but closed to protein with MW of 51 kDa found in MDPV (2). This 50 kDa protein was subjected to LCMSMS sequencing. Only one peptide sequence conformed to the VP1 at residues 607-617 of GPV and MDPV was found.

Reference: