Supplementary Materials:

The following are available online at www.mdpi.com/xxx/s1,Figure S1 H1-D4ORFs and D4ORFs-VP3 fused sequences**:** A, H1-D4ORFs sequence; B, D4ORFs-VP3 sequence. The sequence with the wavy line represents the corresponding sequence of region 1–186 nt of the *CyHV-2 ORF72* gene; the sequence with boldface represents the corresponding sequence of region 993–1197 nt of the *CyHV-2 ORF66* gene; the sequence with a double underline represents the corresponding sequence of region 603–783 nt of the *CyHV-2 ORF81* gene; the sequence in italics represents the corresponding sequence of region 85–186 nt of the *CyHV-2 ORF82* gene; the sequence in lowercase font represents the sequence of region 1–90 nt (H1-tag) of the BmCPV polyhedrin H1-helix in the H1-D4ORFs sequence; and the sequence in lowercase font with a single underline represents the sequence of region 1–279 nt (VP3 tag) of the *BmCPV VP3* gene in the D4ORFs-VP3 sequence. The sequences from CyHV-2 were optimized according to the preference of the silkworm BmNPV codons.

Figure S2 Antibody titer in the immunized fish**:**Serum samples (n = 3) harvested from the caudal vein of fish at 3 weeks post-vaccination with BmNPV-H1-D4ORF-polh or BmNPV-D4ORF-VP3-polh were stored overnight at 4 ℃. After centrifugation for 10 min at 2,000 × g, the supernatants were collected and antibody titers in the sera were detected using an uncompetitive ELISA. ***, $p \leq 0.0001$.

Figure S3 and S4 were the original western blotting figures.

Figure S1. Synthetic D4ORF fusion sequence

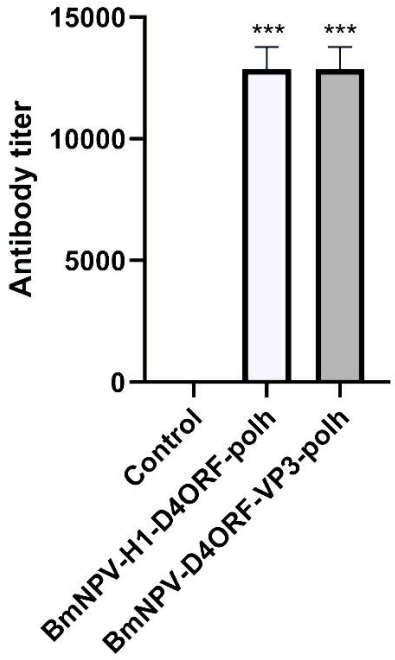

Figure S2. Valence of Antibody.

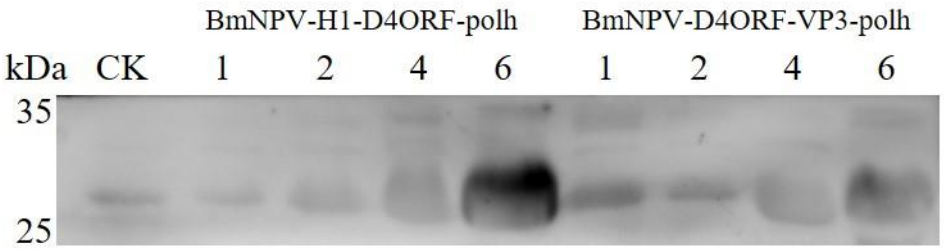

Figure S3. Western blot analysis depicting the hemolymph of silkworm larvae infected with BmNPV-H1-D4ORF-polh/BmNPV-D4ORF-VP3-polh.

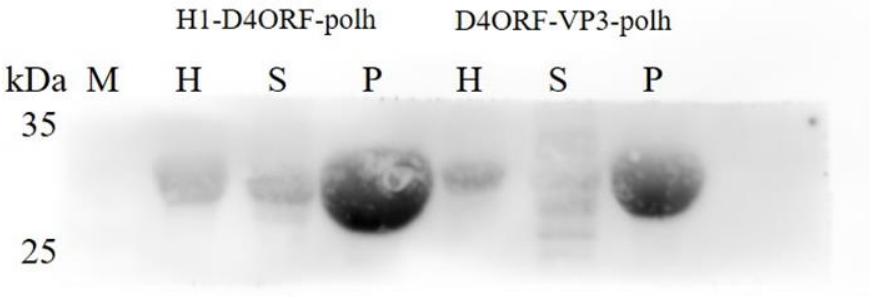

Figure S4. Western blot analysis of the hemolymph, supernatant of the hemolymph, and purified recombinant cytoplasmic polyhedra.