Production of Egg Yolk Antibody (IgY) against Vibrio cholerae O1: Protective Effect in Mice

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Abstract

Background: Cholera is an acute intestinal infection caused by Vibrio cholerae (V. cholerae). The development of antibodies against specific V. cholerae may have a therapeutic effect. In the present research, we investigated the protective effect of egg yolk Immunoglobulin (IgY), which was produced by immunizing hens with formaldehyde-killed V. cholerae O1 and subsequently the isolated IgY was orally administrated to the V. cholerae O1 infected mice for evaluation of its immunizing capability.

Methods: In the current study, hens were immunized three times with formaldehyde-killed V. cholerae O1 (1.5×10⁷ CFU/mL) and an equal volume of adjuvant. The IgY was isolated from egg yolk by polyethylene glycol method. The validity and activity of isolated IgY were confirmed with SDS-PAGE and ELISA methods, respectively. Subsequently IgY was orally administrated to suckling mice following challenge with V. cholerae O1. ELISA results showed high antibody titer in the serum and egg yolk. Also, SDS-PAGE analysis showed successful purification of IgY and anti-V. cholerae IgY prevented the death of mice infected with V. cholerae O1. The anti-V. cholerae IgY was administered at 2, 4, 6 hours’ intervals after 3 hours of inoculation of mice with V. cholerae O1.

Results: Results showed that the rate of surviving mice (2 mg/mL of IgY) were 60% after 4 hours and 40% after 6 hours and the rate of surviving mice (5 mg/mL of IgY) was 70% after 4 hours and 60% after 6 hours.

Conclusion: The findings suggested the egg yolk-driven IgY as a natural antibacterial protein, could be effective in the prevention and treatment of cholera disease.

Keywords: Antibodies, Chicken, Immunoglobulin Y, Mice, Vibrio cholerae O1