WSSV IE1 PROMOTER IS MORE EFFICIENT THAN CMV PROMOTER TO EXPRESS H5 HEMAGGLUTININ FROM INFLUENZA VIRUS IN BACULOVIRUS AS A CHICKEN VACCINE

F. He, Y. Ho, L. Yu, J. Kwang
Temasek Life Sciences Laboratory, Singapore, Singapore

Background: The worldwide outbreak of influenza A (H5N1) viruses among poultry species and humans highlighted the need to develop efficacious and safe vaccines based on efficient and scalable production.

Results: White spot syndrome virus (WSSV) immediate-early promoter one (ie1) was shown to be a stronger promoter for gene expression in insect cells compared with Cytomegalovirus immediate-early (CMV) promoter in luciferase assays. In an attempt to improve expression efficiency, a recombinant baculovirus was constructed expressing hemagglutinin (HA) of H5N1 influenza virus under the control of WSSV ie1 promoter. HA expression in SF9 cells increased significantly with baculovirus under WSSV ie1 promoter, compared with CMV promoter based on HA contents and hemagglutination activity. Further, immunization with baculovirus under WSSV ie1 promoter in chickens elicited higher level anti-HA antibodies compared to CMV promoter, as indicated in hemagglutination inhibition, virus neutralization and enzyme-linked immunosorbent assays. By immunohistochemistry, strong HA antigen expression was observed in different chicken organs with vaccination of WSSV ie1 promoter controlled baculovirus, confirming higher efficiency in HA expression by WSSV ie1 promoter.

Conclusion: The production of H5 HA by baculovirus was enhanced with WSSV ie1 promoter, especially compared with CMV promoter. This contributed to effective elicitation of HA-specific antibody in vaccinated chickens. This study provides an alternative choice for baculovirus based vaccine production.