Date / Time:
Tuesday 8 Nov 2011
12pm – 1pm

Venue:
Department of Microbiology
Seminar Room,
Blk MD4,
5 Science Drive 2,
Level 3,
Singapore 117576

Convener:
Assoc Prof Tan Yee Joo

ALL ARE WELCOME

Coffee & Tea will be provided from 11.30am

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Seminar Coordinators
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Baculovirus As A Mucosal Vaccine Vector Against HPAI H5N1 Strains In Mice

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Abstract

The recent outbreaks of influenza A H5N1 virus in birds and humans have necessitated the development of potent H5N1 vaccines. In this study, we evaluated the protective potential of an immediate-early promoter-based baculovirus displaying hemagglutinin (BacHA) against highly pathogenic avian influenza (HPAI) H5N1 virus infection in a mouse model. Gastrointestinal delivery of BacHA significantly enhanced the systemic immune response in terms of HA-specific serum IgG and hemagglutination inhibition (HI) titers. In addition, BacHA vaccine was able to significantly enhance the mucosal IgA level. Microneutralization assay also indicated that live BacHA vaccine was able to induce strong cross-clade neutralization against heterologous H5N1 strains (clade 1.0, clade 2.1, and clade 8.0) compared to the inactivated BacHA. Viral challenge studies showed that live BacHA was able to provide 100% protection against 5 50% mouse lethal doses (MLD(50)) of homologous (clade 2.1) and heterologous (clade 1) H5N1. Moreover, histopathological examinations revealed that mice vaccinated with live BacHA had only minimal bronchitis in lungs and regained their body weight more rapidly postchallenge. Furthermore, immunohistochemistry results demonstrated that the live BacHA was able to transduce and express HA in the intestinal epithelial cells in vitro and in vivo. We have demonstrated that recombinant baculovirus with a white spot syndrome virus (WSSV) immediate-early promoter 1 (ie1) acted as a vector as well as a protein vaccine and will enable the rapid production of prepandemic and pandemic vaccines without any biosafety concerns.

Selected Publications

1. Prabakaran M, He F, Meng T, Madhan S, Yunrui T, Jia Q, Kwang J. Neutralizing epitopes of influenza virus hemagglutinin: target for the development of a universal vaccine against H5N1 lineages. J Virol. 2010 Nov;84(22):11822-30.

2. Madhan S, Prabakaran M, Kwang J. Baculovirus as vaccine vectors. Curr Gene Ther. 2010 Jun;10(3):201-13. Review. PubMed PMID: 20394572.

3. Prabakaran M, Madhan S, Prabhu N, Geng GY, New R, Kwang J. Reverse micelle-encapsulated recombinant baculovirus as an oral vaccine against H5N1infection in mice. Antiviral Res. 2010 May;86(2):180-7.

4. He F, Madhan S, Kwang J. Baculovirus vector as a delivery vehicle for influenza vaccines. Expert Rev Vaccines. 2009 Apr;8(4):455-67. Review.

5. Prabakaran M, Madhan S, Prabhu N, Qiang J, Kwang J. Gastrointestinal delivery of baculovirus displaying influenza virus hemagglutinin protects mice against heterologous H5N1 infection. J Virol. 2010 Apr;84(7):3201-9.

6. Prabhu N, Prabakaran M, Ho HT, Velumani S, Qiang J, Goutama M, Kwang J. Monoclonal antibodies against the fusion peptide of hemagglutinin protect mice from lethal influenza A virus H5N1 infection. J Virol. 2009 Mar;83(6):2553-62