Preparation of the Navel H7N9 Influenza Virus Recombinant Hemagglutinin and Neuraminidase and Generation of the Monoclonal Antibody Libraries for Laboratory Diagnosis and Virological Surveillance

KAI-TING HSIEH[1*,] Chia-Wei Weng[1]

[1.] National Taiwan University

Background/Objective
The novel H7N9 influenza virus has led to severe and fatal infections in human. Therefore, developing rapid laboratory diagnostics, therapeutic antibodies and vaccines are essential for better pandemic preparedness.

Method
The viral surface structure protein hemagglutinin (HA) is involved in the cell invasion, while neuraminidase (NA) is linked to the release of virus particle. Thus, HA and NA are major targets of the specific vaccines and anti-virus drugs. The present work has established the protein expression and purification protocols for producing the novel H7N9 influenza virus recombinant HA and NA by baculovirus expression system. The gene encoding HA or NA was cloned into pFastBac HT-A and pFastBac1 and then transformed to DH10Bac competent cells for producing the recombinant bacmids. After transfecting the recombinant bacmids into Sf9 or Sf21 insect cells for three days, the baculoviruses that can express recombinant HA or NA proteins were observed.

Result
The NA proteins were post-translationally modified in Sf9 cells. The amino acid sequences of the recombinant HA and NA were further analyzed by mass spectrometry, revealing that they are exactly the same as the deduced sequences of their corresponding H7N9 genes. The optimal protein expression and purification procedures were also determined and investigated in the present study.

Conclusion
The monoclonal antibodies against H7N9 HA and NA were generated for scientific research, laboratory diagnosis and disease surveillance.