Use of Recombinant Flagellin Enhances Hemagglutinin-specific Mucosal IgA Production and IL-17 Secreting T Cells against H5N1 Avian Influenza Virus Infection

Suh-Chin Wu[1*], Chih-Hsuan Lai[1], Neos Tang[1], Jia-Tsrong Jan[2], Ming-Hsi Huang[3], Chun-Yi Lu[4], Bor-Luen Chiang[4], Li-Min Huang[4]

[1.] Institute of Biotechnology, National Tsing Hua University, [2.] Genomics Research Center, Academia Sinica, [3.] National Institute of Infectious Diseases and Vaccinology, NHRI, [4.] Department of Pediatrics, National Taiwan University Hospital,

Background/Objective

Researchers are currently involved in a strong effort to find a safe and effective vaccine against highly pathogenic avian influenza H5N1 viruses.

Method

Toward that goal, we obtained soluble recombinant flagellin (FliC) from Salmonella typhimurium to be used as a mucosal adjuvant for H5HA subunit vaccine development. Intranasal immunization of H5HA antigen with recombinant FliC protein in an oil-in-water emulsion was investigated in BALB/c mice.

Result

The use of FliC adjuvant for intranasal immunization was also found to increase H5HA-specific IgG and IgA titers in sera, bronchoalveolar lavage fluids (BALFs), and nasal washes, and augment B-cell responses in mucosal environments via increased IgA titers in BALFs and nasal washes. Increases in IgA and IgG titers through the use of FliC adjuvant in intranasal immunization correlated with higher neutralizing antibody titers in sera and BALFs and higher numbers of IgG- and IgA-secreting B cells in spleen and cervical lymph nodes. High levels of IL-17A cytokine production were also found in stimulated T cells of spleen and cervical lymph node cells, only by intranasal immunization particularly with the use of FliC adjuvant in oil-in-water emulsions.

Conclusion

These findings may provide useful information toward the development of H5HA mucosal influenza vaccines.