OMICS Group Conferences
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International Conference & Exhibition on
Vaccines & Vaccination

22-24 Nov 2011 Philadelphia Airport Marriott, USA

Safety nasal vaccination of ha vaccine with a potent mucosal antigen vehicle sf-10, mimicking pulmonary surfactant

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Potential mucosal adjuvants have been evaluated for over 40 years, however, many were found to be ineffective or have safety problem. We recently found that pulmonary surfactant in the lungs plays important roles not only in preventing collapse of alveoli but also stimulating antigen uptake into macrophages and dendritic cells as a natural safety vehicle. Here we report that intranasal administration of a minimal dose of HA vaccine at 0.015 μg with a synthetic antigen vehicle SF-10, mimicking pulmonary surfactant, markedly elicited the productions of antigen-specific mucosal sIgA in the airway of mice and IgG in the blood with HI titers ≥ 100. The mucosal adjuvanticities of SF-10 was higher than poly (I:C) and cholera toxin. SF-10 sustained HA antigen in nasal cavity and effectively stimulated antigen uptake into dendritic cells. However SF-10 itself without antigen had no stimulatory effects on dendritic cells. Intranasal immunization of 0.1 μg HA vaccine with 2 μg SF-10 showed complete protection against lethal doses (40-160 × LD_{50}) of influenza A virus PR8/34(H1N1). Since the nasal cavity is continuously exposed to various antigens and pathogens from the environment, an important safety issue for mucosal adjuvants is the protection against over-stimulation of antigen presenting cells or unexpected antibody induction during stimulation by mucosal adjuvants. In this regard, SF-10 with a short half clearance time of less than 2 h in nasal cavity and no stimulatory effects on dendritic cells may be useful for safety mucosal vaccination.

Biography

Hiroshi Kido has completed his M.D. from Hirosaki Medical School, Ph.D from Institute for Enzyme Research, Tokushima University in Japan and postdoctoral studies from Roche Institute of Molecular Biology in USA. He is the director of Institute for Enzyme Research, Tokushima University. He has published more than 200 papers in reputed journals.