Marie-Eve Laliberté Gagné, J Antivir Antiretrovir 2011, 3:4
doi: http://dx.doi.org/10.4172/1948-5964.S1.16

OMICS Group Conferences
Accelerating Scientific Discovery

International Conference and Exhibition on
VIROLOGY
5-7 September 2011 Baltimore, USA

Improvement of the PapMV nanoparticle adjuvant property through an increase of its avidity for the antigen (Influenza NP)

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The principal caveat of existing influenza vaccine is their failure to provide long-term protection. This lack of efficiency is caused by persistent (drift) and dramatic (shift) antigenic changes on the major surface proteins, the main target of protective immunity generated by traditional vaccines. Alternatively, vaccination with most conserved protein, like the nucleoprotein (NP) can stimulates immunity against multiple serotypes and could potentially provide an extended protection. The NP antigen contains more than 90% protein sequence homology among influenza A isolates and it also contains dominant CTL targets epitopes that made this antigen an attractive target for developing universal vaccine. Like many subunit vaccine, NP protein is a week antigen and need the use of adjuvant to increase its immunogenicity. We have developed an innovative high avidity VLP (HAV) nanoparticle to improve its adjuvant property to the NP antigen. The nanoparticles are derived from Papaya mosaic virus capsid protein (PapMV CP) produced in a bacteria expression system. We generated the HAV by adding an affinity peptide directed to the NP protein at the surface of the VLPs. The fusions of the affinity peptide to PapMV VLPs increased the avidity of PapMV VLPs to NP protein. This modification anhanced the humoral and the cellular response directed to NP. Moreover, the immunity generated by the HAV adjuvanted NP protein vaccine increased the protection of vaccinated mice to a challenge with influenza virus. The protection was dependant of the CD8+ T-cells and was characterized by accelerated virus elimination after the onset of infection, rapid recovery and increase of survival rates.

Biography

Ms Laliberté Gagné has obtained her Master's degree in plant biology from the Infectious Disease Research Center (IDRC) of Laval University in Denis Leclerc's laboratory. She has participated to publication of more than 6 papers in reputed journals.