J Infect Dis Ther 2016, 4:6(Suppl)
http://dx.doi.org/10.4172/2332-0877.C1.015

Evaluation of immunogenic properties recombinant fusion protein 4xM2e-HA influenza A virus expressed in MDCK cell line

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Background & Aim: The recent pandemic swine H1N1 influenza (2009) outbreak demonstrated that egg-based vaccine manufacturing does not adequately respond to pandemic strains. Recent study has established an alternative for subunit vaccine by the use of the recombinant. We try produced universal vaccine 4M2e-HA that can be produced in large scale in reasonable time.

Methods: In this study a recombinant 4xM2e-HA gene of influenza A virus was designed and expressed in MDCK cell which could be secreted out of cells. Immunized mice with this protein induced both humoral and cellular response against influenza A virus.

Result: The immunized mice showed increased immunological indicators such as IFN-γ and IL-2, IL-12, IL-4 and induced suitable CTL response, also antibody against fusion protein can be neutralized both heterologous and homologues influenza virus.

Conclusion: These findings suggest that 4xM2e-rHA expression in MDCK cell may provide a new approach for developing a novel universal vaccine that may protect not only specifically against a new circulating strains but is expected to protect broadly against new virus strains possessing common epitopes with conserved sequences. The 4xM2e-rHA protein is a highly purified single protein that might enhance tolerance against the antigen and allows administration of higher doses and produce stronger immunological response and protection against the mentioned virus.

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Comparison between MDCK and MDCK-SIAT1 cell lines as preferred host for cell culture-based influenza vaccine production

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Increasing demands for seasonal influenza vaccine and the need for faster methods of vaccine production during flu pandemics and the threat posed by highly pathogenic avian influenza viruses, have made cell culture a suitable substrate for influenza vaccine manufacturers. Cell-adapted viruses replicate with high fidelity, which are expected to have potent vaccine immunogenicity. The aim of this study was evaluating MDCK and MDCK-SIAT1 cell lines for their ability to produce the yield of influenza virus. Yields obtained for influenza virus H1N1 grown in MDCK-SIAT1 cell was almost the same level as MDCK; however, H3N2 virus grown in MDCK-SIAT1 showed lower peak of viral titers in comparison with MDCK cells. The optimized MOI to infect the cells on plates and microcarrier was 0.01 and 0.1 for H1N1 and 0.001 and 0.01 for H3N2, respectively. MDCK-SIAT1 cells have the capacity to be considered as an alternative mean to manufacture cell-based flu vaccine, especially for the human strains (H1N1), due to its antigenic stability and high titer of influenza virus production compared to egg inoculation.

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