**INTRODUCTION**

- One billion people become infected with influenza A virus (IAV) every year with 3-5 million cases showing severe disease and approximately 500,000 deaths.
- Seasonal IAV vaccines are designed on mutations in either the haemagglutinin or neuraminidase viral surface proteins.
- IAV vaccines are based on strain prediction that is recommended by the WHO using epidemiology data from the winter season in the opposite hemisphere.
- There is high interest in developing a universal vaccine based on the capability of the conserved IAV proteins to provide immunogenic protection to influenza A infection.
- The ferret is the 'gold standard' small animal model to study IAV infection and is the model of choice to assess seasonal vaccine immunity, which is also a novel area for exploration.
- The macromolecular structure of the 3 influenza A conserved proteins from sub-type A/California/04/09: HA, NA, NP, M1, NS-1, N2, PB1, PB2, and PA.

**AIMS**

- To identify the commonly immunogenic H1N1/ A/California/04/09 virus proteins and peptides that are capable of stimulating an immune response, assessed by interferon gamma (IFN-γ) ELISpot for uninfected, H1N1 and H3N2 ferret groups.

**RESULTS**

- The data reported supports and strengthens the use of the ferret as the ‘gold standard’ small animal for study IAV disease.

**DISCUSSION**

- To study peptide sequences and map epitope in greater depth by studying cell-mediated immunity and characterization of the adaptive immune response to the antigens identified from this research.
- To design, characterize and develop MVA constructs of the most immunogenic proteins NP, M1 and NS-1.
- To deliver MVA constructs expressing immunogenic IAV proteins to study cellular immunity in the lower respiratory tract (the lung) using the ferret model.
- To develop new immunological tests and identify new biomarkers of IAV disease and assess their role in IAV infection.

**REFERENCES**


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