MONASH University

Targeted antigen delivery approach for vaccine

THERAPEUTIC: Preventative & therapeutic vaccine

Product Type	Monoclonal antibody (anti-Clec9A) conjugated with antigen
Indication	Cancer, Infectious Disease
Target	Clec9A
Development Stage	Pre-clinical validation: humanised antibody in development.
Brief Description & Differentiation	Clec9A is selectively expressed by cDC1, the dendritic cell population with cross-presentation ability. We have designed a novel immunisation strategy utilizing anti-Clec9A antibody conjugated with antigen (Figure 1), which elicits very potent antigen-specific T cell and B cell immune responses. Compared to a competing technology targeting DEC205, our approach induces superior (25-fold better) antibody responses. Targeted antigen delivery via Clec9A offers the following benefits: • Strong humoral response can be elicited, even without the use of adjuvant • Robust CD8 T cell response as a result of antigen cross-presentation; adjuvant required, e.g. poly I:C • Ideal for delivery of antigens with low immunogenicity, e.g. M2e for universal influenza vaccine • Strong dose sparing effect • Simplified vaccination regime, as fewer immunisations are needed
Research Team	Associate Professors Mireille Lahoud and Irina Caminschi
Intellectual Property	Patents granted in US, Europe, Australia, Japan and Israel from PCT/AU2008/001294.
Key Publications	Zhang et al., The Dendritic Cell Receptor Clec9A Binds Damaged Cells via Exposed Actin Filaments. *Immunity (2012) 36 (4): 646–657.* Lahoud et al., Targeting antigen to mouse dendritic cells via Clec9A induces potent CD4 T cell responses biased toward a follicular helper phenotype. *J Immunol (2011) 87(2):842-50.* Caminschi *et al*., The dendritic cell subtype-restricted C-type lectin Clec9A is a target for vaccine enhancement. *Blood (2008) 112 (8): 3264–3273*
Future	A humanised anti-Clec9A antibody is currently under development. Further pre-clinical validation is needed. Disease areas under investigation: solid tumour, multiple infectious diseases (including COVID-19).

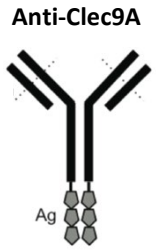

Figure 1: Antibody conjugate scheme showing anti-Clec9A antibody is conjugated with antigens at the Fc region.

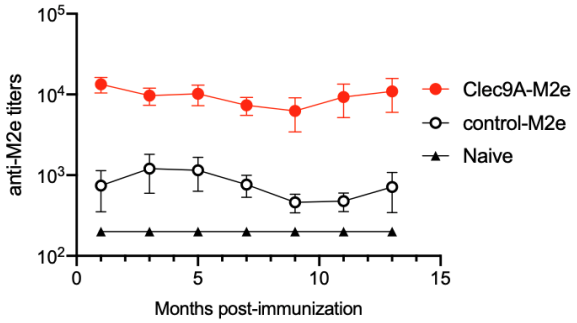

Figure 2: Long term antibody responses elicited by Clec9A targeting of influenza antigen M2e, with a single dose of 2 micrograms of construct, in mouse models