



Infectious
Diseases Labs

A*STAR IDL



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Monday 5th Jan 2026

10:00 AM to 11:00 AM (SGT)

Venue: Codon A & B, Matrix Level 5

A temporal and spatial framework for vaccine design

Control over when and where vaccines deliver antigen and adjuvant signals profoundly shapes the magnitude, quality, and durability of protective immunity. This seminar will highlight two complementary approaches - temporal dosing optimization and mucosal boosting - that together can inform the design of next-generation vaccines.

Firstly, “extended prime” immunizations that prolong initial antigen exposure enhance humoral immune responses to a variety of subunit vaccines. We show that a simplified two-dose extended prime regimen, timed to synchronize with the germinal center (GC) reaction, can amplify humoral responses. Computational modeling of the GC response suggested that this is mediated by antigen delivered in the second dose being captured as immune complexes in follicles, an effect that can be amplified by prolonged antigen exposure in the second dose administration, predictions we verified experimentally.

Next, we introduce Bioactive Enhanced Adjuvant Chemokine Oligonucleotide Nanoparticles (BEACON) as a mucosal adjuvant for vaccination against herpes simplex virus (HSV). Following systemic priming, mucosal boosting with BEACON and HSV glycoproteins increased vaginal CD8⁺ tissue-resident memory T cells and mucosal IgG and IgA responses, while inducing minimal vaginal inflammation. This strategy conferred superior protection when compared with intramuscular boosting, reducing disease severity and suppressing viral load in vaginal mucosa and dorsal root ganglia.

Together, these findings illustrate how temporal and spatial modulation of vaccination can amplify systemic and mucosal immunity, providing a blueprint for vaccines against infectious diseases and cancer.

Hosted by: Dr Low Jun Siong

Seminar is open to all. No registration required.

Questions? Contact us at seminars@idlabs.a-star.edu.sg

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