Guest Speaker: Daniel Bader
Affiliation: Ward lab, Scripps Research Institute, San Diego, USA
Date: 22 August 2024
Time: 11:00-12:00
Venue: 07-15-92

The Novo Nordisk Foundation
Initiative for Vaccines and Immunity

Title: Antibody Germline Targeting Vaccine Design

Join NIVI for a guest presentation by Daniel Bader, a graduate researcher in Andrew Ward's lab at the Scripps Institute. Daniel specializes in vaccine design using germline-targeting strategies, a promising approach for inducing broadly neutralizing antibodies (bnAbs) against challenging-to-target epitopes on pathogens including HIV. This innovative strategy aims to stimulate the rare germline B cells capable of maturing into cells that produce bnAbs. Don't miss this opportunity to learn more about a cutting-edge advancement in vaccine science!

Abstract: Novel tools for structural and immunogenetic characterization of humoral immunity against invading pathogens have enabled the visualization of Ab-antigen interactions at unprecedented resolution. Although the human Ab repertoire displays a large conformational and genetic diversity to recognize diverse antigens recent observations indicate that key neutralization epitopes on viral antigens are preferentially engaged by specific amino acid motifs encoded in heavy- and light-chain germline gene segments. Germline targeting (GT) vaccine methodology harnesses such structurally and immunogenetically-defined paratope motifs to engineer immunogens that selectively activate unique B cell receptors with specific features required for protection against invading pathogens. This method is particularly attractive to design an efficacious vaccine against HIV-1 because the precursor frequency of broadly-neutralizing antibodies (bnAbs) in the human antibody repertoire is remarkably rare. VRC01-class bnAbs target the CD4-binding site on HIV-1 Env glycoprotein in a VH-dependent manner and are attractive targets for HIV GT vaccine design because they (1) are highly broad and potent, (2) use common heavy- and light-chain genes, (3) do not require specific V(D)J recombination, (4) have relatively high precursor frequency in humans. The G001 clinical trial provided proof-of-concept in humans that eOD-GT8 60-mer nanoparticle engineered for high affinity against a pool of VRC01-class bnAb precursors with the potential to become broadly-protective antibodies are capable to activate specific BCRs, promote clonal expansion of VRC01-class lineages and drive early affinity maturation towards VRC01-class bnAbs. More recently, HCDR3-dependent precursors for diverse types of broadly-neutralizing antibodies targeting the MPER, V2-Apex and N332-glycan neutralization epitopes on the HIV-1 Env glycoprotein have been successfully primed in pre-clinical studies which highlights the potential of this rational vaccinology approach to

develop more effective precision vaccines against challenging pathogens that have evolved unique mechanisms to evade immune responses.

Any questions please contact Kara Aves (kara-lee@sund.ku.dk)