GRADUATE STUDENT SEMINAR

Assessment of *P. falciparum* SLTRiP Immunogenicity and Identification of Protective and Immunodominant T-Cell Epitopes

Malaria continues to be one of the top causes for the morbidities worldwide due to emergence of drug-resistant Plasmodium strains, and lack of a highly efficacious vaccine. We aim to address this gap by evaluating novel antigens, that trigger robust and long-lasting immune responses. Previous work by our group led to the identification of a novel antigen SLTRiP (Sporozoite and Liver Stage Tryptophan-Rich Protein) which is expressed exclusively during pre-erythrocytic stage. SLTRiP contains PEXEL motifswhich enable this protein to be exported into host hepatocytes. In a murine model, immunization with SLTRiP led to reduction in liver-stage parasite burden,and delayed onset of parasitaemia by four days, thus proving strong protective efficacy. This study aims to determine the protective and immunogenic potential of P. falciparum SLTRiP and further identifying the immunodominant T-cell epitopes. SLTRiP holds strong promise as a vaccine candidate, and it could be strategically combined with other stage specific malaria antigens to enhance immunogenicity and broaden protective coverage in next generation multi-antigen vaccine platforms.

Neha Gupta

Infectious Diseases Laboratory

4:00 PM | THURSDAY | 12 JUNE 2025

AUDITORIUM, NII

GRADUATE STUDENT SEMINAR

Understanding the Role of Interferon Regulatory Factors in Dendritic Cell Biology

Dendritic cells (DCs) are central to initiating and shaping immune responses, and their development is tightly regulated by transcription factors belonging to the Interferon Regulatory Factor (IRF) family. The transcriptional activity of IRFs is modulated by interaction with partner proteins through the IRF Association Domain (IAD). These protein–protein interactions are essential for the transcriptional programs that drive DC differentiation and function. The critical importance of these interactions is evident from natural mutations in the IRF8 IAD-region, identified in mouse as well as human populations, leading to impaired development of specific DC subsets and resulting in severe immunodeficiencies. Such observations underscore the role of IRF8 as a central regulator of immune cell fate decisions, acting through dynamic interactions with co-factors to control gene expression. Understanding the IRF8 interaction network is key to deciphering the transcriptional regulation of cell fate decisions and innate immunity.

Anshul Kushwaha

Lab of Innate Immunity

4:30 PM | THURSDAY | 12 JUNE 2025

AUDITORIUM, NII

GRADUATE STUDENT SEMINAR

Understanding the Role of Osteocalcin in maintaining Blood Brain Barrier Integrity and Preventing Neuroinflammation in Alzheimer`s Disease

The disruption of the blood-brain barrier (BBB) is a central event in the pathology of many neurological and chronic disorders, including Alzheimer's disease (AD). Despite its critical role, there is currently no safe and effective treatment to prevent or repair BBB damage. Research has mostly focused on how BBB is disrupted to aid drug delivery, rather than how its integrity is naturally maintained. Our study describes how bone—the body's only mechanosensing organ—helps preserve BBB integrity through the secretion of osteocalcin (OC). OC levels decline with age and poor bone health, correlating with increased BBB breach. Using an AD mouse model, we observed age-dependent changes in BBB function, cognition, and bone health. Remarkably, OC treatment not only improved cognitive and skeletal outcomes but also restored BBB integrity and protected the brain from acute LPS-induced shock. This work highlights a novel bone-brain axis essential for maintaining brain homeostasis.

Rakhi Panwar

Molecular Science Lab

5:00 PM | THURSDAY | 12 JUNE 2025

AUDITORIUM, NII