Tata Institute of Fundamental Research
Survey No. 36/P, Gopanpally Village, Serilingampally, Ranga Reddy Dist., Hyderabad - 500107

Internal Seminar

Understanding T cell receptor assembly and signalling using molecular dynamics simulations

Namita Dube

University of Cambridge, UK

The T cell receptor (TCR) together with an accessory cluster of differentiation 3 (CD3) molecules form the TCR complex and are key components in the function of T cells and adaptive immunity. The mechanisms of assembly, activation and immunosuppression of the TCR signalling pathway are not fully understood. This study uses all-atom molecular dynamics (MD), coarse-grained (CG) MD, replica exchange MD (REMD) and free energy perturbation (FEP) simulation approaches to characterise the structural and dynamic behaviour of the TCR complex in a membrane environment. Through this study, I was able to propose an updated model for the association of the TCR-associated trimers within the lipid membrane in which the local environment plays a key role; uncovered details of the contribution of particular amino acids to intramembrane and inter-peptide interactions that are important for the HIV immunosuppressive; and finally, this study was able to shed some light on the mechanism of dissociation of ITAM, where multiple factors were found to be the cause of dissociation, including phosphorylation of tyrosines, neutralisation of lipid negative charge by ions and reduction of acidic lipid concentrations.

Tuesday, May 29th 2018

2:30 PM (Tea/Coffee at 2:00 PM)

Seminar Hall, TIFR-H