REGIONAL CENTRE FOR BIOTECHNOLOGY
Seminar series

Insight into Structure and Versatility of the Transport Channel of the Nuclear Pore Complex

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The nuclear pore complex (NPC) houses the largest and most versatile transport channel of eukaryotic cell, which mediates bidirectional nucleo-cytoplasmic transport. It is thought to be made up of three nucleoporins (nups), Nup54, Nup58 and Nup62, however the structure and composition of transport channel remained elusive. Based on the crystal structures of the interacting domains between these nups and supporting data, the molecular architecture of the mammalian transport channel is assembled. The salient features of the channel are: its highly flexible Nup54•Nup58 mid-plane ring which can undergo large-scale structural rearrangements to yield a diameter changes from ~20 to 40 nm, representing minimally and maximally active states, respectively. The channel is composed of 224 molecules of Nup62, Nup54 and Nup58 and amounts to a molar mass as much as to 12.3 MDa. Additionally, molecular consequences of a genetic mutation in Nup62 that cause infantile bilateral striatal necrosis are established. In summary, a structural basis for the architecture and versatile transport function of the NPC central channel will be presented.