



REGIONAL CENTRE FOR BIOTECHNOLOGY
Seminar series

**Molecular Genetic Regulation of
Synaptic Structure and Function**

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2:00 PM
Seminar Room

Abstract

The synapses that neurons make with each other form the cellular basis of complex processes, such as thinking and learning. A large number of studies have been done to study the molecular pathways responsible for synapse development, structure and function in a complex brain. We have utilized the powerful genetic tool of *Drosophila melanogaster* neuromuscular junction synapses, which like mammalian central synapses, are glutamatergic in nature.

I will present some of my data showing how we used a forward genetics screen to find two novel genes that affect synaptic structure and function. Mutation in *tuberous sclerosis 2 (tsc2)* gene leads increase in number of synapses and reduces the probability of neurotransmitter release per synapse. Using elegant genetics and molecular tools, we show that TSC2 functions via TORC2/AKT pathway to restrict the size of the synaptic terminus.

Mutation in protein kinase CK2 leads to accumulations of presynaptic active zone proteins in the axons. Ruling out the possibility of axonal transport defect, we show that CK2 is a novel regulator of transcription of active zone proteins with important functional implications that will be discussed during the presentation.

In the end I will then present how I will use my expertise and experience to address some of the outstanding questions in the field.
