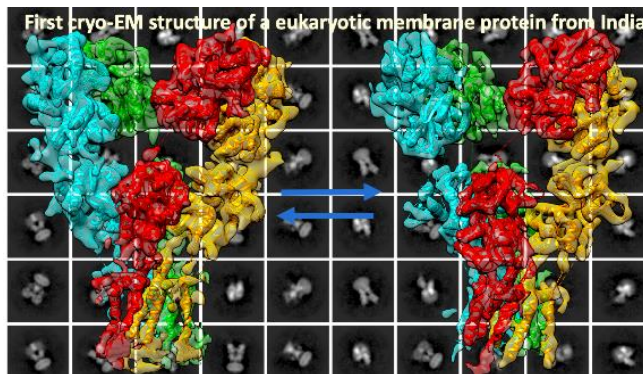


Brain receptor "dance" is tuned by sugars present on its surface

By Dr. Bilqeesa Bhat

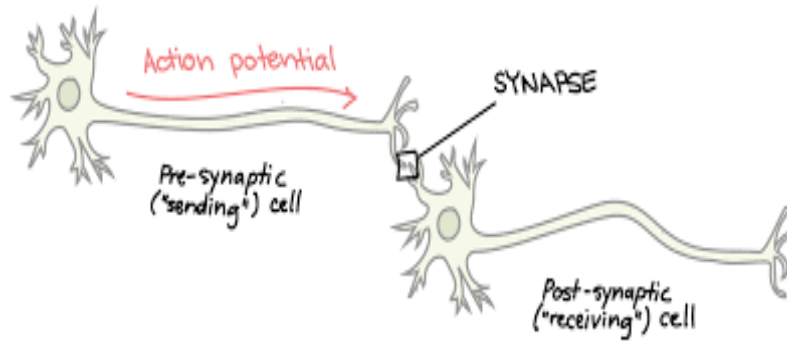
Scientists at National Centre for Cell Science (NCCS), Pune have studied a protein with help of Cryogenic electron microscopy (cryo-EM) and provided first 3D view of the GluK3 receptors, an important cell receptor that helps nerve cells to communicate with each other. Scientists showed that sugar molecules present on the receptor surface tune the crucial brain signals carried out of this receptors. It is considered probably to be the first Cryo-EM based structure determination study of the eukaryotic membrane protein.



Schematic representation of the receptor in two states of its activity, and the sugar chains present on its surface that tune its properties are shown by red lines

The study has successfully captured the receptor in two different states of its back-and-forth motions (gating cycle) and determined their structure via high-powered electron microscopy. The valuable structural information showed that sugar chains present on GluK3 receptors helps its various regions to interact with each other. The comparison and analysis of the structures revealed the various movements (dance) of the receptor responsible for its functions.

Most of the neurological disorders are caused by dysfunction of receptors which plays a crucial role in synaptic transmission. One such important receptor is GluK3, which is located at the pre (sending neuron) and post synapse (of receiving neuron). Research team tried to understand the ability of GluK3 to influence signal transmission across the synapse.



GluK3 receptors belong to the family of glutamate receptor ion channels which plays critical role in normal functioning of brain. Furthermore, this receptor is also involved in high cognitive functions, including learning and memory and any abnormality in the protein will lead to development of disorders such as Alzheimer's, Parkinson's, epilepsy, schizophrenia, etc.

An understanding about the functioning of the GluK3 receptor is of utmost importance to researchers. The 3D structure of receptor has made it possible to understand how this receptor works. Furthermore, its structural understanding will help in researchers to develop drugs to combat such neurological diseases. Research was supported by India Alliance and DBT, New Delhi and the results were published in *Scientific Reports*.