The First 3-D Model of GluD1 Receptor

April 28, 2020

Context: National Centre for Cell Science (NCCS) researchers have captured the first three dimensional views of the GluD1-subtype glutamate receptor

- GluD1 receptors in the brain play crucial roles in motor coordination and motor learning, high-frequency hearing and are also key to many other brain functions.
- They are linked to social and cognitive deficits and to neuronal disorders like schizophrenia and cocaine addiction.
- Majority (~60%) of excitatory brain signalling is carried out by glutamate receptor ion channels. These receptors form cornerstones of a multitude of high cognitive functions, including learning and memory.
- Domain organization of GluD1 receptors distinct from that observed in other members of the glutamate receptor family highlights the fact that not all glutamate receptor ion channels are built the same and gives insights into molecular underpinnings of receptor functions
- These receptors are not activated by neurotransmitter glutamate binding.The current discovery offers clues into the structural differences that might be responsible for this inactivity and the unique functions of the GluD1 receptors/‘orphan delta receptors.
- Understanding these processes will impact future studies on glutamate receptor signaling in neurodegenerative diseases as well as drug design

Other

- The 3D view was obtained using cryo-electron microscopy,

a revolutionary technique that images several thousand molecules in a frozen state and combines the 2D images generated to build a 3D view. This was awarded a nobel prize in 2017

- The National Centre for Cell Science (NCCS), an autonomous organisation aided by the Department of Biotechnology, Government of India, was established to facilitate cell biology research in the country. Located in Pune