EXTERNAL SEMINAR

INMED Conference Room

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Invited by: Alfonso REPRESA

Neuroglial Interactions in Cerebral Physiopathology
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Unraveling the role of astroglial perisynaptic processes in synaptic strength and memory

Astrocytes play active roles in brain physiology by dynamic interactions with neurons. The modalities of such interactions remain nevertheless elusive. Connexins, the gap-junction subunits, are thought to be involved in behavioral and basic cognitive processes. However, the underlying cellular and molecular mechanisms are unclear. In this talk, I will present data showing that connexin 30, one of the two-astroglial gap junction protein, controls hippocampal excitatory synaptic transmission through modulation of astroglial glutamate transport, which directly alters synaptic glutamate levels. Unexpectedly, we found that connexin 30 regulated cell adhesion and migration and that connexin 30 modulation of glutamate transport, occurring independently of its classic channel function, was mediated by unprecedented morphological changes controlling insertion of astroglial perisynaptic processes into synaptic clefts. By setting excitatory synaptic strength, connexin 30 plays an important role in long-term synaptic plasticity and in hippocampus-based contextual memory. Taken together, these results establish connexins as critical regulators of synaptic strength by controlling the synaptic location of fine astroglial processes.

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