



## Seminari extraordinari

# “Electrical synapses and their interactions with chemical synapses”

Professor Alberto Pereda

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Dia: 15 de març.  
Hora: 11 del matí.  
Lloc: Sala d'actes del Pavelló de Govern.  
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Professor Pereda is interested in the properties and dynamics of gap junction-mediated electrical transmission in the vertebrate brain. Because perhaps of the relative simplicity of transmission, electrical synapses are generally perceived as passive intercellular channels that lack dynamic control. While the study of plasticity of chemical synapses has long been an area of primary interest to neuroscientists, less is known about the modifiability of electrical synapses.

His current work focuses on the mechanisms underlying activity-dependent changes in electrical synapses by investigating:

- Their functional relationship with glutamate receptors.
- Their interaction with the dopaminergic and endocannabinoid systems.
- The molecular mechanisms responsible for changes in the strength of electrical transmission, in particular the role of trafficking of gap junction channels and interactions with connexin-associated regulatory proteins.
- Interactions between intrinsic membrane properties and gap junctional conductance, as a mechanism for the control of the synaptic strength.

Thus, while focusing in the properties of electrical synapses, the research of his laboratory explores the complexity of synaptic transmission and signaling mechanisms in general.

1: Pereda AE. *The Variable Strength of Electrical Synapses*. *Neuron*. 2016 Jun 1;90(5):912-4. doi: 10.1016/j.neuron.2016.05.031.

2: Pereda AE. *Developmental functions of electrical synapses*. *J Physiol*. 2016 ,594(10):2561-doi: 10.1113/JP272361. PubMed PMID: 27173021.

3: Nagy JI, Pereda AE, Rash JE. *On the occurrence and enigmatic functions of mixed (chemical plus electrical) synapses in the mammalian CNS*. *Neurosci Lett*. 2017 Sep 11. pii: S0304-3940(17)30755-3. doi: 10.1016/j.neulet.2017.09.021.

4: Pereda AE. *Electrical synapses and their functional interactions with chemical synapses*. *Nat Rev Neurosci*. 2014 Apr;15(4):250-63. doi: 10.1038/nrn3708.

5: Pereda AE. *Neurobiology: all synapses are created equal*. *Curr Biol*. 2015 Jan 5;25(1):R38-41. doi: 10.1016/j.cub.2014.11.029.

