INSTITUT PARIS DESCARTES NEUROSCIENCES COGNITION

FÉDÉRATION DE RECHERCHE EN NEUROSCIENCES

Neuroscience Seminar Series

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Salle des Conférences (R229)
Centre Universitaire des Saints-Pères
45 rue des Saints-Pères, 75006 Paris

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Inhibition vs excitation: subthreshold mechanisms regulating cerebellar cortical output *in vivo*.

The cerebellum is important for the coordination and control of complex motor movements, balance, posture and locomotion. In order to play this vital role, the cerebellum – and in particular the spinocerebellum - continuously samples sensory feedback from the periphery and descending cortical information to generate output signals that precisely control muscle movements. The activity of Purkinje cells – which provide the sole output signal from the cerebellar cortex – is governed by the balance of feedforward excitation and inhibition. Although decades of work have provided us with an in-depth understanding of how excitatory and inhibitory synaptic input can influence the firing patterns of Purkinje cells, how these signals interact to produce behaviourally-relevant output spike patterns *in vivo* has not been fully explored. To address this issue, we performed patch-clamp recordings from cerebellar Purkinje cells (dendritic and somatic), molecular layer interneurons and cerebellar granule cells in lobule V of awake, head-restrained mice during self-paced, voluntary locomotion. By optogentically manipulating the balance between feedforward excitation and inhibition we have generated new insights into the subthreshold mechanisms that govern Purkinje cell spike output during motor behaviour.

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