Cerebro-Cerebellar Interplay and Cognition

Organizers:
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Over the past few decades, brain imaging and lesion studies have contributed to substantially extend the role of the cerebellum beyond motor control and coordination. Cerebellar involvement in attention, working memory, language but also visual perception and emotional processing has been demonstrated. However, comprehension of underlying mechanisms remains limited. With the recent advent of sophisticated techniques, substantial progress has been achieved in imaging interplay between the cerebellum and cortical areas subserving cognitive function. This symposium intends to bridge the gap between concepts on cognitive processing in the cerebellum and current knowledge on cerebellar connectivity. Novel multimodal evidence from fMRI, DTI, transcranial magnetic stimulation (TMS), resting state and effective connectivity analyses will be presented. A differentiated pattern of cerebellar topography will be extracted from lesion, fMRI as well as structural and functional connectivity data, fostering an ongoing paradigm shift and providing a framework for design and interpretation of future research. Clinical implications will also be highlighted, particularly referring to cerebellar lesions, addiction, autistic spectrum disorders (ASD) and schizophrenia. In summary, the symposium aims at promotion of up to date knowledge of cognitive processing through cerebro-cerebellar interactions. Learning outcomes include better understanding of cerebellar engagement in working memory, action perception and social cognition; corresponding findings on resting state functional and task-dependent effective communication between the cerebellum and the cerebral cortex; and contemporary approaches to investigate cerebro-cerebellar pathways.

Learning Objectives:

1. Understand cerebellar involvement in cognitive processing;
2. Become acquainted with novel concepts on cerebro-cerebellar connectivity; and
3. Integrate the cerebellum in models of cognitive processing and brain circuitries..

Intrinsic Cerebellar Connectivity and Anatomic Correlates
Christophe Habas, Service de Neuro-Imagerie, Centre Hospitalier National d'Ophtalmologie des XV-XX Paris, France

Cerebellar Contributions to Working Memory
Cherie Marvel, PhD, Johns Hopkins University School of Medicine, Neurology, Baltimore, USA

The Cerebellum and Visual Perception of Action
Arseny Sokolov, Département des Neurosciences Cliniques, Centre Hospitalier Universitaire Vaudois (CHUV), Lausanne, Switzerland

Imaging Cerebellar Networks with Tractography
Marco Catani, Institute of Psychiatry - King's College London, London, United Kingdom