

Structure and function : in search for the (neuro)biological foundations of visuomotor space

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In most goal-directed movements, a spatial congruence exists between the source of sensory stimuli and the endpoint of movements toward this source. The physical location of the goal can be viewed as a node between two neural representations, a sensory representation and a motor one. In normal conditions, goal directed movements do not seem to be performed by appending and fusing elementary movement units ; their execution looks ballistic and their temporal course smooth. Goal-directed movements also follow spatial rules such that a sensorimotor mapping exists with a one-to-one correspondence between the sensory and motor representations.

During my talk, I will present results of experiments that were designed to understand the contribution of the cerebellum in the establishment of this sensorimotor mapping. The cerebellum is chosen because its dysfunction leads to severe deficits in movement accuracy. We will focus on the generation of saccadic gaze shifts toward a visual target because of their relative simplicity, and also because these orienting responses are essential movements used by many vertebrates to spatially organize their sensory experience. We will see how the medio-posterior cerebellum helps adjusting the orienting motor system to the structure of the visual system.