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Investigation of sensory interface relaying information from cerebrospinal fluid to motor circuits

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The cerebrospinal fluid (CSF) is a complex solution circulating around the brain and spinal cord. Behavior has long been known to be influenced by the content and flow of the CSF, but the underlying mechanisms are completely unknown. CSF-contacting neurons by their location at the interface with the CSF are in ideal position to sense CSF cues and to relay information to the nervous system. By combining electrophysiology, optogenetics, bioluminescence monitoring with calcium imaging *in vivo*, we demonstrate that neurons contacting the CSF in the spinal cord detect local bending and in turn feedback GABAergic inhibition to multiple interneurons drives locomotion in the ventral spinal cord. Behavior analysis of animals deprived of this mechano-sensory pathway reveals its contribution in modulating frequency and duration of locomotion. Altogether our approach developed in a transparent animal model shed light on a novel pathway enabling sensory motor integration between the CSF and motor circuits in the spinal cord.

Biography

Claire Wyart has completed her PhD in Strasbourg, France and her Postdoctoral Fellowship in UC Berkeley, California, USA. She has trained in neuroscience, physiology and biophysics. She has started her lab in the Brain and Spine Institute in Paris in 2011. Her main interest is to unravel the circuits located in hindbrain and spinal cord that underlie locomotion. In particular, she has developed new optical and ontogenetic technologies to probe the role of sensory feedback during active locomotion.

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