



Zenith

INTERNATIONAL PHD PROGRAM IN NEUROSCIENCE

**WEDNESDAY, 21 APRIL 2021
AT 5:00 PM (CET)**

ROSA COSSART
INMED (INSERM U1249), AIX-MARSEILLE
UNIVERSITY, TURING CENTER FOR LIVING
SYSTEMS, FRANCE



ZENITH SEMINARS

SHEDDING LIGHT ON HUB NEURONS

Structure-function studies of neuronal networks have recently benefited from considerable progress in different areas of investigation. Advances in molecular genetics and imaging have allowed for the dissection of neuronal connectivity with unprecedented detail while *in vivo* recordings are providing much-needed clues as to how sensory, motor and cognitive function is encoded in neuronal firing. However, bridging the gap between the cellular and behavioral levels ultimately requires an understanding of the functional organization of the underlying neuronal circuits. One way to unravel the complexity of neuronal networks is to understand how their connectivity emerges during brain maturation. In this talk, I will present experimental evidence for the existence of hub neurons, cells displaying an exceptionally large connectivity degree, in different cortical regions, *in vitro* as well as *in vivo*. These cells are born the earliest during embryogenesis and critically contribute to the development of cortical circuits. Using a combination of electrophysiology, neurochemical analysis, optogenetic connectivity mapping as well as *ex vivo* and *in vivo* calcium imaging we have tracked the fate of hub neurons. I will show that neurons are specified from birth to ensure unique functions throughout their lifetime.

Rosa Cossart is the Director of the Institute of Mediterranean Neurobiology (INMED), affiliated to INSERM and Aix-Marseille University, a pioneering Institute in the field of Systems Developmental Neuroscience. After graduating in Mathematics and Physics from the Ecole Centrale Paris, she studied the functional rewiring of GABAergic circuits in epilepsy during her PhD with Bernard and Ben-Ari. As a postdoctoral fellow with Pr. Yuste at Columbia University, she pioneered the use of calcium imaging to study cortical circuit function. Her lab made seminal contributions to the understanding of how development scaffolds hippocampal circuits. They discovered “hub cells” and more recently “assemblies” forming the functional building blocks of hippocampal function.

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