Development of neural circuits in the prefrontal cortex

Objective

The prefrontal cortex (PFC) is important for a wide range of cognitive behaviours and is impacted in numerous neuropsychiatric disorders. The PFC is thought to function as a key buffer for working memory, allowing us to store and manipulate information across time. The PFC is therefore critical to our ability to link past and future events. To do this the circuitry of the PFC must sustain task relevant neural activity across the delay period, when information is stored in memory. This process is thought to occur through recurrent networks in the superficial layers of the PFC, however the organization of these circuits remains poorly understood. This proposal will apply cutting edge optogenetic methods to produce dense, single-cell connectivity maps to elucidate the circuit architecture of the mouse PFC, providing insight into the circuit mechanisms that support mnemonic coding. It will also explore the development of this circuit, to better understand how refinement of connectivity gives rise to adolescent enhancement in PFC dependent cognition. These findings will also test key computational predictions into the mechanisms that support delay period activity. They will therefore be of broad interest to cellular, systems, computational and cognitive neuroscientists.

Programme(s)

H2020-EU.1.3.2. - Nurturing excellence by means of cross-border and cross-sector mobility
MSCA-IF-2019 - Individual Fellowships

See other projects for this call

MSCA-IF-EF-RI - RI – Reintegration panel

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