Neuroscience Institute Cavalieri Ottolenghi

NICO

UNIVERSITÀ DEGLI STUDI DI TORINO

FONDAZIONE CAVALIERI OTTOLENGHI

Thursday, 4th June - h 14:00

Seminar room, NICO

DISSECTING ALTERNATIVE PATHWAYS AND FUNCTIONS OF THE microRNA BIOGENESIS MACHINERY IN MAMMALIAN NEUROGENESIS AND NEURODEVELOPMENTAL DISORDERS

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The overarching goal of our research is to understand the role played by microRNAs (miRNAs) in neurogenesis and during neuronal network formation in the mammalian brain. We envision the use miRNAs as a technology to control cell reprogramming and to develop novel RNA-based therapies.

Neurogenesis is the process of new neuron generation through the differentiation of neural stem/progenitors cells. Though the majority of neurons that comprise the mammalian brain are generated during embryonic neurogenesis, some neurogenesis persists throughout life in specific niches of the mammalian brain. Adult neurogenesis may be considered as an intrinsic compensatory response to self-repair the adult nervous system, but it also influences brain functions, such as learning and memory. It therefore follows that understanding the mechanisms controlling neurogenesis may have potential implications for therapeutic development.

miRNAs are small non-coding RNAs with regulatory functions on the majority of target mRNAs, and are rapidly emerging as a new layer of regulation of "virtually all" biological pathways, including neurogenesis. Several studies have elucidated the crucial role(s) of miRNA-guided gene expression in murine embryonic neurogenesis (reviewed in Barca-Mayo and De Pietri Tonelli 2014). However, still very little is known about the specific contribution of miRNAs in adult neurogenesis (in particular in the hippocampal stem cell niche).

Ongoing experiments in our lab aim to dissect alternative pathways and functions of the miRNA biogenesis machinery in physiological and aberrant neurogenesis in the embryonic mouse neocortex, as well as to characterize the role of miRNAs in adult neurogenesis.

Barca-Mayo and De Pietri Tonelli. *Convergent microRNA actions coordinate neocortical development*. Cell Mol Life Sci. (2014) Feb 12.

Host:
Alessandro Vercelli