



Doctorate program  
Milan  
EXPERIMENTAL  
MEDICINE



UNIVERSITÀ  
DEGLI STUDI  
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# D-MEM SEMINAR

## International PhD Program in Experimental Medicine

### ELENA TAVERNA

Neurogenomics Research Center  
Human Technopole, Milan

December 21<sup>st</sup>, 2022 - 4.00 pm  
Aula Magna, LITA Segrate

## OF HUMAN AND APES: STUDYING NEURONS THROUGH THE LENS OF EVOLUTION

Differences in cognitive abilities between humans and non-human primates are thought to depend on greater numbers of neurons and more complex. To study the cellular basis of evolutionary differences, we generated induced excitatory neurons (iNeurons, iNs) from chimpanzee, bonobo, and human stem cells by expressing the transcription factor neurogenin-2 (NGN2). Single-cell RNA sequencing showed that genes involved in dendrite and synapse development are expressed earlier during iNs maturation in the chimpanzee and bonobo than the human iNs. The transcriptional differences result in striking differences in the timing and dynamics of functional maturation. Indeed, chimpanzee and bonobo iNs showed more repetitive action potentials and more spontaneous excitatory activity than human iNs at any time point considered. Our data point to the timing of synapse maturation as a possible driver of functional differences between human and apes' neurons and raise the intriguing possibility that dynamics of maturation might influence overall brain function. We are currently dissecting the cell biological and molecular mechanism underlying delayed maturation, and its possible consequences on cellular and network functions.

**The streamed seminar will be available:**

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