European School of Molecular Medicine

2025 summer call PhD selections

AVAILABLE POSITIONS

Principal Investigator	Elena Taverna
Affiliation	Human Technopole, Milan
Title of the proposed project	Cell biology of brain development
Short description of the project	We study how traffic and glycosylation affect neural stem cell behavior and brain development by merging basic cell biology and robotics for single cell manipulation in brain tissue. To understand how traffic and glycosylation affect brain development, we leverage the genetics of Congenital Disorders of Glycosylation (CDGs), a group of rare diseases where alterations in the function of the secretory pathway is associated with derailed neurodevelopment and subsequent neurological manifestations. The candidate will focus on modeling CDG in a dish using human brain organoids derived from patients' cells.
Main research area for the project	Neurobiology
Second research area for the project	Molecular & Cellular Biology
3 key words for project	Brain development, cell biology, neural stem cells
Main topic/s of the lab	Neuroscience and cell biology
Short description of the lab activity	Our lab is interested in defining the molecular and cell biological logic underlying brain development and evolution. We study the role of intracellular traffic and glycosylation in neural stem cells using iPSCs-derived human brain organoids, where we model diseases of glycosylation at the single cell level. A second avenue of investigation in the lab is the study of synapse evolution in human and apes. By using iPSCs-derived induced neurons we study the mechanisms setting the pace of synapse maturation in humans, and how synapse's maturation dynamics might impact the function of the neuronal network. Our lab is multidisciplinary, and we make use of the mouse, of iPSCs-derived human neurons, neural rosettes and brain organoids. We make extensive use of state-of-the art microscopy techniques, expansion microscopy, biochemistry, RNAsequencing, calcium imaging and functional imaging, electrophysiology and MEA recordings. We also have a custom robot in the lab that we use to trace and reconstruct cellular history in the developing brain.
Recent bibliography	Amin, S. and **Taverna, E.** (2025) Vesicular trafficking and cell-cell communication in neurodevelopment and neurodegeneration. ***Frontiers Cell and Dev. Biol.*** doi 10.3389/fcell.2025.1600034 Polenghi, M. and **Taverna, E.** (2023) Intracellular traffic and polarity in brain development. ***Front. Neurosci***. Schörnig, M., Ju, X., Fast, L., Weigert, A., Schaffer, T., Ebert, S., Treutlein, B., Kasri, N.N., Peter, B., Hevers, W. and **Taverna, E**. (2021) Comparison of induced neurons reveals slower structural

	and functional maturation in humans than in apes, **Elife**, Jan 20;10:e59323 Shull, G., Haffner, C., Huttner, W.B., Kodandaramaiah, S.B. and **Taverna, E.** (2019)Robotic platform for microinjection into single cells in intact tissue. **EMBO Reports**, e47880. doi: 10.15252/embr.201947880. **Taverna*, E.**, Mora-Bermúdez, F., Strzyz, P.J., Florio, M., Icha, J., Haffner, C., Norden, C., Wilsch-Bräuninger, M. and Huttner, W.B.* (2016) Non-canonical features of the Golgi apparatus in bipolar epithelial neural stem cells. Sci. Reports. Feb 16; 6:2120
Group composition	We are a total of 9 people: 1 PI, 1 Lab Technician, 1 PostDoc, 4 PhD students, 1 postgrad fellow, 1 master student
Institutional page link	https://humantechnopole.it/en/
Lab website link	https://humantechnopole.it/en/research-groups/taverna-group/
Social media links	https://www.linkedin.com/in/elena-taverna-stemcellsmeetrobotics/