European School of Molecular Medicine

2025 summer call PhD selections

AVAILABLE POSITIONS

Principal Investigator	Nereo Kalebic
Affiliation	Human Technopole, Milan
Title of the proposed project:	Role of the morphology of neural progenitor cells during brain development
Short description of the project	he focus of project is the interplay between cellular morphology and function during neurodevelopment. The first aim will be the dissection of the molecular mechanisms underlying the establishment of the correct morphology of neural progenitor cells during brain development. The project will further examine how the progenitor morphology is linked to the functional behaviors of these cells, whose alterations can be eventually linked to neurodevelopmental diseases. To address these questions the PhD candidate will employ both human cortical organoids and animal model systems. The study will further involve various techniques in genomics (single cell RNA sequencing, spatial transcriptomics), advanced microscopy techniques (including live imaging) and functional assays. Results will be analyzed by a combination of advanced image and omics analysis approaches.
Main research area for the project	Neurobiology
Second research area for the project	
3 key words for project:	Cortical development; Neural stem and progenitor cells; Brain evolution
Main topic/s of the lab	Developmental neurobiology (cortical development, cortical evolution, neurodevelopmental disorders) and Neuro-oncology (brain tumors)
Short description of the lab activity	The research of the Kalebic Group focuses on the molecular and cell biological mechanisms underlying human neocortical development and its implications for neurodevelopmental disorders and brain cancers. In the context of neurodevelopment, we are studying molecular and cellular characteristics of neural stem cells whose impairment results in an alteration of the neocortical size and shape, which can lead to intellectual disabilities, such as Down syndrome. In the context of brain cancers, we are interested in the molecular and cell biology of glioblastoma stem cells to identify new targets associated with the cancer invasiveness and chemoresistance.
Recent bibliography	1. Kalebic N, Gilardi C, Stepien B, Wilsch-Brauninger M, Long K, Namba T, Florio M, Langen B, Lombardot B, Shevchenko A, Kilimann M, Kawasaki H, Wimberger P & Huttner WB. Neocortical expansion due to increased proliferation of basal progenitors is linked to changes in their morphology. Cell Stem Cell, 2019, DOI: 10.1016/j.stem.2019.02.017. 2. Kalebic N & Huttner WB. Basal progenitor morphology and neocortex evolution. Trends in Neurosciences, 2020, DOI: 10.1016/j.tins.2020.07.009 3. Kalebic N & Namba T. Inheritance and flexibility of cell polarity - a clue for understanding human brain

	development and evolution. Development, 2021, DOI:10.1242/dev.199417. 4. Barelli C, Kaluthantrige Don F, Iannuzzi RM, Faletti S, Bertani I, Osei I, Sorrentino S, Villa G, Sokolova V, Campione A, Minotti MR, Sicuri GM, Stefini R, Iorio F, Kalebic N. Morphoregulatory ADD3 underlies glioblastoma growth and formation of tumor-tumor connections. Life Sci Alliance, 2024 DOI: 10.26508/lsa.202402823 5. Ossola C, Cokorac N, Faletti S, Capra E, Bertani I, Ambrosini C, Faga G, Kalebic N. Adducins regulate morphology and fate of neural progenitors during neocortical neurogenesis. BioRxiv, 2024 DOI: 10.1101/2024.11.08.622634
Group composition	10 (2 postdocs, 3 PhD students, 3 postgraduate fellows, 1 senior technician, 1 clinician scientific visitor)
Institutional page link	https://humantechnopole.it/en/research-groups/kalebic-group/