

2-year Post Doc position @ the Pasteur Institute

**Assessing the Presence and Functionality of Tunneling Nanotubes in Zebrafish embryos**

**Project summary**

Tunneling Nanotubes (TNTs) are a cell-to-cell communication mechanism allowing the direct transfer of cargoes (organelles, viruses, proteins, RNAs, ions) between cells in culture. The Zurzolo lab has pioneered the TNT field and shown that TNTs play a major role in the spreading of amyloid proteins between neurons. Emerging physiological evidence supports our hypothesis that TNT-like connections exist during embryonic development and could play a fundamental role in the exchange of materials between distant cells, thereby determining cell synchronization, positioning and fate in the embryo.

Here we will employ cutting- edge interdisciplinary approaches (machine learning, high-resolution live & EM imaging, cell/molecular/structural/computational biology) to demonstrate TNT existence in vivo during development in zebrafish.

The post-doc will benefit from the interdisciplinary environment of the Pasteur Institute in Paris: he/she will use microinjection and transplantation techniques to create cell mosaics, in which will be possible to distinguish two cell populations. Live- and fixed-cell confocal fluorescence microscopy will be used to visualize TNTs and the transfer of mitochondria at the gastrula stage between donor cells bearing labelled mitochondria and acceptor cells labelled with a fluorescent plasma membrane construct. Furthermore, the successful candidate will have the opportunity to spend some weeks at the Janelia laboratory in the US, as the project has been approved for the use of the new AO-LLSM imaging system in the Spring/Summer 2022.

Molecular candidates responsible for TNT formation will be characterized in vivo by using gene-editing tools (over-expression, Morpholino KD, CRISPR), and analyzed by the cargo transfer assay described above. We will focus on actin modifiers (e.g., EPS8, the Wnt pathway) and Rab proteins already shown to have a role in TNTs in cell models.

Finally, we will adapt the CLEM and FIB-SEM approaches we recently established in cell culture and use the new TITAN-cryo at Institut Pasteur to reveal the ultrastructure of TNTs in the embryo.

**Desired skills**

We are seeking to hire outstanding, enthusiastic and autonomous postdoctoral scientist eager to work on an interdisciplinary project. Experience in zebrafish, confocal microscopy and image analysis as well as a developmental biology background will be very useful.

**Further information**

The position is open immediately and is funded for two years (possibly extensible) by the Equipe FRM granted to Prof. Chiara Zurzolo. Candidates should apply by sending a CV, a motivation letter as well as the name and contact details of at least two academic references to chiara.zurzolo@pasteur.fr

Lab full link &publications: https://research.pasteur.fr/en/team/membrane-traffic-and-pathogenesis/