Master Biologie Moléculaire et Cellulaire 'BMC',
Université Paris Cité - *UFR Sciences du Vivant*

Parcours : **Biologie et Développement Cellulaires 'BDC'**
https://master2bdc.ijm.fr/
Fiche de Projet de Stage de M2, 2024-2025

Unité INSERM ou CNRS ou Université : **Institut Pasteur -CNRS UMR3691** **Intitulé Equipe : Trafic Membranaire et Division Cellulaire** **ED d'appartenance : Complexité du Vivant** **Responsable de l'Equipe : Arnaud Echard**	**Responsable du Stage : Neetu Gupta-Rossi** **Contacts** Adresse : Institut Pasteur 28, rue du Dr. Roux, 75015 Paris Email : neetu.gupta@pasteur.fr Tel : 01 40 61 37 44

Titre du projet : Post-mitotic role(s) of cytokinetic midbody remnants on cell proliferation and stemness

Résumé du Projet de Stage (en 300 mots maximum, mots clés en gras)

Cytokinesis, the last step of cell division is highly relevant in cancer biology, since cytokinesis defects lead to genetically unstable tetraploid cells. The midbody is present at the middle of the intercellular bridge separating the daughter cells. This scaffold recruits proteins essential for abscission and can be released at the end of cytokinesis, as a midbody remnant (MBR).
Recently the MBR, has gained new interest as its accumulation was correlated with **cancer** and **stemness**. Curiously, cells do not accumulate MBRs to the same extent, according to their cell type. Indeed, some shed them in the media while others interact and engulf and degrade them. In order to explain why proliferating cells accumulate MBRs, it has been proposed that MBRs could act as a signaling platform, inducing proliferation in the recipient cells. Do the MBRs help cell proliferation and survival? Can they govern cell lineage commitment besides their role as the abscission platform?
The potential function of MBRs on cells has been suspected but no direct studies have associated MBR accumulation and cell growth. We and others have results suggesting a link between MBR accumulation and **cell proliferation**. Recent studies reveal MBRs acting as Extracellular organelles that carry mRNA with localized translation.
We have set up an original MBR purification strategy and identified their full proteome in cancer cells and liver progenitors (Addi et al, Nat. Comm. 2020). The aim of the study is to prospect the post-mitotic roles of the MBR on mammalian **liver cell progenitors**. The effect of MBRs on cell proliferation and anchorage independent growth will be assessed. With the data from the proteomics studies (https://flemmingsome.pasteur.cloud/; Addi et al. 2020; and unpublished new data) the perspective of this research project aims at identifying potential candidate proteins that may act through midbodies on cell fate, proliferation, differentiation.

Publications de l'équipe relatives au projet de stage (max 5)

1. Advedissian T, Frémont S, Echard A, Nat Commun. 2024 doi: 10.1038/s41467-024-46062-9.
2. Andrade V, Bai J, **Gupta-Rossi N**, et al, Sci Adv. 2022 doi: 10.1126/sciadv.abm5095.
3. Presle A, …, **Gupta-Rossi N***, Echard A* Curr Biol. 2021 doi: 10.1016/j.cub.2021.02.039
4. Addi C, Presle A, … **Gupta-Rossi N***, Echard A* Nat Commun. 2020 doi: 10.1038/s41467-020-15205-z

(*) Equal contribution.

See also https://research.pasteur.fr/en/team/membrane-traffic-and-cell-division/