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

Parcours : **Biologie et Développement Cellulaires 'BDC'**
http://www.master2bdc.fr/
Fiche de Projet de Stage de M2, 2022-2023

Unité INSERM ou CNRS ou Université : **UMR 7592/ Institut Jacques Monod** **Intitulé Equipe :** Membrane Dynamics and Intracellular Trafficking **ED d'appartenance :** BioSPC **Responsables de l'Equipe : Catherine Jackson et Jean-Marc Verbavatz**	**Responsable du Stage : Véronique Proux-Gillardeaux** **Contacts** Adresse : Institut Jacques Monod CNRS UMR7592 15 rue Hélène Brion 75205 Paris Cedex 13 Email : veronique.proux@ijm.fr Tel : 0157278106

Titre du projet : Role of contact sites in epithelial cell polarity

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

Cell polarity is essential for many physiological processes, including the formation and maintenance of a barrier within an epithelium. In epithelial cells, this polarity involves apico-basal organization of cellular components, organelles, plasma membrane components and intracellular trafficking. Deregulation of these mechanisms has been implicated in various pathologies including cancer. Recently, in addition to traditional vesicular trafficking, the exchange of molecules such as lipids at membrane contact sites (MCSs) has emerged as a crucial process regulating cellular organization, including the lipid and protein identity of individual cellular compartments. MCSs are defined as locations where the membranes of two organelles are apposed at a distance of 10 to 30 nm without membrane fusion allowing direct lipid exchanges by lipid transfer proteins (LTPs). These exchanges contribute to cell membrane identity, in particular via the regulation of their phosphoinositides (PIs). In polarised epithelial cells, PIP3 for example is located exclusively at the basolateral membrane. Thus, lipids distribution implicates the MCSs. However, the role of lipid transfer at MCSs in cell polarity has never been studied. MCSs result from the assembly of molecular complexes between membranes of two compartments often including the endoplasmic reticulum. In particular, we will focus our analysis on the endoplasmic reticulum-localized VAPA and the lipid transfer protein ORP3, which are major players at MCS between the endoplasmic reticulum and the plasma membrane, and between membranes of the endoplasmic reticulum and other intracellular compartments.

Our goal is to study the role of contact sites in establishing and maintaining epithelial cell polarity. For this purpose, we will use biochemical approaches, cell biology, light and electron microscopy (including live cell imaging and correlative approaches), in close collaboration with the Imaging and Proteomics platforms of the Institut Jacques Monod.

Mots clefs : Cell Polarity, Membrane Contact Sites (MCS), Membrane Trafficking

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

*Franke C, Repnik U, Segeletz S, Brouilly N, Kalaidzidis Y, **Verbavatz JM**, Zerial M. (2019) Traffic. doi: 10.1111/tra.12671. Correlative single-molecule localization microscopy and electron tomography reveals endosome nanoscale domains.

*__Kaczmarek B__, __Verbavatz JM__, __Jackson CL__. Biol Cell. (2017). doi: 10.1111/boc.201700042. GBF1 and Arf1 function in vesicular trafficking, lipid homoeostasis and organelle dynamics.

*__Jackson CL__, __Walch L__, __Verbavatz JM.__ (2016) Dev Cell.. doi: 10.1016/j.devcel.2016.09.030. Review. Lipids and Their Trafficking: An Integral Part of Cellular Organization.

*__GalmesR, Houcine A__,van Vliet AR,Agostinis P,__Jackson CL__,__Giordano F__(2016)EMBORep. Doi:10.15252/embr.201541108. ORP5/ORP8 localize to ER-mitochondria contacts and are involved in mitochondrial function.