Université de Paris

Universités de Paris, Master BMC

Master 1 : Biologie Cellulaire

Fiche de Projet de Stage, Année 2019-2020

Unité INSERM ou CNRS ou Université : Insitut Jacques Monod, CNRS /université de Paris **Intitulé Equipe : Cycle Cellulaire & développment** **Responsable de l'Equipe : Lionel PINTARD**	**Responsable du Stage : Nicolas JOLY** **Contacts** Adresse : 15, rue Hélène BRION 75013 Paris Email : nicolas.joly@ijm.fr Tel : 01 57 27 80 92

Titre du projet : Role and regulation of Katanin activity during the meiosis-to-mitosis transition

Résumé du Projet de Stage (en 300 mots maximum, mots clés en gras)
Katanin, from the japanese sword Katana, is an evolutionarily conserved AAA-ATPase that exhibits microtubule-severing activity. Katanin regulates multiple cellular processes including cell divisions (meiosis and mitosis), signaling and development by controlling microtubules stability. Mutations of Katanin have been associated with several human diseases including microcephaly, male sterility and cancer. Understanding its mode of action and regulation is therefore of primary importance. We are using the nematode C. elegans as a model system to study Katanin function and regulation. In this system, Katanin is essential for the assembly of the short anastral meiotic spindle. Inactivation of mei-1 or mei-2, which encode the catalytic and the regulatory subunits respectively, results in severe defects in meiotic spindle assembly leading embryonic lethality. The exact role of Katanin in meiotic spindle assembly is however poorly understood. Importantly, whereas Katanin is essential for meiosis, it is highly toxic for mitosis, which takes place in the same cytoplasm 20 minutes after. Persistence of Katanin in mitosis results in severe defects in microtubule-dependent processes including defect of spindle positioning and cytokinesis. Previous work has shown that this regulation is due to the degradation of the Katanin via the ubiquitin/proteasome degradation system but the signal and mechanism allowing this inactivation are not clear. To study Katanin function and regulation, the candidate will use a combination of approaches already established in the laboratory combining genetics approaches in C. elegans, CRISPR/Cas9, biochemistry techniques, in vivo and in vitro functional assays as well as live cell-imaging.

Publications de l'équipe, relatives au stage proposé

Microtubule-severing activity of AAA-ATPase Katanin is essential for female meiotic spindle assembly.
Joly N, Martino L, Gigant E, Dumont J, Pintard L.
Development. 2016 Oct 1;143(19):3604-3614.