Laboratoire Physico-Chimie Curie

Institut Curie, 11 Rue Pierre et Marie Curie-75005 PARIS

TITRE DU STAGE :

MUTUAL ROLE OF ESCRT-III AND SEPTINS DURING THE CYTOKINESIS.

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Ce stage peut être poursuivi en thèse : OUI

Si oui, la thèse est-elle financée : NON

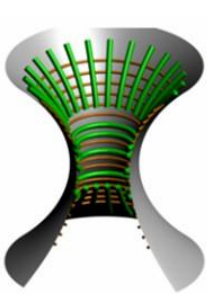
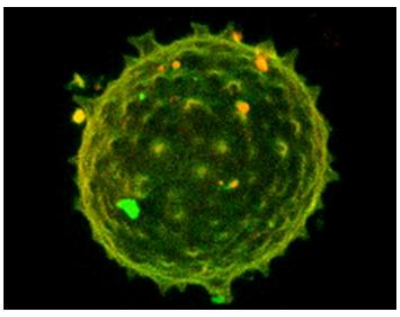
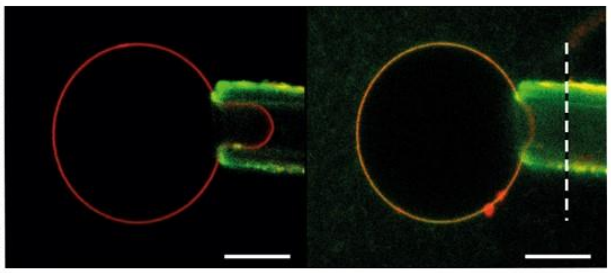
SUJET de la thèse :

Cytokinesis is the last step of cell division, when a mother cell is spitted in two daughter cells. Several proteins are involved in this complex process and their mutual and cooperative role is still under debate.

In this proposal, we propose to focus our work on the role of ESCRT-III and septins. Septins are multitasking proteins. During cytokinesis, they form a collar shape around the constriction site. ESCRT-III proteins are then recruited to decrease the neck diameter and to allow membrane scission. ESCRT and septins are involved in several cancer and deseases.

In our teams, we have previously shown that septins are sentive to positive micrometric curvature, whereas ESCRTs are sensitive to negative curvature.

We would like to elucidate the mutual interaction of these two proteins. We propose to use an in-vitro bottom approach, where we will:

1- Elucidate the supramolecular organization of ESCRT-III and septins on flat and curve susbstrate. We propose to perform cryo-electron microscopy on model membrane.
2- Study how ESCRT-III and septins are able to deform model membrane consisting of Giant Unilamellar Vesicle.
3- Reconstitute in vitro a constriction site. We will use micro fabricated approach to built in an in vitro system mimicking the geometry of the constriction site, where we can sequentially added the proteins.

Tools available in the teams: Cryo-electron microscopy, Confocal microscopy, Optical tweezer, micro-pipette manipulation, micro fabrication.