

INTERNSHIP PROPOSAL

Institute and Group: IBS, group IRPAS

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Research project title: Deciphering the molecular organisation of the “effero-synapse”, by super resolution microscopy (STORM)

5 Keywords to describe the project: phagocytosis of apoptotic cells, autoimmune diseases, molecular interactions, super resolution microscopy, C1q

Description of the project (aims, experimental techniques, recommended background):

Efferocytosis is the process of removal or clearance of apoptotic cells by professional and non-professional phagocytes. The process is continuously going on in human body, in all animals and multicellular organisms, and is crucial for development, tissue homeostasis and resolution of inflammation. We propose to visualize at nano scale and to quantify the molecule(s) taking place at the effero-synapse which is the interface between the apoptotic cell and the phagocyte. Studies will focus on some phagocyte receptors known to bind C1q, a serum protein previously characterized as a bridging molecule between the phagocyte and its prey and involved in the maintenance of immune tolerance.

Methodologies

Building on solid results obtained by confocal microscopy for calreticulin and C1q localizations, our plan will be to reach the nanoscale, first by Stochastic Optical Reconstruction Microscopy (STORM), an approach based on chemical dyes easily adaptable from our current protocols. The ideal candidate will have a good background in biochemistry

Relevant publications of the team:

1. Investigations on the C1q-calreticulin-phosphatidylserine interactions yield new insights into apoptotic cell recognition. Païdassi H, Tacnet-Delorme P, Verneret M, Gaboriaud C, Houen G, Duus K, Ling WL, Arlaud GJ, Frachet P*. J Mol Biol. 2011; 408(2):277-90.
2. Relative Contribution of C1q and Apoptotic Cell-Surface Calreticulin to Macrophage Phagocytosis. Verneret M, Tacnet-Delorme P, Osman R, Awad R, Grichine A, Kleman JP, Frachet P*. J Innate Immun. 2014; 6(4):426-34.
3. Philippe Frachet, Pascale Tacnet-Delorme, Christine Gaboriaud and Nicole M. Thielens (2015). Role of C1q in Efferocytosis and Self-Tolerance — Links With Autoimmunity, Autoimmunity - Pathogenesis, Clinical Aspects and Therapy of Specific Autoimmune Diseases, Dr. Katerina Chatzidionysiou (Ed.), InTech, DOI: 10.5772/60519. Available from: <http://www.intechopen.com/books/autoimmunity-pathogenesis-clinical-aspects-and-therapy-of-specific-autoimmune-diseases/role-of-c1q-in-efferocytosis-and-self-tolerance-links-with-autoimmunity>.