

**Master 2 internship project
Year 2019-2020**

Laboratory/Institute: IBS/IRIG
Team: SAGAG

Director: W. Weissenhorn
Head of the team: H. Lortat-Jacob

Name and status of the scientist in charge of the project: Rabia SADIR **HDR:** yes no

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Program of the Master's degree in Biology:

- Immunology, Microbiology, Infectious Diseases Integrative Structural Biology
 Physiology, Epigenetics, Differentiation, Cancer Neurosciences and Neurobiology
 Planta International

Title of the project: Study of enzyme complexes involved in Heparan sulfate biosynthesis

Objectives (up to 3 lines):

Purification of enzyme complexes, involved in heparan sulfate biosynthesis and endogenously expressed by HeLa cells, for identification and characterization by mass spectrometry.

Abstract (up to 10 lines):

Heparan sulfate (HS) is a complex polysaccharide of the glycosaminoglycan (GAG) family, ubiquitously present on cell surfaces and within extracellular matrices. This molecule is a key regulator of most biological processes, including cell proliferation, migration, chemoattraction, inflammation, angiogenesis, matrix assembly or viral attachment. HS influences embryonic development as well as adult physiology through interactions with various proteins. These interactions depend on HS structure, which is largely determined during biosynthesis by Golgi enzymes, and this process is highly regulated. HS is synthesized in the Golgi network through complex, concerted action of several distinct enzymes, and how these enzymes organize this machinery is far from fully understood.

Our goal is to characterize the nature and the organization of these enzyme complexes by the combination of affinity purification and mass spectrometry. The objective will be to determine the best strategies to prepare enzymes or enzymes complex samples for MS (Mass Spectrometry) analysis. This work could decipher the supramolecular organization of enzyme complexes involved in biosynthesis of HS.

Methods (up to 3 lines):

Cell culture, co-immunoprecipitation, Cross-linking, Western blot, Golgi membranes extraction

Up to 3 relevant publications of the team:

- Connell B, Sadir R, Baleux F and Lortat-Jacob H. Heparan sulphate differently regulates CXCL12 \square and \square mediated chemotaxis through differential presentation to CXCR4. *Science Signaling* (2016) 9 : ra107
- Pegeot M, Sadir R, Eriksson I, Kjellen L, Simorre JP, Gans P, Lortat-Jacob H. Profiling sulfation/epimerization pattern of full-length heparan sulfate by NMR following cell culture ^{13}C -glucose metabolic labeling. *Glycobiology*. 25:151-156 (2015)
- Saesen E, Sarrazin S, Laguri C, Sadir R, Maurin D, Thomas A, Imberty A, Lortat-Jacob H. Insights into the mechanism by which interferon- γ basic amino acid clusters mediate protein binding to heparan sulfate. *J Am Chem Soc*. 135 :9384-90 (2013)

Master's degree in Biology – Chemistry-Biology Department

Requested domains of expertise (up to 5 keywords):