Master's degree in Biology – Chemistry-Biology Department

Master 2 internship project
Year 2020-2021

Laboratory/Institute: Institute for Advanced Biosciences  
Director: Pierre Hainaut  
Team: RNA and epigenetics  
Head of the team: André Verdel

Name and status of the scientist in charge of the project: André Verdel DR2 CNRS - Daphné Seigneurin-Berny CRCN CNRS  
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Program of the Master’s degree in Biology:
☐ Immunology, Microbiology, Infectious Diseases  
☒ Physiology, Epigenetics, Differentiation, Cancer  
☐ Planta International

Title of the project: Role of the nuclear m6A reader, YTHDC1, in human stress response

Objectives (up to 3 lines):
This project aims at characterizing at the molecular level the role of the human protein YTHDC1 in the regulation of gene expression in response to heat stress.

Abstract (up to 10 lines):
All cells need to adapt to physiological and environmental stresses. They do so by activating a highly conserved cellular response known as the heat shock response (HSR). The HSR acts on genome expression through a regulation of transcription, RNA processing and export, and translation. Recently, reversible chemical modifications of RNAs grouped under the term "epitranscriptome" have been demonstrated to play an important role in the proper control of gene expression. In particular, N6-methyladenosine (m6A) methylation was found to play a role in the stress response in mammals. One of the main readers of m6A are proteins belonging to the YTH-domain protein family. Among them is the protein YTHDC1, the only known nuclear reader of m6A. Strikingly, our very recent work provides evidence, for the first time, that human YTHDC1 is a major regulator of the heat stress response, acting not only on the expression of protein-coding genes but also non-coding genes. The aim of the M2 internship will be to further decipher the molecular mechanisms involving YTHDC1 in the HSR and by extension in cancer that is known to often imply an out-of-context activation of the HSR.

Methods (up to 3 lines):
Human cells culture and transfection, omic analysis (RNAseq, ChIPseq), single cell analysis, qRT-PCR, Western-blot.

Up to 3 relevant publications of the team:

Requested domains of expertise (up to 5 keywords):  
Experience in molecular and cell biology is a plus