

Targeting Extracellular Pro-Cachectic Factors by Directed Proteomics

Period: 6 months from January/February to June/July 2025

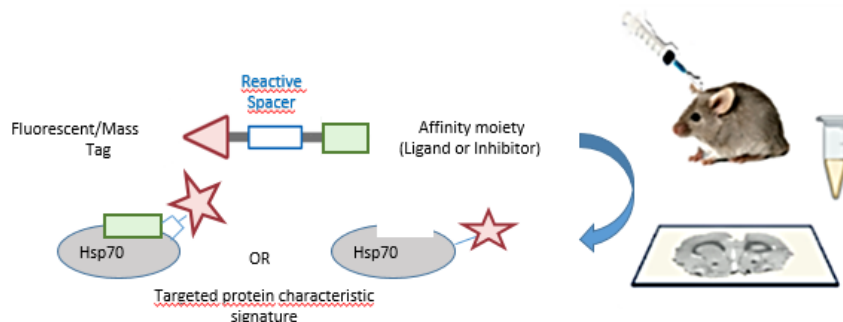
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Internship locations: IBMM, Pôle Chimie Balard, Montpellier, www.ibmmpeptide.com and Institut de Recherche en Cancérologie de Montpellier, IRCM, www.ircm.fr

The work will take place mainly at the IBMM in Montpellier, and IRCM for biological evaluation.

Summary

Cancer-associated cachexia is a multifactorial syndrome characterized by involuntary weight and skeletal muscle mass loss. Untangling the communication between the tumor and skeletal muscle to better understand the causes of cancer cachexia remains a crucial challenge. We aim to explore the crucial role of the chaperone protein Hsp70, in the process of muscle catabolism observed in cachectic mice. Our goal is to develop a specific targeting method for exosomal Hsp70 using an innovative approach called "affinity-based probe" (ABP). This method relies on protein profiling based on the activity or affinity of a probe to its target. The ABP we will develop will consist of three main components: a targeting moiety, a reactive portion, and a detectable marker. The targeting moiety will guide the probe selectively towards exosomal Hsp70. This strategy relies on three key points: i) the design of chemical probes that react exclusively with Hsp70, ii) the transfer of a fluorescent marker from the probes to the target protein, and iii) the detection, under appropriate conditions of Hsp70, strategy opening new therapeutic perspectives precisely targeting proteins involved in colorectal cancer-associated cachexia.



Student work

Working at the interface between cancer biology and chemistry, the Master student will carry out the synthesis, analysis and purification of the different ABP using state of the art techniques, LC/MS and NMR (¹H ¹³C) analyses. He or She will take part in the biological assays dedicated highlight the targeted protein of interest in order to monitor and ultimately block their pro-cachectic activity.

Skills acquired:

1. Project management with several laboratories, work at the interfaces of disciplines.
2. Synthesis of peptides, solid support synthesis, bioconjugation, chemistry of protein
3. Characterization of biomolecules (LC/MS, NMR).
4. Docking

Required skills and soft skills

1. Scientific English, Organic Chemistry and Analytical Chemistry Master's level.
2. Knowledge of biology and biochemistry will be appreciated
3. Autonomy, scientific curiosity
4. Rigor, capacity for work
5. Good interpersonal skills, ability to report