Master/3d year engineer 6 months RESEARCH INTERNSHIP
From January 2025

Impact of tumoral extracellular vesicles on energy metabolism during colorectal cancer-associated cachexia

Period: 6 months from January/February to June/July 2025
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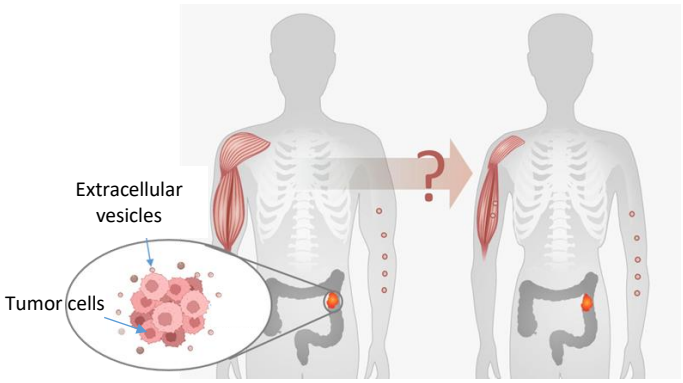
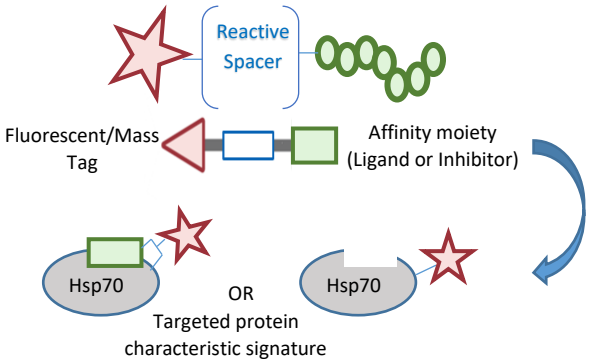
Internship locations: Institut de Recherche en Cancérologie de Montpellier, IRCM, *www.ircm.fr* and IBMM, Pole Chimie Balard, Montpellier, Peptides *www.ibmmpeptide.com*

Summary
Colorectal cancer (CRC) is the second leading cause of cancer death in developed countries. Up to 60% of CRC patients suffer from cachexia. Cachexia is a syndrome characterized by loss of weight and muscle mass, with or without loss of body fat, increasing the CRC mortality rate. The mechanisms responsible for the development of cachexia associated with CRC remain poorly understood. A better understanding of the communication between metabolic tissues and the tumor is a clear and unmet need in oncology. Extracellular vesicles (EVs) are circulating particles naturally produced by cells, which enable the transfer of biological material (DNA, RNA, proteins, lipids, etc.) between tumor cells and normal cells. EVs produced by colorectal cancer cells inhibit the metabolism of recipient myoblasts *in vitro* and induce muscle wasting *in vivo*. This Master's project at the interface between cancer biology and chemistry aims to identify the proteins present in EVs from cachectic colorectal cancer cells and target them in order to monitor and ultimately block their pro-cachectic activity.





Student work
The Master student will carry out a multidisciplinary approach in order to detect and to tag specific pro-cachectic factors in EVs secreted by colorectal cancer cells at the protein level. He or she will use the cellular models available in the team (C26) to purify EVs whom content will be analysed by proteomics. The cachectic function of the identified factors will be confirmed on the differentiation of muscle cells in vitro. In parallel, a well-described exosomal cachectic factor (Hsp70) will be tagged by "Affinity-based probe" inside the EVs. The tagged factor will be followed into recipient cells using fluorescent detection.

Skills acquired:
1. Project management with several laboratories, work at the interfaces of disciplines
2. Purification of extracellular vesicles from cancer cells by differential centrifugation
3. Basic cellular biology
4. Synthesis of peptides, Affinity-based probe chemistry
5.

Required skills and soft skills
1. Scientific English
2. Knowledge of cancer biology will be appreciated
3. Autonomy, scientific curiosity, rigor
4. Good interpersonal skills, ability to report