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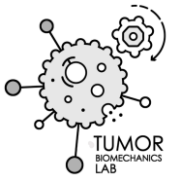

aviesan
alliance nationale
pour les sciences de la vie et de la santé
ITMO CANCER
ITMO BASES MOLÉCULAIRES ET STRUCTURALES DU VIVANT

PLAN CANCER 2014-2019

NANO TUMOR

Montpellier, August 27nd 2020

Open position for a staff scientist (Post-doctoral / Research Engineer) for **18 months**
Pierre Martineau group at IRCM - Montpellier

in the Work-Package 3 of the

PROGRAMME FÉDÉRATEUR AVIESAN

NANOTUMOR

TOWARDS A SUBCELLULAR MAPPING OF THE CANCER CELL

The NanoTumor consortium is a French national multi-disciplinary workforce that aims to study cancer initiation and progression at molecular and subcellular level, by combining cutting-edge technologies and expertises in electron and fluorescence 2D-3D imaging, spatial transcriptomics and mass-spectrometry, micropatterning and microfluidics/biomechanics in various cellular and animal models, anti-intrabody/PPI engineering, and high-throughput screening. It will explore several children and adults' cancers characteristics from the structure of underlying molecular complexes, spatio-temporal genes and proteins expression patterns, all the way up to subcellular organization, tissues morphology/rheology, and ultimately drug design and screening.

This first AVIESAN federative program joins forces of 13 French laboratories located in 7 cities, and is co-coordinated by Jacky G. Goetz (U1109 – Strasbourg) and Patrick Schultz (IGBMC – Illkirch). This program at the interface between cancer research (ITMO Cancer) and molecular and structural life sciences (ITMO BMSV) aims at drawing a functional and structural map of the cancer cell, study the dynamics of cancer-cell transformation by studying modifications in high order structures like large molecular complexes and organelles, and finally identify innovative anti-cancer targets and pharmacological compounds.

The NANOTUMOR project is structured around 4 work packages (WP), which aim to:

- WP1: Isolate, characterize the protein composition and determine the structure of key molecular complexes involved in cancer onset and progression.
- WP2: Quantify alterations of intracellular organelles during the cancer cascade and identify and characterize protein complexes that sustain oncogenic intracellular signatures.
- **WP3, object of the present position**: Develop biosensors, protein and chemical inhibitors to characterize in cellulo the molecular or cellular targets and to modify their properties by targeted inhibitors. **Headed by Pierre Martineau at IRCM – Montpellier, and co-headed by Marc Tramier at IGDR – Rennes.**
- WP4: Integrate in vivo and validate the targeted candidate protein complexes in vivo on patients samples

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WP3 context: The identification of new therapeutic targets and specific inhibitors remains the key to develop new medicines (Swinney & Anthony, 2011). So far, all the methods used to reach these objectives employ a two-step process that either first identify a suitable target before designing or screening for chemical inhibitors (Bottom-Up approach), or screen for inhibitors in a cellular system then identify the drug target (Top-Down approach).

The main objective of the WP3 is to implement both approaches based on the original results that will be generated in WP1 and WP2. Notably the high quality of the structural characterizations of macromolecular complexes generated in WP1 will be used to implement Bottom-Up approaches to identify original compounds that target the identified pathogenic protein-protein interactions (PPI: Protein-Protein inhibitors). However, the links between the molecular complex, the integrated cellular phenotype of the cancer cells (proliferation, migration, invasion, etc.) and the genetic and epigenetic dysfunctions studied in WP1-2 are still partially understood. Therefore, we will implement in parallel a Top-Down approach based on genetically encoded protein inhibitor screens (intrabodies) to identify in a single step both original targets and inhibitors. Since the implemented strategy will directly look at oncogenic-specific events (modified complexes characterizing the cancer cell and/or certain stages characterizing tumor progression), this will confer a high degree of selectivity to the identified inhibitors for subsequent therapeutic developments.

Mission and main tasks

To support the research program of WP3, a postdoc/engineer will be initially hired for 18 months with the objective of securing 18 additional months. The postdoc/engineer will be in charge of optimizing the experimental protocols required during the project, in particular immunochemistry, cell culture, live cell imaging techniques, and biochemistry. The postdoc/engineer will be also in charge of the formation of students (Masters, PhD) to these experimental approaches. Previous experience in NGS, proteomics, HTS, protein engineering, and/or bioinformatics would be a strong asset. The position will be located at the IRCM in Montpellier, but will require personal flexibility since the postdoc/engineer may be involved in experiments in all the laboratories of the consortium (stays from days to months)

Profile, operating and behavioral skills

- Applicants must hold a Ph.D. in biology or biochemistry
- Ability to conduct a research project independently
- In-depth knowledge in molecular and cell biology
- Good knowledge in microscopy would be a strong asset
- Experience in protein engineering, cell HTS, viral transduction, FACS analysis and sorting is desirable
- Ability to work and communicate within a multidisciplinary group, and geographical personal flexibility are mandatory

Contacts

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For more information about the NanoTumor consortium in general:

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