

Postdoctoral position available: RNA based nanovaccine for oncoimmunology.

Offer: The laboratory of Dr Nathalie Bonnefoy, Immunity and Cancer team, at the research cancer institute of Montpellier (IRCM, INSERM U1194: <https://www.ircm.fr>) is looking for a full-time postdoctoral research fellow to take on an exciting highly translational project to innovate in anti-cancer RNA based vaccine in the context of a European consortium project.

The position is offered for **24 months with a possible reconduction for 1 year**; selected candidate will work under the supervision of Dr Julien Faget.

Keywords: Neutrophil, lung cancer, immunotherapy, single-cell multi-omics, epigenetics, image mass cytometry, genetic engineered mouse models

Scientific summary: The research project we are proposing is part of a European consortium project (TRANSCAN-3) dedicated on innovative RNA vaccine formulation for lung cancer patients. In the case of non-small cell lung cancer (NSCLC), peptide based vaccines (NCT00409188, NCT01935154), NCT00480025) were evaluated and showed weak or not-significant benefits for the patients. mRNA vaccines most probably represent the next revolution in cancer care, as it was the case for the SARS-COV2 vaccine development. Indeed, mRNA based vaccines are being tested in various tumor types[1] as it will allow specific design and selection of tumor-antigen cocktail for each individual patient. An mRNA-based cancer vaccine (mRNA-4157) formulated in liposomes and used in combination with the anti-PD1, pembrolizumab (KEYNOTE-063, ongoing) provided results suggesting that it is well tolerated and can induce an effective tumor-antigen specific T cell response. Aside from this important aspect the research project proposed here emanates from our expertise on lung tumor microenvironment[2–7] as it aims at including **simultaneous modulation of the tumor immune cells behavior together with tumor antigen delivery** in myeloid cells.

We will take advantage of **innovative nanoparticles** formulation designed to deliver **mRNA and siRNA** into **tumor infiltrated myeloid cells**. From that, we will not only deliver tumor antigens but also **eradicate immunosuppressive functions** of the target cells through different knockdown strategies.

This research project will also generate proof of concept in the $Kras^{LSLG12D/WT};p53^{fl/fl};GAG-LSLeYFP-OVA$ **autochthonous mouse model of lung cancer** in which tumor formation is induced by virus mediated Cre-recombinase expression in the lung and where cancer cells will specifically express the eYFP-OVA protein as tumor antigen. It will benefit from a privileged access to **image mass cytometry** (Hyperion) multiplex mass cytometry (Helios), flow cytometry and mouse computed tomography. Furthermore, the selected candidate will work in the context of our European consortium, thus the project has a strong multidisciplinary dimension and multiple interactions will take place with partners of the consortium in Spain, Italy, Germany and Israel that includes dedicated trainings. Finally, the project is already initiated, most of the required tools were imported into the lab, and mouse colonies will be ready and accessible at the time of position start.

Lab location and description: The IRCM (INSERM U1194) currently hosts 16 teams dedicated to cancer research and located in ICM Cancer Hospital Campus allowing optimal interaction with clinicians. IRCM hosts several technical facilities (proteomics, cellular screening, cytometry, microscopy, organoids) some being part of the Montpellier Biocampus network. It offers a unique pipeline dedicated to the generation and in vivo use of preclinical models (including genetic engineered mouse models, syngeneic grafts, cell-line and patient-derived xenografts models), and their most comprehensive analysis by small animal imaging (IPAM), targeted or whole-body irradiation and histology (RHEM). IRCM has developed top notch innovative platforms to generate genetically engineered monoclonal antibodies (GenAc), to exploration of tissue ecosystems by imaging mass cytometry (CIM) and the PLATON platform dedicated to metabolomic analysis. IRCM is also characterized by its efforts to valorize its research activity through the creation/housing of biotech.

Candidate profile: We are seeking a highly motivated PhD/MD-PhD who wants to develop its own research project in an independent way while having a good team-working spirit. The candidate must be strongly motivated for translational research in preclinical mouse models.

- Expertise on mouse colonies management and in vivo experimentation
- Knowledge on cancer immunology and / or RNA vaccine will be strongly appreciated
- Expertise on human sample handling, flow cytometry and cell purification methods will be a good point.

Application: Please send a concise cover letter with a statement of research interests and a summary of previous research activity and achievements. We will also require detailed *curriculum vitae* and two reference letters. Applications should be send to Julien Faget: Julien.faget@inserm.fr

The immunity and Cancer Team dedicates its activity in investigating solid tumor immune escape mechanisms. The team is composed of five permanent researchers, one engineer, one technician and PhD-students. We expected from our research programs to discover new targets for cancer immunotherapy as well as new biomarkers or immune signatures that in fine will permit to deliver the right treatment to the right patient at the right time. Our group has a strong knowledge of preclinical models and a recognized expertise of immune tumor microenvironment.

References:

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