

OPEN POSITION AT THE CANCER RESEARCH CENTER OF MARSEILLE

Researcher in Breast Cancer Biology

Triple-negative breast cancer (TNBC) has a very poor prognosis and does not benefit from hormone therapy or HER2-targeted drugs. The considerable complexity of TNBC, studied for many years by the BORG-MAINA team, is linked to its high heterogeneity, tumorigenicity resulting from the action of non-mutated genes, and the key role played by immune cells in its development and resistance to treatment. We have identified novel therapeutic vulnerabilities that can be targeted with clinically relevant drugs using unique TNBC mouse models we have generated, which faithfully recapitulate the human disease. Multi-parametric analysis of TNBC heterogeneity enabled us to identify distinct TNBC clusters, each defined by unique intrinsic (molecular/genomic, inherent to cancer cells) and extrinsic (immune) features, and characterised by different therapeutic vulnerabilities. Notably, these clusters are distinguished by the relative enrichment of: 1) lymphocytes 2) macrophages, 3) neutrophils, or 4) dendritic cells.

This project is based on the combined use of innovative strategies to uncover how intrinsic features shape the immune, cellular, and molecular composition of the tumour microenvironment in TNBC clusters, and determine the metastatic properties of cancer cell subtypes. The identified features will then be used to design combinatorial onco-immuno-therapies optimised for each subcluster. This interdisciplinary research project combines mouse, tumoroid, and co-culture models that reconstitutes TNBC complexity with multi-omics, bioinformatics, human data, and mechanistic and functional studies.

The BORG-MAINA team is seeking a researcher (postdoctoral or permanent) to join its TNBC programme '*Molecular traits and immune-cancer cell crosstalk in TNBC*', at the Cancer Research Center of Marseille, in close collaboration with clinicians and pathologists at the Institut Paoli-Calmettes hospital, which is accredited as the Comprehensive Cancer Center of Marseille by the Organisation of European Cancer Institute (OECI). Studies are conducted with the support of state-of-the-art facilities focused on proteomics, genetics, spectral flow cytometry, histology, preclinical research, microscopy, and tumoroid culture. The research is carried out within established research networks, including the Institute for Cancer and Immunology (ICI), Canceropôle PACA, and CENTURI.

Applicants should send a *curriculum vitae*, with a publication list, a 2-page summary of their research achievements in English, and the names and addresses of two referees to jean-paul.borg@inserm.fr and flavio.maina@univ-amu.fr.

References:

- Castellane O, Monatte J, et al. *Multi-omics profiling uncovers immune-molecular clusters with distinct chemo-immunotherapeutic vulnerabilities in a mouse model of triple-negative breast cancer.* **Molecular Cancer** 2026, Jan 10;25(1):35. PMID: 41520125.
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- Lamballe F et al. *Modeling Heterogeneity of Triple-Negative Breast Cancer Uncovers a Novel Combinatorial Treatment Overcoming Primary Drug Resistance.* **Advanced Science** 2021 8: 2003049.
- Daulat AM, et al. *ECT2 associated with PRICKLE1 are poor-prognosis markers in TNBC.* **British J Cancer** 2019, 120: 931-940.
- Michea P. et al. *Adjustment of dendritic cells to the breast-cancer microenvironment is subset specific.* **Nat Immunol** 2018, Aug;19(8):885-897. PMID: 30013147.
- Puvirajesinghe TM et al. *Identification of p62/SQSTM1 as a component of non-canonical Wnt VANGL2-JNK signaling in breast cancer.* **Nat. Commun** 2016, 7:10318.

The **Cancer Research Centre of Marseille (CRCM)** is an international centre affiliated with national (Inserm, CNRS) and local (Aix-Marseille University, Paoli-Calmettes Institute) institutions. The CRCM comprises 450 members across 4 departments dedicated to Cell Communication and Microenvironment, Genome Integrity, Onco-Haematology and Immuno-Oncology, and Translational/Clinical Research. The CRCM offers excellent research opportunities and access to high education in oncology and immunology, cutting-edge technological support, and a collegial group of teams, providing a fertile and outstanding environment to develop fundamental, translational, or clinical projects for patient benefit.