PARIS SACLAY CANCER CLUSTER

Technology Platforms

FRANCE 2030

The PSCC serves as a catalyst for transforming potentially breakthrough approaches into industrial diagnostic and therapeutic solutions for cancer patients.

We provide high-potential innovators with a

AMMICa Platform

Single Cell, Genomic[1] and Spatial Biology[2]

Heads: 1. Nathalie Droin; 2. Cécile Badoual

Technology and expertises

Single-cell transcriptomics for high-resolution analysis of cell-to-cell variation in a complex multicellular environment.

Spatial transcriptomics for spatial localization of RNA molecules and proteins in tissues at cellular to subcellular resolution.

Objectives

Identification and characterization of different cell types and tissue regions associated with diseases to guide the discovery of potential therapeutic drugs.

The AMMICa platform of Gustave Roussy brings expertise and cutting-edge technologies to perform genomics, single cell genomics and spatial transcriptomics analyses.
The unit is labelled ISO 9001.

Services and activities

Nucleic Acid Preparation for Genomic Analyses
Technology highlight: Ionic DNA extraction system (Bionano).

Genomics and Single Cell Genomics by Next Generation Sequencing
Technology highlights: NovaSeq, MiSeq, MiniSeq, NextSeq2000 (Illumina), Promethion (Oxford Nanopore technologies), Tapestri (MissionBio), Chromium (10X Genomics).

Multi-OMICS Spatial Biology Analyses (PETRA, PFIC)
Technology highlights: Ultra Spatial Imaging Merscope ISH-based system (Vizgen), Visium HD CytAssist Probe-based systems (10X Genomics).

dedicated ecosystem, including world-class experts, cutting-edge technologies, services and infrastructures, as well as unique access to patient data and associated biological samples.

As part of the biocluster initiative, several technology platforms are funded by the PSCC and described in this document.

Histopathology[1], Imaging[2] & Cytometry[3]

Heads: 1. Cécile Badoual; 2. Tudor Manoliu; 3. Cyril Catelain

Technology and expertises

Immuno-Histopathology analyses of patient tumor biopsies.
Imaging Mass Cytometry capable of simultaneously detecting and visualizing up to 40 different protein targets (using CyTOF).
Spatial proteomics (cycIF) – imaging enabling the immunofluorescent imaging of hundreds of protein targets across a single specimen at subcellular resolution.
Nanoscale advanced imaging (STED)
Multiparametric Spectral Cell sorting

Objectives

Analysis of the biology of tumors and their microenvironment, monitoring the expression and distribution of biomarkers, addressing the specificity, efficacy and toxicity of therapeutic approaches associated with diseases to guide the discovery of potential therapeutic drugs.

Services and activities

High Throughput Histological analysis
Technology highlight: Two Ventana benchmark Ultra Plus (Roche diagnostics).

Advanced Cellular Imaging
Technology highlights: Super-resolution STED Stedycon nanoscope system (Abberior), MACSima Antibody-based imaging system (Miltenyi biotec), Mass cytometry imaging.

Multiparametric Spectral Cell Sorting
Technology highlight: High throughput Bigfoot spectral cell sorter (Thermofisher).

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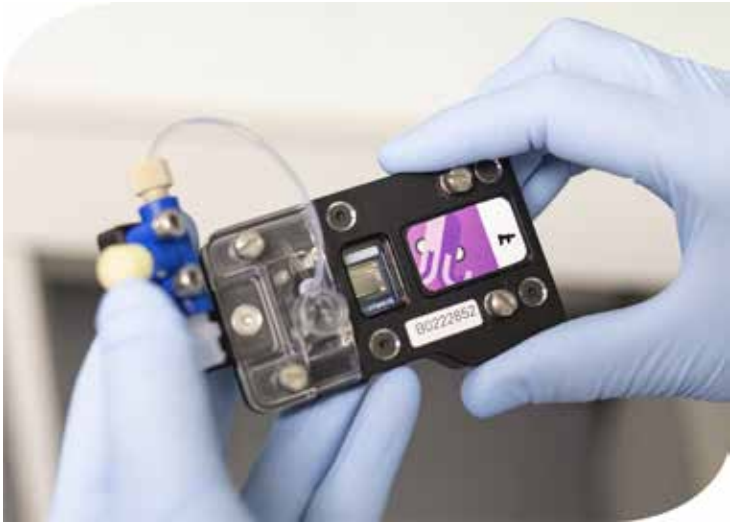
CANCER CAMPUS GRAND PARIS

CellAction Platform

Cell and Gene Therapies

Heads: Marion Alcantara, Sebastian Amigorena



Technology and expertises

Pre-GMP cell & gene therapy development
Highly qualified technical and scientific team Integrated clinical expertise
Pre-GMP environment.

In vitro and in vivo Proof of Concept analyses

CellAction from the Institut Curie brings expertise and cutting-edge technologies to provides a complete solution for GMP-compliant cell engineering and scalable manufacturing for clinical testing, bringing a new momentum for innovative clinical trials.

Objectives

Bringing the gap from academic research to product development
Developing GMP-ready products / Modes and mechanisms of action.

Facilities and activities

Pre-GMP CAR-T cell engineering and manufacturing
Technology highlights: CliniMACS Prodigy platform / GMP-compliant electroporators.

Analytical development
Technology highlights: MACSQuant cytometer / Stilla ddPCR.

In vitro POC
Technology highlights: Lumicks z-Movi cell avidity analyzer, xCELLigence RTCA eSight Real-time live cell analyser, spectral flow cytometry platform, multiomics.

In vivo POC
Technology highlights: Xenograft and syngeneic tumor models, Imaging (bioluminescence, fluorescence), Stereotaxic neurosurgery.

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CellAction

institut Curie

MI-PP Platform

Immunoprofiling and PCTS preclinical models

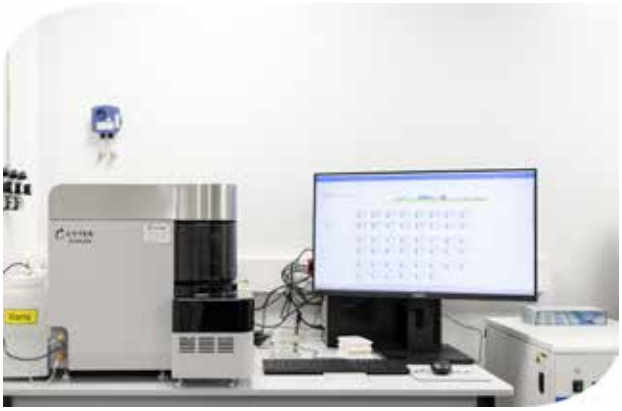
Head: Frédéric Vely

Technology and expertises

Immunoprofiling of immune cells in tumors by cytometry and single cell transcriptomics.

Functional characterization of immune cell activities in tumor microenvironment.

PK/PD of mAb therapies with mass spectrometry and computational analysis.



Objectives

Identification and characterization of different cell types and tissue regions associated with diseases to guide the discovery of potential therapeutic drugs.

Services and activities

Immunoprofiling (Leucocyte immunophenotyping)
BD Fortessa X20, BD Melody, Cytek Aurora spectral flow cytometer).

Functional assays on blood populations
T cell proliferation, NK cell degranulation, NK cell cytoxicity, Single cell transcriptomics (Chromium, 10X Genomics).

Quantification of soluble molecules/cellular markers of activation, proliferation, regulation
ELLA platform (Biotechne), ELISA platform (Biotek), Signature Q100 (OLink).

Preclinical testing on Ex vivo Precision Cut Tumor Slices (In development).

Pharmacokinetics and pharmacodynamics studies (biotherapies and immuno-therapeutics)
LC-MS/MS analyses with pharmacometrics and modeling/simulation for optimal dosing and scheduling (Xevo TQ-XS mass spectrometer plus UPLC system, Waters).

The MI-PP platform of La Timone hospital brings expertise and cutting-edge technologies to perform immunoprofiling and functional analyses. The unit is labelled COFRAC and ISO-15189.

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In Machina platform

Ex Vivo Liver Perfusion as a new approach for preclinical testing

Heads: Pr Eric Vibert, Pr Marc-Antoine Allard, Dr Elie Farha

Technology and expertises

Innovative, long term, ex vivo organ perfusion technology that preserves resected human livers in a physiological state. Totally or partially diseased livers contain CHC, cholangiocarcinoma or colorectal metastasis.

Objectives

Evaluate drug candidates and medical devices on patient-derived cancerous livers, enabling multiple analysis to support decision making and for better derisking.

Services and activities

Long term ex vivo liver perfusion
Totally or partially resected livers will represent a human model that recapitulate whole organ architecture with an established TME and an integrated immune system. Livers will be perfused for 10-14 days in physiological conditions (normothermia, blood perfusion, gaz exchange, regulated metabolism, dialysis...).

Efficacy, Toxicity, Pharmacokinetics, Pharmacodynamics studies
Easy access to livers and fluid lines allows for tissue biopsies, direct injections and fluid withdrawal following described protocols.
Pharmacokinetics is feasible due to the availability of an integrated dialysis unit and bile collection.
Associated platforms for Pharmacodynamic studies:

- AMMICA (IGR) : Histopathology, Immunomonitoring, Spatial genomics, Microscopy, Mass cytometry, Metabolic profiling, In vivo imaging.
- FUI : Functionnal ultrasound imaging to capture cancer microvasculature.
- Fluorescent imaging system: Assess tissue perfusion and explore new fluorescent antibodies.

The In Machina platform of Paul Brousse hospital brings expertise and cutting-edge technologies to perform pharmacokinetic and pharmacodynamic studies (PK/PD) on cancerous explanted livers and surgical specimens as preclinical models.

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Hôpital Paul-Brousse AP-HP

Early Clinical Trials Platform

Head: Pr Benjamin Besse, Guylène Chartier and Thibault Raoult

Technology and expertises

The Clinical Research Division is nationally and internationally reknown. It comprises a team of experts composed of senior clinical research doctors, project managers, pharmacists, statisticians, regulatory affairs managers, pharmacovigilance experts, data managers, clinical research associates.

Objectives

An access to key opinion leaders and a wide panel of services to support building a clinical trial and optionally to sponsor the study according to institute internal processes.

Services and activities

Start-up:	Identification of main objectives and needs for implementation
Coordination:	Connecting with clinical research experts (CREs)
Synopsis:	Support in writing the synopsis by CREs
Protocol:	Support in drafting the clinical trial protocol by CREs
Product:	Contacts with medical and paramedical experts to provide support and advice on the use of drugs and medical devices
Platform:	Connecting with GR technology platforms for downstream analyses
Budget:	Support for clinical study budget set up
IMPD:	Support in drafting the Investigational Medicinal Product Dossier
Investigator:	Support in identification of expert investigator center
Review:	Provide advice by CREs on the written study documents
Practice:	Provide advice by CREs on the operational feasibility of the clinical project
Sponsorship:	Sponsoring the clinical trial (with a GR coordinating investigator)

The Clinical Trial platform of Gustave Roussy brings expertise to support the set up of early clinical trials.

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The Paris-Saclay Cancer Cluster is a European biocluster selected by the French authorities as part of the Innovation Santé 2030 plan, with the mission of accelerating innovation in oncology.

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