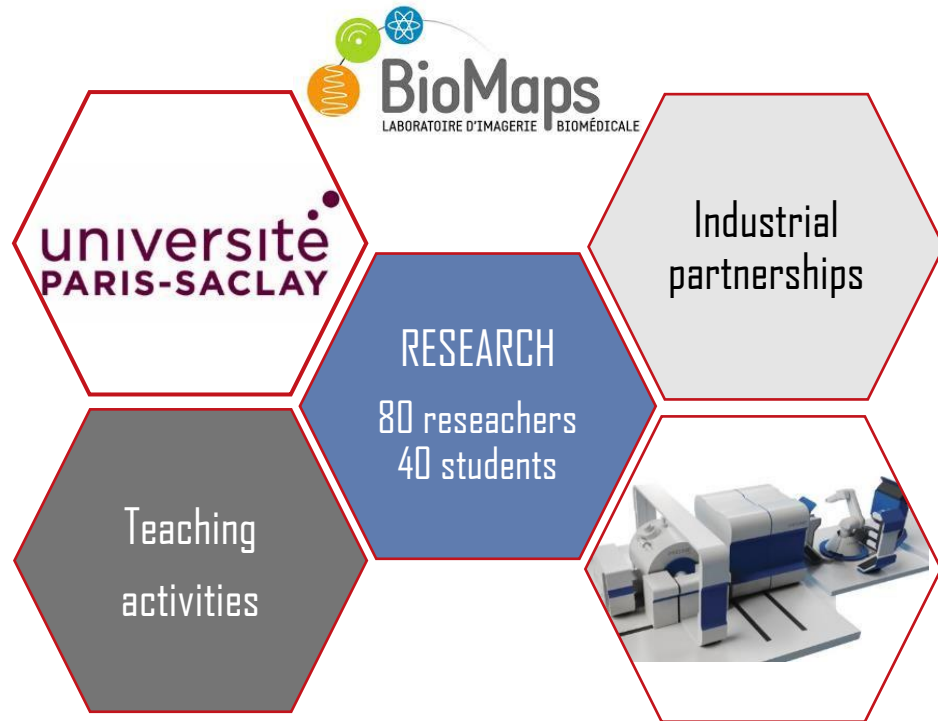




## Research unit

Translational development for methods and tools for biomedical imaging



PET imaging: translational development of original radiotracers. Tomographic reconstruction, quantification, digital simulation, pharmacokinetic modelling

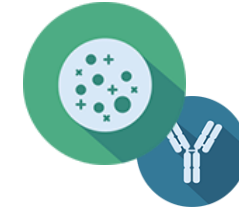
US : imaging and therapy

MRI : instruments and methods

## Therapeutic and research areas



CNS / Psychiatry / BBB



Oncology / ImmunoPET



Infectiology



Pharmacology

# Unrivaled in vivo imaging expertise & platforms for translational research



## Radiotracers



- ✓ Cyclotrons and radioisotopes
- ✓ Radiolabeling

## PET



Dedicated animal PET Scanners  
(Brain & whole body)

## Radiopharmaceuticals

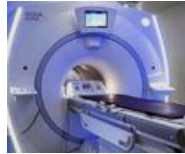


- ✓ Cyclotrons and radioisotopes
- ✓ Radiolabeling

## PET



## Multimodal Imaging



PET-CT / PET-MRI / PET-US / MRI-US

## MRI



7T

## Ultrasound



Imaging & Therapeutic

## Multimodal Imaging



PET-CT / PET-MRI / SPECT-CT

## MRI



0.55T /3T

## Ultrasound



Therapy / Validation of preclinical models / POC / Dose-response relationship / Efficacy / PK-PD / Longitudinal biodistribution

## PRECLINICAL STAGE

Therapy / Target - Side effect / Dose selection / Stratification / Go-No Go

## CLINICAL STAGE

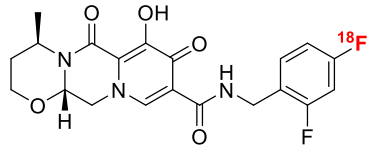
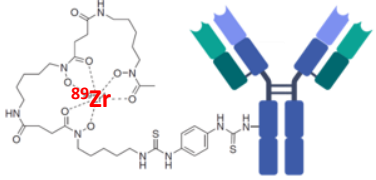
Therapy / Companion diagnostics / Stratification / Predictive response

\*MA : Market authorization

# Some illustrative cutting-edge applications

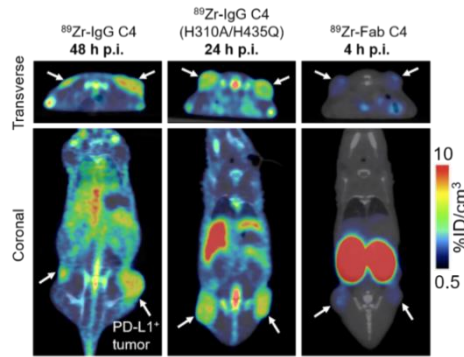


## Custom radiolabelling of ligands, drugs, and biologics



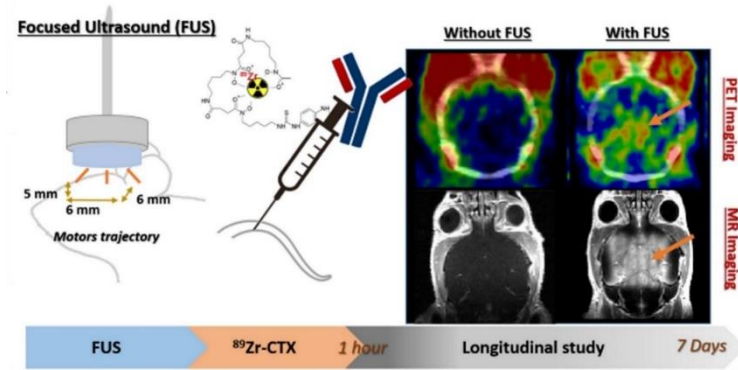
Dolutegravir

## Immuno-PET



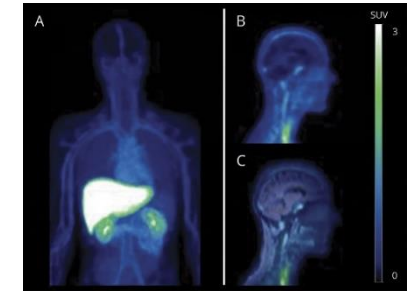
Characterization of 3 ligands derived from the anti-PD-L1 IgG1 using <sup>89</sup>Zr in a xenograft model

## Focused ultrasound to cross the BBB



Controlled delivery of mAb to the mouse brain using focused ultrasound and immunoPET

## PET/MRI



Biodistribution of marketed drug PET Microdosing - [<sup>11</sup>C]Glyburide

- Production and characterization of radiotracers and radiopharmaceuticals
- Efficacy using specific biomarkers / Biodistribution and PK-PD (dose optimization, drug efficacy and/or toxicity prediction, etc.)
- Digital simulation, image reconstruction, data and imaging analysis methodology
- Translational development
- From Imaging to Therapy



## RADIOISOTOPE PRODUCTION & RADIOLABELING



### Internal production

$^{11}\text{C}$  /  $^{18}\text{F}$  /  $^{15}\text{O}$   
Cyclone 18/9 (IBA)

### Other radioisotopes

Routinely

$^{89}\text{Zr}$  Reviity  
 $^{177}\text{Lu}$  ITM Radiopharm  
 $^{64}\text{Cu}$  Cyrce or Arronax

Granted

$^{43}\text{Sc}$   
 $^{44}\text{Sc}$   
 $^{47}\text{Sc}$   
 $^{149}\text{Tb}$   
 $^{161}\text{Tb}$   
 $^{225}\text{Ac}$

### Radiotracer production



$^{11}\text{C}$  (3 units)  
Mel+ Research SYNTHRA  
iPHASE iPHASE

$^{18}\text{F}$  (3 units)  
All in One Trasis

### Radiopharmaceutical production

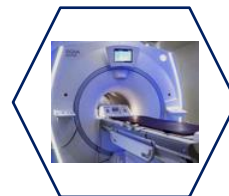


$^{11}\text{C}$  (2 units)  
iPHASE iPHASE

$^{18}\text{F}$  (2 units)  
All in One Trasis

## IMAGING SCANNERS

### Preclinical stage



#### PET: Positron Emission Tomography

Rodents  
PET Inveon Siemens

PET /CT Inveon Siemens  
IRIS Inviscan

Non-human primates  
PET / IRM 3T SIGNA GE  
PET /CT Biograph Siemens

#### MRI: Magnetic Resonance Imaging

7T (soon) Varian Agilent  
PET / IRM 3T SIGNA GE

### Clinical stage



#### PET: Positron Emission Tomography

PET / IRM 3T SIGNA GE  
PET /CT Biograph Siemens

#### SPECT: Single photon emission computed tomography

SPECT/CT Symbia Pro.specta Siemens

#### MRI: Magnetic Resonance Imaging

0.01T Homemade  
0.55T Magnetom Free Max Siemens  
PET / IRM 3T SIGNA GE



## MAGNETIC RESONANCE IMAGING

### Preclinical stage

#### Rodents

7T (soon)

Varian

Agilent



#### Non-human primates

PET / IRM 3T

SIGNA

GE

### Clinical stage

0,01T

Homemade



0,55T

Magnetom Free Max

Siemens

PET / IRM3T

SIGNA

GE

## ULTRASOUND

### Preclinical stage

#### Imaging

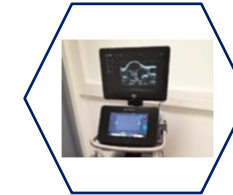
Vevo F2

Aixplorer Mach 30

Aixplorer Ultimate

Aixplorer

Vega™ ultrasound system



#### Therapeutics

Vega™ ultrasound system

CUBE

### Clinical stage

#### Imaging

Vevo F2

Aixplorer Mach 30

Aixplorer Ultimate

Aixplorer

Vega™ ultrasound system



#### Therapeutics

Vega™ ultrasound system

CUBE



## PLATFORMS CLASSIFIED AS A RADIOLOGICAL RISK

### Immunofluorescence and cytometry

Epifluorescence microscope		Zeiss
Spectral microscope	EVOS S1000	ThermoFisher
Flow cytometer	Attune NXT	ThermoFisher (green, blue and red lasers)

### Protein extraction, western blot and HPLC laboratories

Measuring metabolites following the injection of compounds

### Molecular biology

qPCR	QuantStudio 3	Thermofisher
------	---------------	--------------

### Digital simulation, image reconstruction, data and imaging analysis methodology

### Ex vivo radioanalysis and immunology

Access to autoradiography, gamma counter & NFS

## IMAGING ANALYSIS TOOLS

### Digital simulation

GATE  
Development of detectors  
Modeling of the tumor microenvironment  
Etc.

### Image reconstruction

Spatial resolution  
Attenuation correction  
Error association Improved calculation times  
Etc.

### Data and imaging analysis methodology

Metabolic modelling  
Texture analysis  
Pharmacokinetics  
Etc.

