



**State-of-the-art *in vivo* imaging**

**PET IMAGING**

# PASREL IMAGERIE IN A NUTSHELL

## PRECLINICAL AND CLINICAL IMAGING

PET



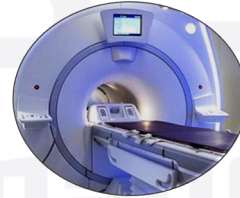
Radiotracers



Ultrahigh field MRI



Multimodal Imaging



UltraFast UltraSound



Illustrations CEA ©

## FOUR CENTERS OF EXCELLENCE



Infectious diseases



Preclinical & clinical multimodal imaging



Brain neuroimaging



Neurodegenerative diseases

## A COMPLETE OFFER



One-Stop-Shop



A dedicated manager



One single contract



Studies

Partnerships

Training

# PET IMAGING

## *From preclinical POC to drug development*

### **Our activity**

- ✓ Translational PET imaging from rodents and non-human primates to patients
- ✓ On-site isotope production ( $^{11}\text{C}$ ,  $^{15}\text{O}$ ,  $^{18}\text{F}$ )
- ✓ Routine synthesis of radiopharmaceuticals (list on request)
- ✓ On demand labeling of small & large molecules
- ✓ Multimodal imaging: PET/CT – PET/MRI – PET/US
- ✓ BSL 1 to 3 environment
- ✓ Complementary assets: animal housing, radiometabolite analysis and quantification, autoradiography, histology, immunohistochemistry, behavior, etc.

### **Therapeutical fields**

- ✓ Infectious diseases
- ✓ Neurodegenerative diseases
- ✓ Oncology
- ✓ Addiction
- ✓ Inflammation
- ✓ Ophthalmology

### **Our expertise**

- ✓ Radiomedicine validation
- ✓ Animal model validation
- ✓ Evaluation of new therapies
- ✓ Study of drug-target interactions
- ✓ Pharmacokinetics study
- ✓ Co-registration of reconstructed 3D-histological volumes of multimodal data acquired in vivo and/or ex vivo imaging

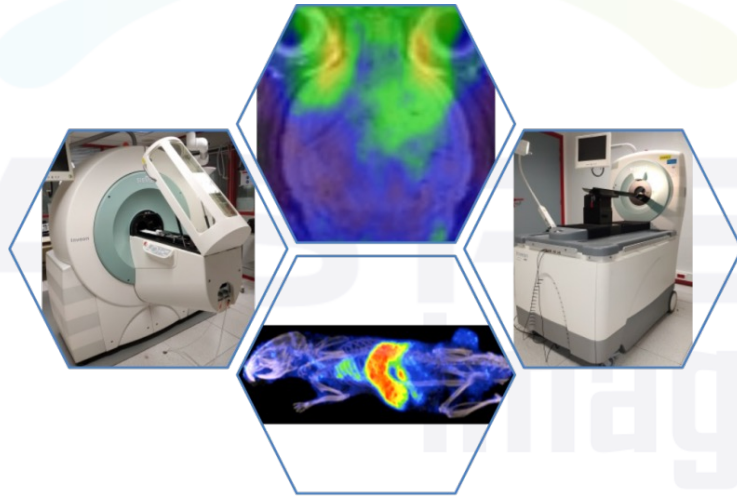
### **Our strength**

- ✓ Long-standing experience in multimodal imaging processing on rodents and non-human primates
- ✓ Complementary experts: biologists, physicists, pharmacologists, radiochemists, radiopharmacists, nuclear doctors, physicians
- ✓ Well-established partnerships with public and industrial players

# PRECLINICAL PET IMAGING

## RODENTS

Brain and whole body multimodal imaging



## APPLICATIONS

### ❖ Therapeutic fields

- ✓ Neurodegenerative diseases
- ✓ Oncology
- ✓ Neuroinflammation
- ✓ Addiction

### ❖ Expertise

- ✓ Radiomedicine validation
- ✓ Animal model validation
- ✓ Evaluation of new therapies
- ✓ Study of drug-target interactions
- ✓ Pharmacokinetics study

## EQUIPMENT

PET  
High-resolution PET  
PET (2 units)  
PET/CT

Inveon  
HRRT  
FOCUS 220  
Inveon  
Biograph

Siemens  
Siemens  
Siemens  
Siemens  
Siemens

# PRECLINICAL PET IMAGING

## NON-HUMAN PRIMATES

Brain and whole body multimodal imaging



CEA ©

## APPLICATIONS

### ❖ Therapeutic fields

- ✓ Infectious diseases
- ✓ Neurodegenerative diseases
- ✓ Oncology
- ✓ Neuroinflammation

### ❖ Expertise

- ✓ Radiomedicine validation
- ✓ Evaluation of new therapies
- ✓ Study of drug-target interactions
- ✓ Drug biodistribution
- ✓ Infection progression
- ✓ Immune response

## EQUIPMENT

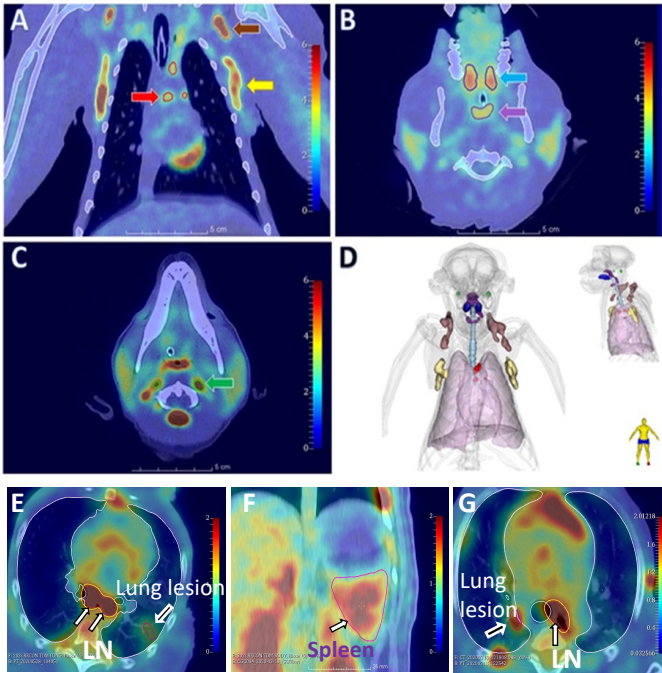
PET  
PET/MRI 3T  
PET/CT

HR+  
SIGNA  
Biograph  
Vereos

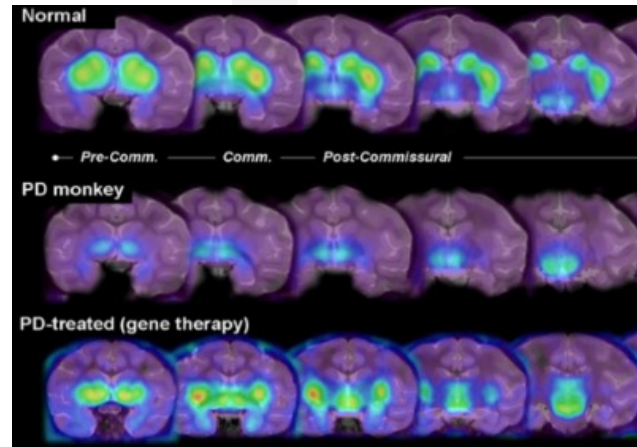
Siemens  
GE  
Siemens  
Philips

# PRECLINICAL PET CASE STUDIES

## PET-CT



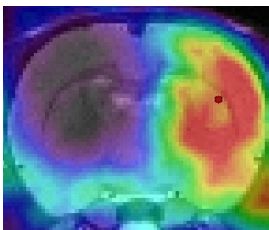
Infection effect of Sars-Cov-2 in NHP -  $[^{18}\text{F}]$ FDG uptake (Lemaitre *et al.*, 2021)



Gene therapy efficacy on a NHP model of Parkinson's disease -  $[^{18}\text{F}]$ FDOPA (Jarraya *et al.*, 2009)

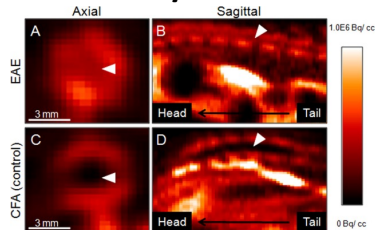
## PRECLINICAL VALIDATION OF $[^{18}\text{F}]$ DPA-714

### Stroke



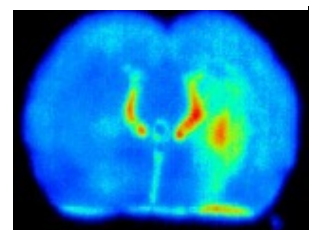
Martin *et al.*, 2010

### EAE/MS



Abourbeh *et al.*, 2012

### Kainate inj.



Chaveau *et al.*, 2009

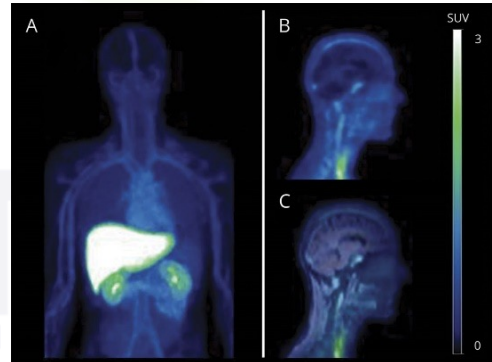
Animal models of neuroinflammation using  $[^{18}\text{F}]$ DPA-714 binding TSPO, a biomarker of microglia activation

# CLINICAL PET IMAGING

## Multimodal imaging



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Mariel *et. al*, 2019

## APPLICATIONS

### ❖ Therapeutic fields

- ✓ Infectious diseases
- ✓ Neurodegenerative diseases
- ✓ Oncology
- ✓ Chronic mental illnesses in adult
- ✓ Normal aging
- ✓ Early brain pathology

### ❖ Expertise

- ✓ Radiomedicine validation
- ✓ Evaluation of new therapies
- ✓ Study of drug-target interactions
- ✓ Drug biodistribution
- ✓ Infection progression
- ✓ Immune response

## EQUIPMENT

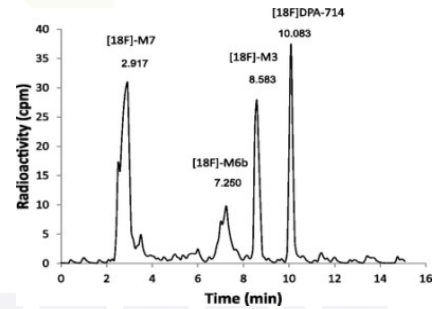
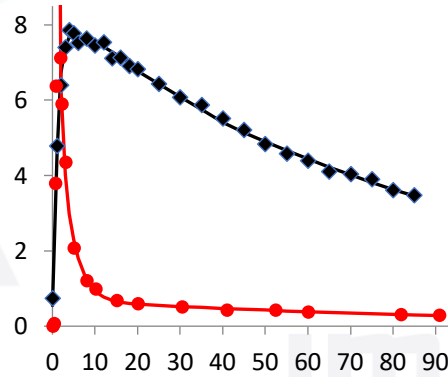
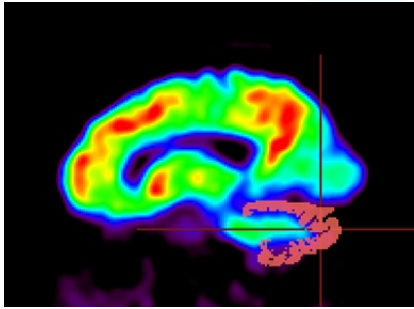
PET/MRI 3T  
PET/CT  
PET

SIGNA  
Biograph  
HRRT

GE  
Siemens  
Siemens

# CLINICAL PET CASE STUDIES

## QUANTIFICATION STUDY OF [<sup>18</sup>F]DPA-714 IN HEALTHY SUBJECT

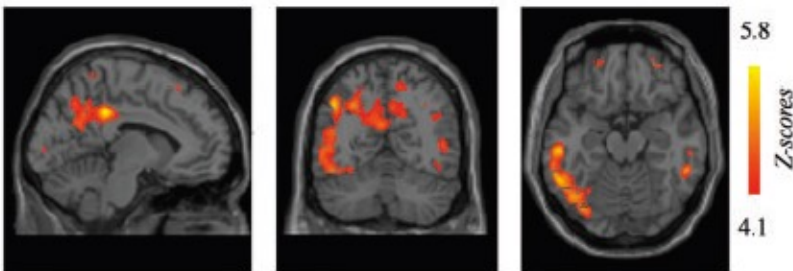


Lavisse et al., 2015 ; Garcia-Lorenzo et al., 2018; Wimberley et al., 2018; Peyronneau et al., 2013

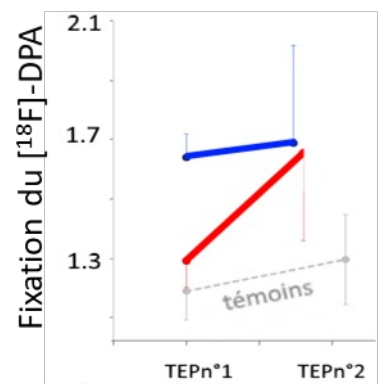
Cerebellum TSPO (a marker of microglia) imaging using [<sup>18</sup>F]DPA-714  
Kinetic profiling of metabolites in brain (blue) and plasma (red)

## LONGITUDINAL STUDY OF THE MICROGLIAL ACTIVATION IN AD

TSPO IMAGING <sup>18</sup>F-DPA-714 :  
Alzheimer patients > Controls



Hamelin et al., Brain 2016 ; 2018



Temporo-parietal cortex imaging: [<sup>18</sup>F]DPA-714 binding was higher in patients with AD than in controls in all volumes of interest

Individual analysis showed heterogeneous [<sup>18</sup>F]DPA-714 binding progression profiles among patients with AD (blue compared to red)





# PASREL

## PASREL imagerie



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[Pasrel Imagerie](#)



[PASREL-PROJECT](#)



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