

# Innovative technical platform in radiochemistry and radiopharmacy (Pi-R<sup>2</sup>)

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## Purpose

• Medical imaging by using Positron Emission Tomography (PET) technology = measurement of **metabolic activity** + identification of therapeutic potential + **in vivo biodistribution** of **radiopharmaceuticals (RP)** as **18F-FDG** for **cancers**<sup>(1)</sup>.

• **Only few RP are available** to discriminate different forms of cancer.



• Necessity to create a radiochemistry and radiopharmacy **platform** for the development of new RP (**diagnosis** and **therapeutic**).

• **Objective of Pi-R<sup>2</sup>** : transdisciplinary pooled **research platform** for the development of **innovative RP** and their transfer to the clinic in neurology, vascular cardiology and **oncology**.

• Pi-R<sup>2</sup> project, funded by the operational program **Region Occitanie/FEDER**, lead by **ToNIC** in partnership with regional academic institutions (**LCC**, **CRFRE**, **CRCT**, **I2MC**) and companies (**Zionexa** and **Imavita**).

(1) Som, H. L. Atkins, D. Bandyopadhyay, J. S. Fowler, A. R. MacGregor, K. Matsui, Z. H. Oster, D. F. Sackler, C. Y. Shiu, H. Turner, C.-N. Wan, A. P. Wolf, and S. V. Zabinski, **A fluorinated glucose analog, 2-fluoro-2-deoxy-D-glucose (F-18): nontoxic tracer for rapid tumor detection.** J Nucl Med. 1980 Jul;21(7):670-5

## Experimental design

• 4 Task Force :

- **Radiochemistry** :



Organic Synthesis & Medicinal Chemistry  
(Fluorinated compounds & radiolabelling precursors)  
Innovative Methods for radiolabelling (Main Group & Coordination Chemistry)

- **Radiopharmacy** :



Automatisation  
Pharmaceutical quality and regulatory assessments

- **Preclinical validation** :

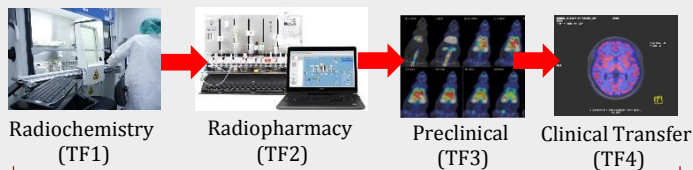


Proof of concept ,  
Safety studies, dosimetric analyses  
Development of new pre-clinical models,

- **Clinical Transfer** :



First in Man !



**One integrated platform**

## Results

The **expected results** at the end of the project are:

- **relevant** and **innovative** radiotracers
- access to **radiotracers** according to **controlled synthesis** and **quality** processes
- **preclinical models** for **PET imaging** of **identified targets**
- development of **RP** and provision for the implementation of **clinical trials** in **partnership** with the **academic** and **private** sectors

## Conclusion & Perspectives

This project introduces the current missing in the continuum from molecular design to clinical research in nuclear imaging. The Pi-R<sup>2</sup> project will provide an effective transdisciplinary platform.

The scope of MRP is not only restricted to the diagnosis of cancers and can be exploited for therapeutic evaluation, and developments in other various fields such as Cardiology, Neurology, Psychiatry...<sup>(2)</sup>

(2) Beaurain M, Salabert AS, Ribeiro MJ, Arlicot N, Damier P, Le Jeune F, Demont JF, Payoux P. **Innovative Molecular Imaging for Clinical Research. Therapeutic Stratification, and Nosophy in Neuroscience.** Front Med (Lausanne). 2019 Nov 27;6:268. doi: 10.3389/fmed.2019.00268.