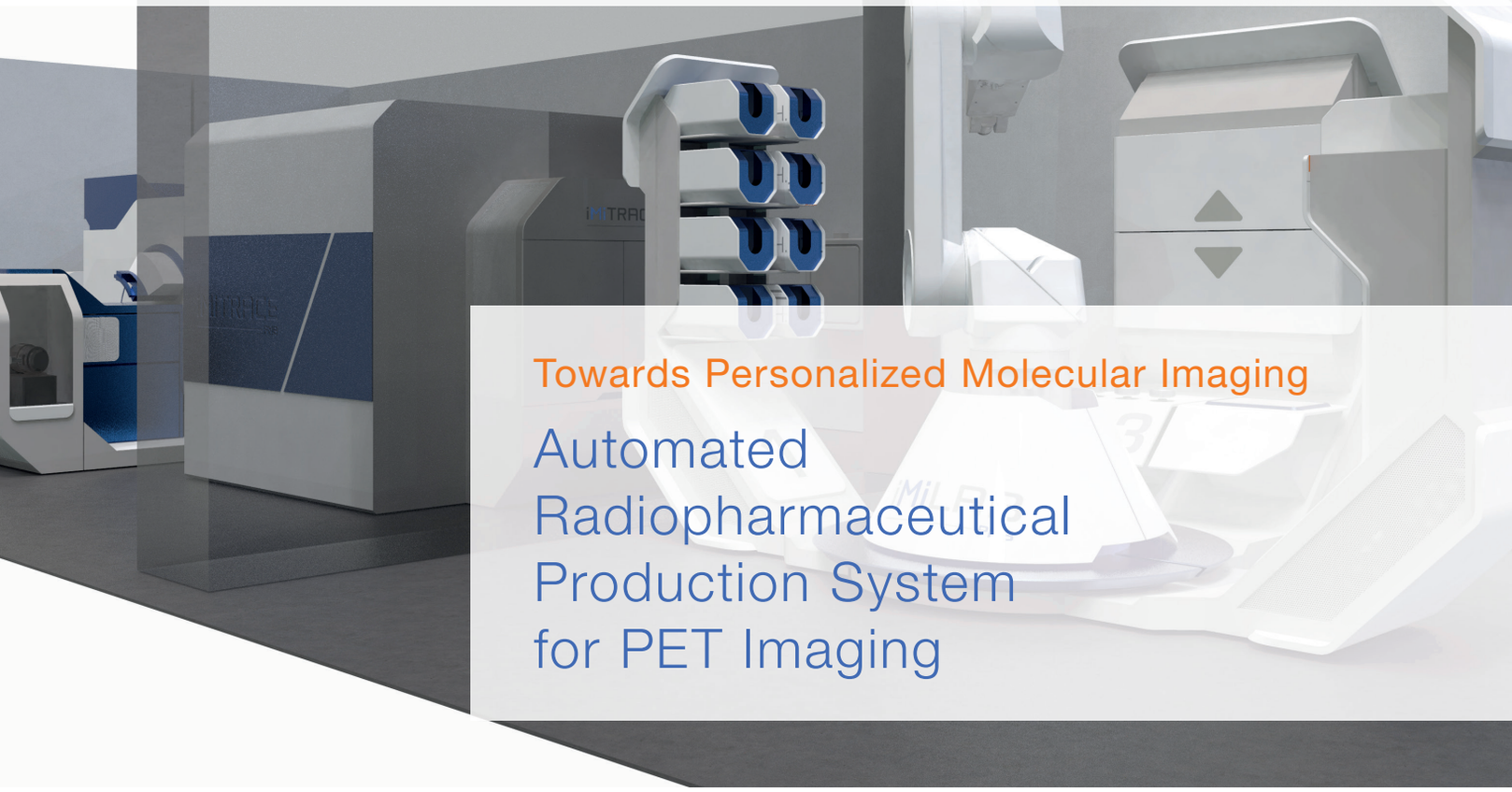
iMiGiNE
PMB



Towards Personalized Molecular Imaging

Automated Radiopharmaceutical Production System for PET Imaging

Combining an iMiTRACE cyclotron with a robotized iMiLAB radiochemistry room and an automated quality control device, iMiGiNE allows medical centers to free themselves from current limitations in the production and distribution of PET radiopharmaceuticals.

Positron-emission tomography (PET) is a nuclear imaging technique used to observe metabolic or molecular activity of an organ, by detecting the gamma-ray emissions produced by the positrons contained in an injected radiopharmaceutical solution. PET systems can be used to make a diagnosis in the fields of oncology, neurology and cardiology and to monitor the progression of the disease while the patient receives treatment.

Today, limited access to specific radiopharmaceuticals

Currently, the radiopharmaceuticals used in PET imaging are generally produced and distributed by major private centers, using a heavy and costly process. These centers produce radioactive atoms with large size cyclotrons, then synthesize those atoms with targeting agents of clinical interest, before testing and injecting them in a patient. Due to financial and technical constraints, the supply of radiopharmaceuticals is limited to a few molecules, even though more than 200 could be of clinical interest.

The production facilities are located far from the medical and research centers: in addition to raising logistical issues, this distance eliminates the opportunity to have access to more specific radiopharmaceuticals, whose half-life is often short.

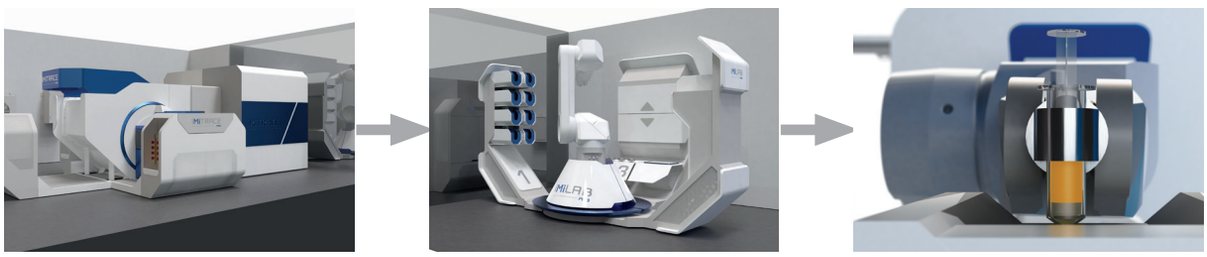
This limited access has direct consequences on patient care: health facilities are unable to use specific molecules, which would help better characterize the disease and eventually, provide patients with more efficient treatments and adequate care.

iMiGiNE, a system designed for facilitated *in-situ* production

Production of various radioisotopes (^{18}F, ^{11}C, ^{68}Ga, etc...) in a 12 MeV superconducting cyclotron

Radiosynthesis carried out in a robotized radiochemistry room (labelling the targeting agent with a radioisotope)

Quality control completed through an automated process to test the synthesized molecule



A breakthrough technology compared to current processes

By providing solutions to current limitations in radiopharmaceutical production processes, iMiGiNE allows medical centers to break new ground in medical diagnostics and biological research.

Radiopharmaceutical production is relocated close to the patient.
Installed within 50-cm-thick concrete walls and occupying an area of less than 100 sqm, this system enables the production of a specific radiopharmaceutical, near the patient.

The system use is simple and requires few human resources.
From isotope production to syringe-filling and molecule testing and control, the process is entirely automated, with a decreased need in staff.

iMiGiNE grants access to several new molecules of clinical interest.
Using innovative microfluidic techniques, this system is extremely versatile and can produce tens of different specific molecules daily.

iMiGiNE fosters and facilitates research.
With this system, research teams dispose of a readily available tool to produce new radiopharmaceuticals and test them, within a relatively short period.

Patient treatment is improved.
The “one dose - one patient” production mode and the access to new and more specific radiopharmaceuticals allow health centers to better characterize disease, precisely monitor its progress and determine the efficacy of the selected treatment plan.

Located near Aix-en-Provence, in France, PMB is a 130-employee SME. With a strong expertise in brazing, the company designs and manufactures complex mechanical assemblies and components (ceramic-metal, radio-frequency...) and linear particle accelerators. PMB is part of the industrial group ALCEN, working in the fields of Defense & Security, Energy, Medical & Healthcare, Aeronautics & Space and Large Scientific Instruments.

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