

Theranostics

In Interdisciplinary Cancer Care

Dirigente Medico – UOC Medicina Nucleare
Dipartimento di Diagnostica per Immagini e Radioterapia Oncologica
Responsabile GSTeP Radiopharmacy – BAC, TOC, Direzione Scientifica
Fondazione Policlinico Universitario A. Gemelli IRCCS



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Rome, Italy, 27.10.25

Gemelli

Fondazione Policlinico Universitario Agostino Gemelli IRCCS
Università Cattolica del Sacro Cuore



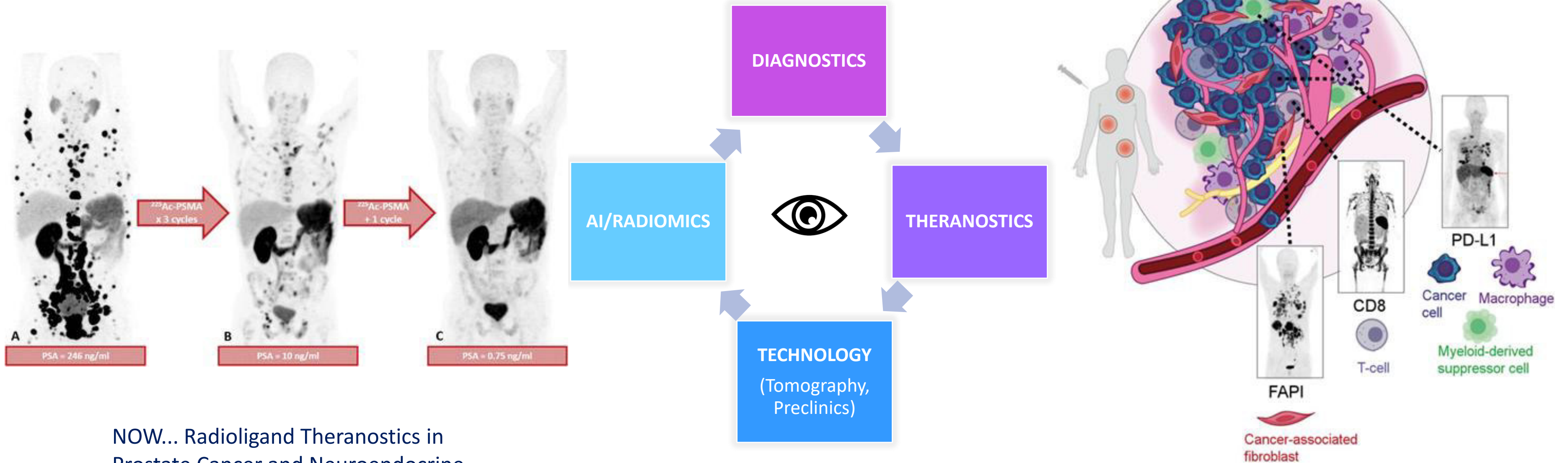
GART

Advanced Radiation Therapy



Theranostics – The Good Nuclear

“See what you treat, and treat what you see”



NOW... Radioligand Theranostics in Prostate Cancer and Neuroendocrine

NEW... Microenvironment Theranostics in Oncology and Inflammatory Diseases

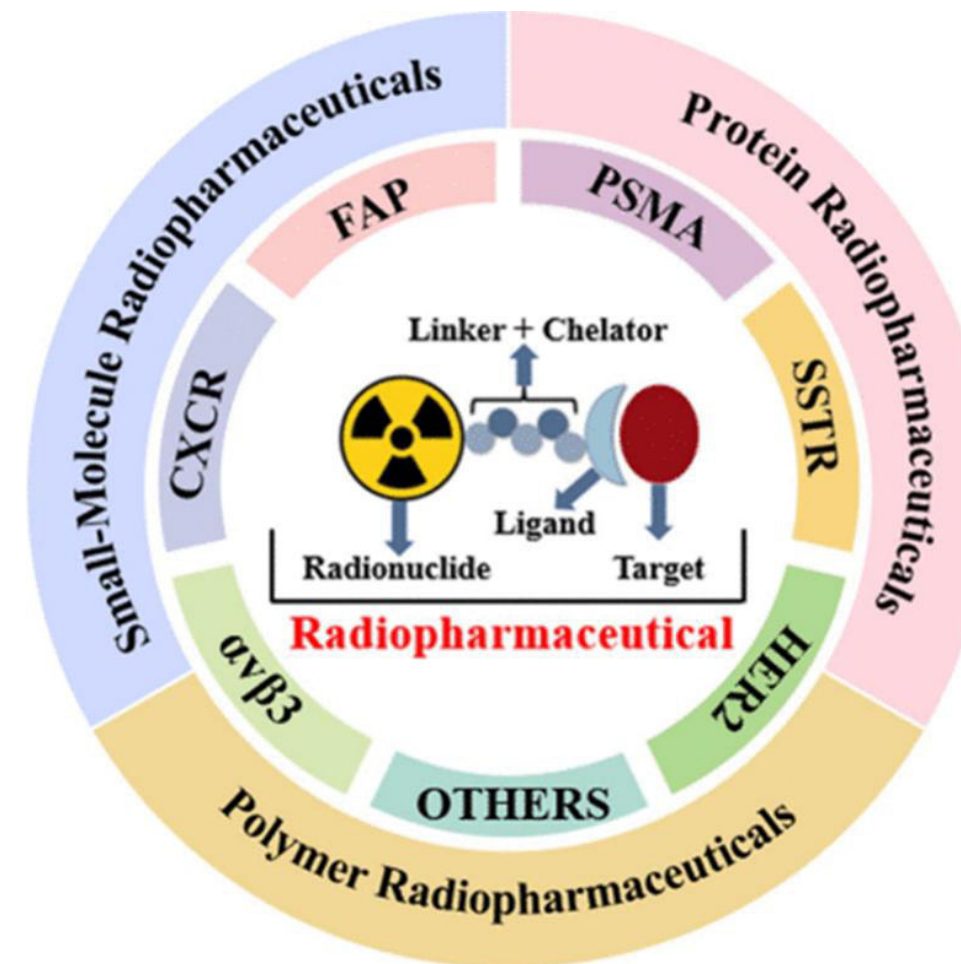
Theranostics - The Good Rationale

“Why Radioligand Theranostics?”

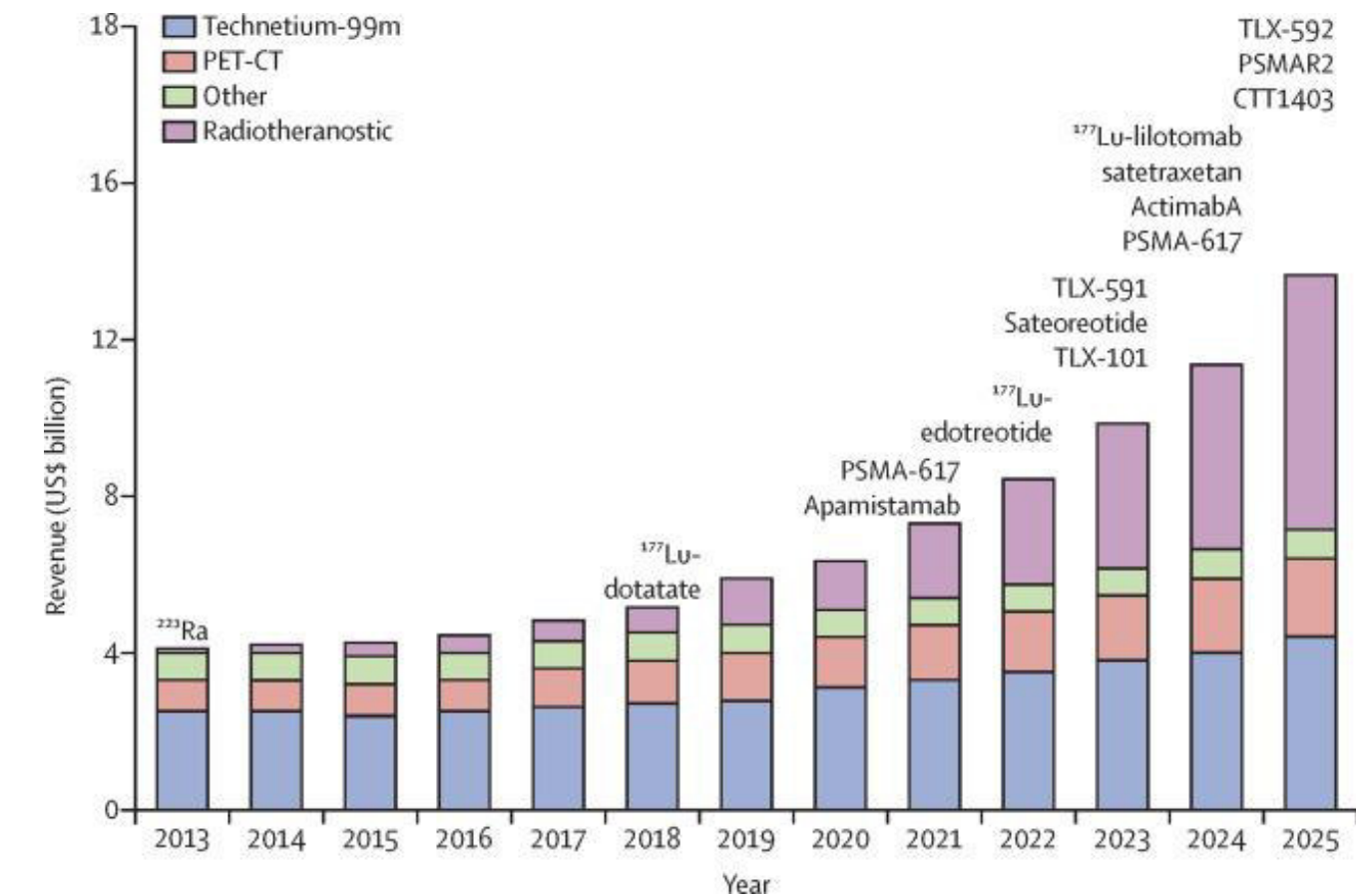
By Physicists...

	Radionuclide	T½	Type	Mean Energy (MeV)	Max. range (mm)	Imaging
commercially available	Radium-223	11.4 d	Alpha	6.9	<0.1 mm	no
	Lutetium-177	6.7 d	Beta	0.14	2	SPECT
	Yttrium-90	2.7 d	Beta	2.3	12	PET
	Iodine-131	6.7 d	Beta	1.0	2	SPECT
potentially available	Copper-67	2.6 d	Beta	0.5	21	SPECT
	Terbium-161	6.9 d	Beta/Auger	0.2	0.03	SPECT
	Actinium-225	9.9 d	Alpha	6.8		no
	Bismuth-213	46 min	Alpha	8.4	0.08	no
	Throrium-227	19 d	Alpha	6.1	0.1	no
	Lead-212	10.6 d	Alpha	6.1	0.1	no

By Radiopharmacists...



By Patients...



New Theranostic Couples, New Microenvironment Targets, Sustainability

“We are stronger together!”



Nuclear Medicine Unit, Medical Physics



Routine Theranostics, Out/In-Patient
(Public and Private Practice; eg. ^{177}Lu -PSMA/DOTATATE)

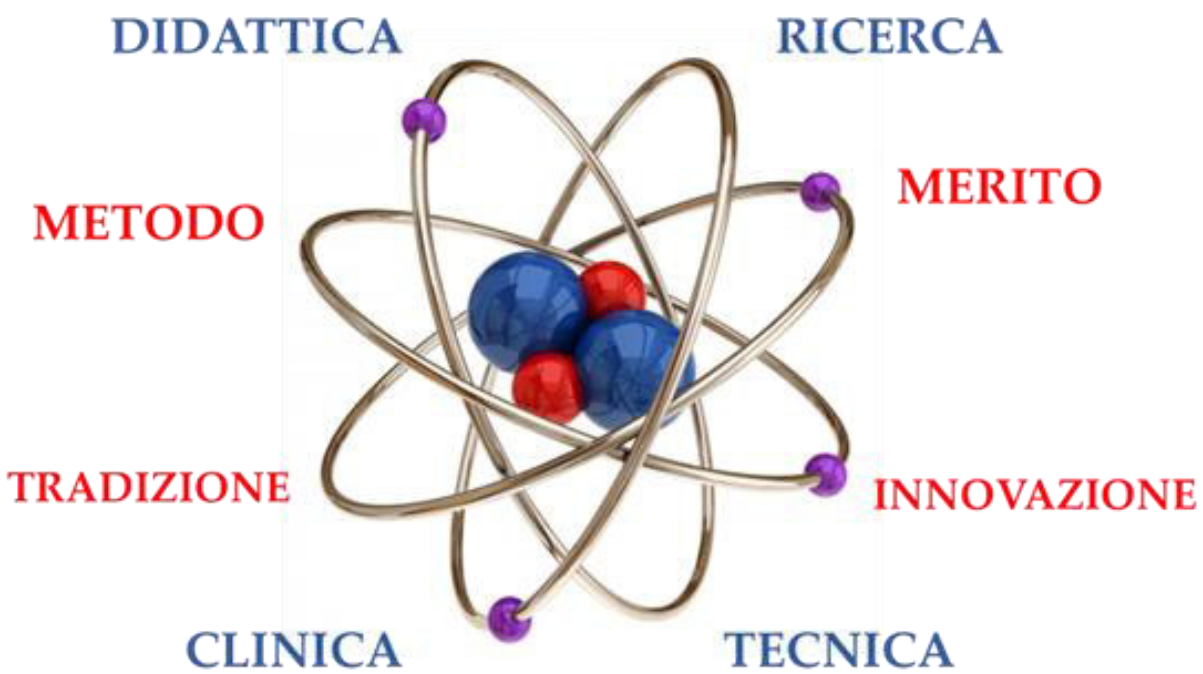
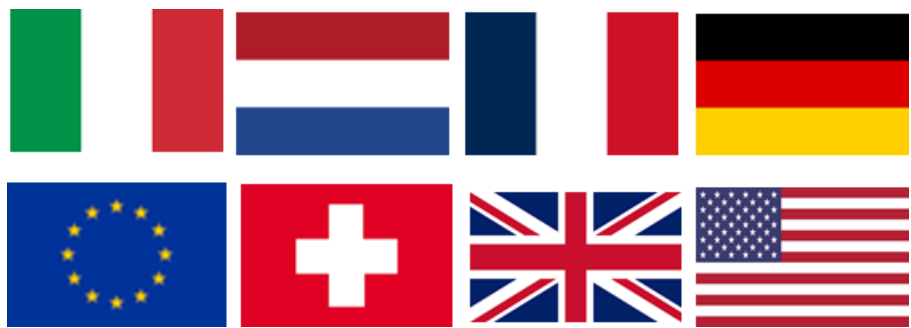
Phase III/II Trials, In-Patient
(Grants, Profit or Compassionate; eg. ^{177}Lu -PSMA/FAP)

Phase I Trials, In-Patient
(Grants and Profit; eg. $^{225}\text{Ac}/^{67}\text{Cu}/^{161}\text{Tb}$ PSMA/FAP)

Pre-Clinical Experimental
(Grants and Profit; new compounds)

Teaching - The Good School

«On the shoulders of the giants»



Nuclear Medicine - The Good Expertise

«Scintillating past, Illuminating future»



1970

SPECT/CT Scanners
and SPECT/Therapy
Radiopharmacy



2005

PET/CT Scanners
and PET Radiopharmacy
(with Medipass®)



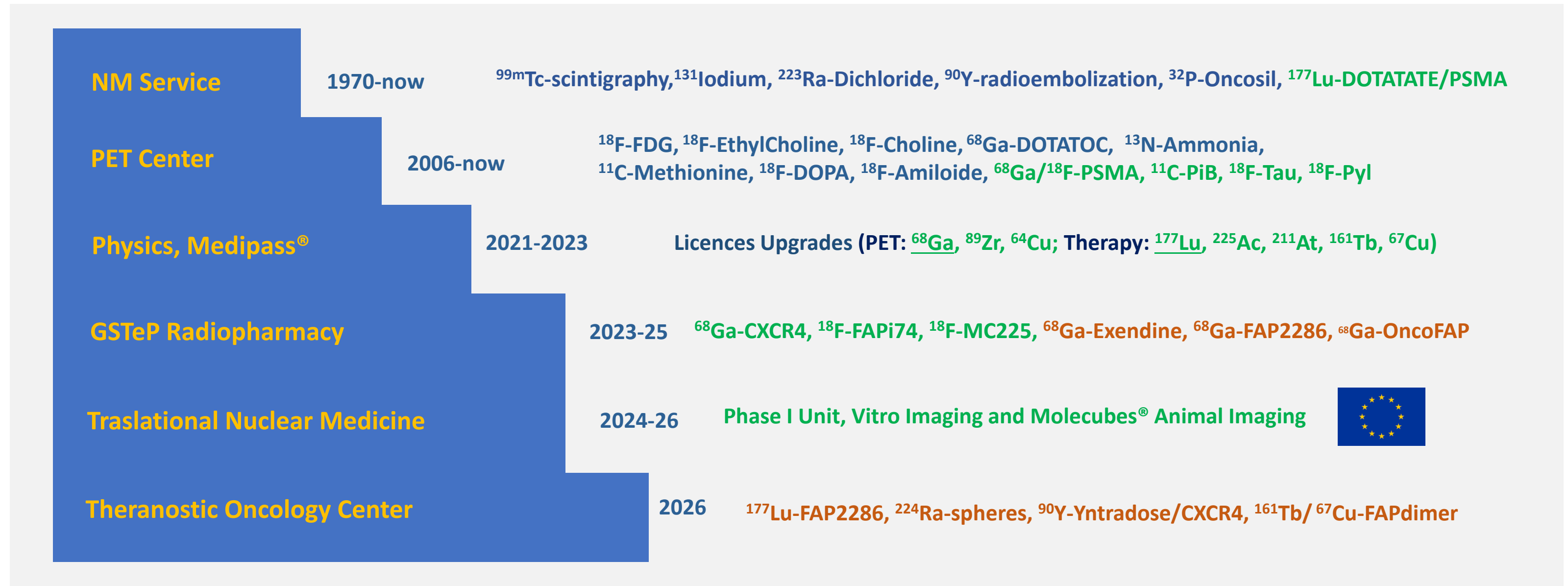
2025

Vitro Imaging
and Animal Imaging
(with Direzione Scientifica and Animal Lab)



Radiopharmaceuticals - The Good Job

Look up: Benchmarks and Rankings



Legend

Ongoing

To-Start



Sustainability - The Good Plan

«Excellence, Viability, Feasibility»

Profit Trials

Diagnostic trials

- BioPharma® (¹⁸F-Tau)
- Synektik® (¹⁸F-SYN)
- Bracco® (⁶⁸Ga-OncoFAP, ⁶⁸Ga-rhPSMA)
- ITM® (¹⁸F/⁸⁹Zr-Folati, ¹⁸F-DOTATOC)
- GEHC® (⁶⁸Ga-FAPi46/¹⁸F-FAPi74)

Theranostic Trials

- Pentixapharm® (⁶⁸Ga-PTF301/302, ⁹⁰Y-PTT101/102/103)
- Novartis® (¹⁷⁷Lu/²²⁵Ac-PSMA, ¹⁷⁷Lu-DOTATATE/FAP2286)
- Telix® (⁶⁸Ga/¹⁷⁷Lu-abPSMA, ⁸⁹Zr/¹⁷⁷Lu-Girentuximab)
- Oncoinvent® (²²⁴Ra-microspheres)
- Philogen® (¹⁷⁷Lu-OncoFAP/ACP3)
- Bayer® (²²⁵Ac-PSMATrillium)



No-Profit Grants

Grants won

- Finalizzate (¹⁸F-FDG, ¹⁸F-MC225)
- PNRR (¹⁸F-FAPi74, ⁶⁸Ga-Exendine)
- Veronesi, Oncidium® (¹⁸F-PSMA)
- EU4Health (CLAUD-IT, SAMIRA)
- Horizon IHI (Thera4Care, Q-AID)



Grants applied

- Finalizzate, PNRR, PRIN
- AIRC, Roche®, Oncidium®
- PRIN, FIS/FISA
- COST, ERC, Horizon
- EraPER, Transcan



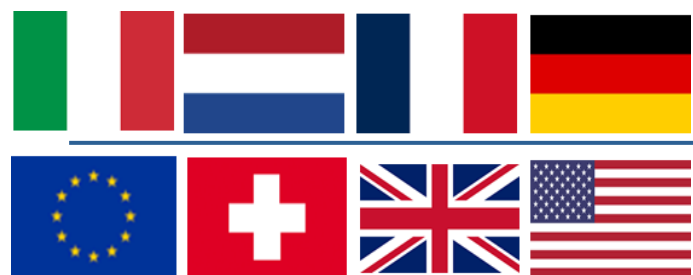
Legend

Ongoing

To-authorize

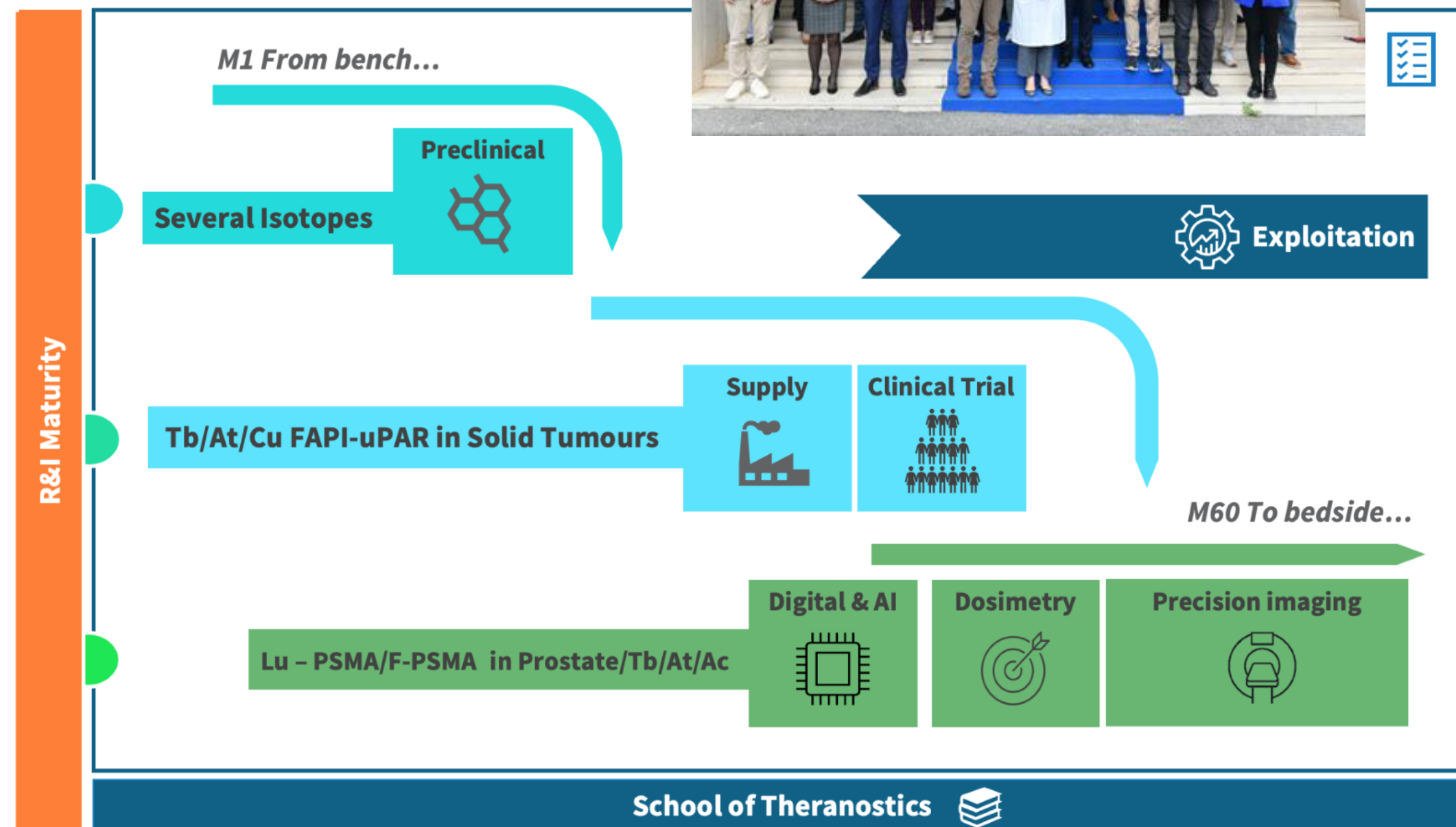
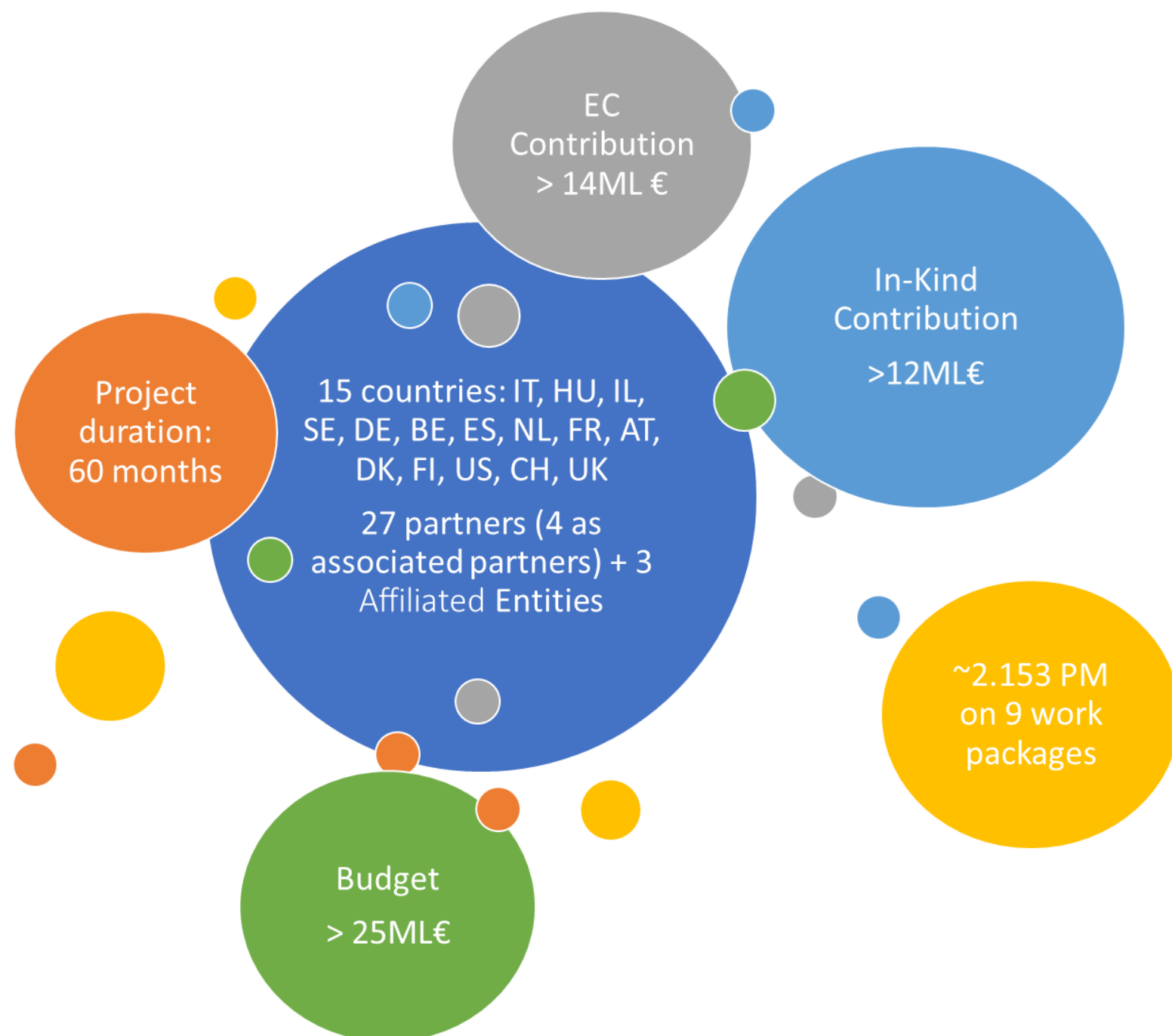
To-fund





Thera4Care – The Good Horizon

The largest Consortium, coordinated by UCSC/FPG



This project is supported by the Innovative Health Initiative Joint Undertaking (IHI JU) under grant agreement 101172788. The JU receives support from the European Union's Horizon Europe research and innovation programme and COCIR, EFPIA, EuropaBio, MedTech Europe, Vaccines Europe, Atley Solutions, Curasight, Dosisoft, Minerva Imaging, Perspective Therapeutics, and Terthera.

Clinics - The Internal Networks

«The Power to Serve»

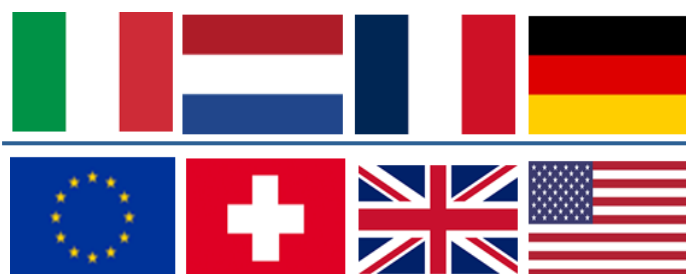
	2022.....2023.....2024.....2025.....2026.....
Diagnostics & Radiotherapy	Veronesi® (Uro), Novartis®/ <u>Horizon IHI</u> (various), PROMISE/Oncidium®/Telix® (Uro)
Laboratory & Hematology	Finalizzata, Pentixapharm® (Hematology)
Female Health	Philogen®/Oncoinvent® (Peritoneal), GEHC®/Bracco®/ITM® (Ovarian)
Medicine and Surgery	PRIN-PNRR (Diabetes), GEHC®/Bracco® (Gastro-Intestinal)
Ageing and Orthopedics	PNRR-Salute (Rheumatology)
Neuro-science	Medipass®, Biopharma® (Dementia), Finalizzata (Depression)
Cardio-vascular	Synektik® (Ischemia)

Legend

Ongoing

To-Start





Learning - The Esternal Networks

«Look up: Benchmarks and Rankings»

INSTITUTIONS



Leiden University
Medical Center



ETH Zürich
University of Zurich



Universitätsmedizin Essen
Universitätsklinikum



PAUL SCHERRER INSTITUT
PSI



Curanosticum
Wiesbaden · Frankfurt



KING'S
College
LONDON



Memorial Sloan Kettering
Cancer Center

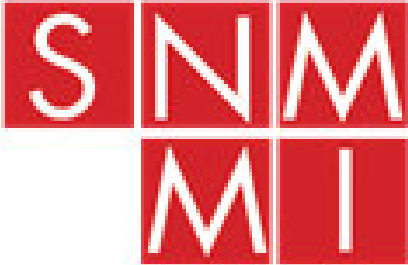
International Fellows

ASSOCIATIONS





EUROPEAN ASSOCIATION OF
NUCLEAR MEDICINE





eatris
European infrastructure
for translational medicine



ACCREDITED CENTRE OF EXCELLENCE
• 2024 •
RESEARCH4LIFE®
an EANM initiative
PET/CT · PET/MR



Oncidium
foundation



ICPO
FOUNDATION

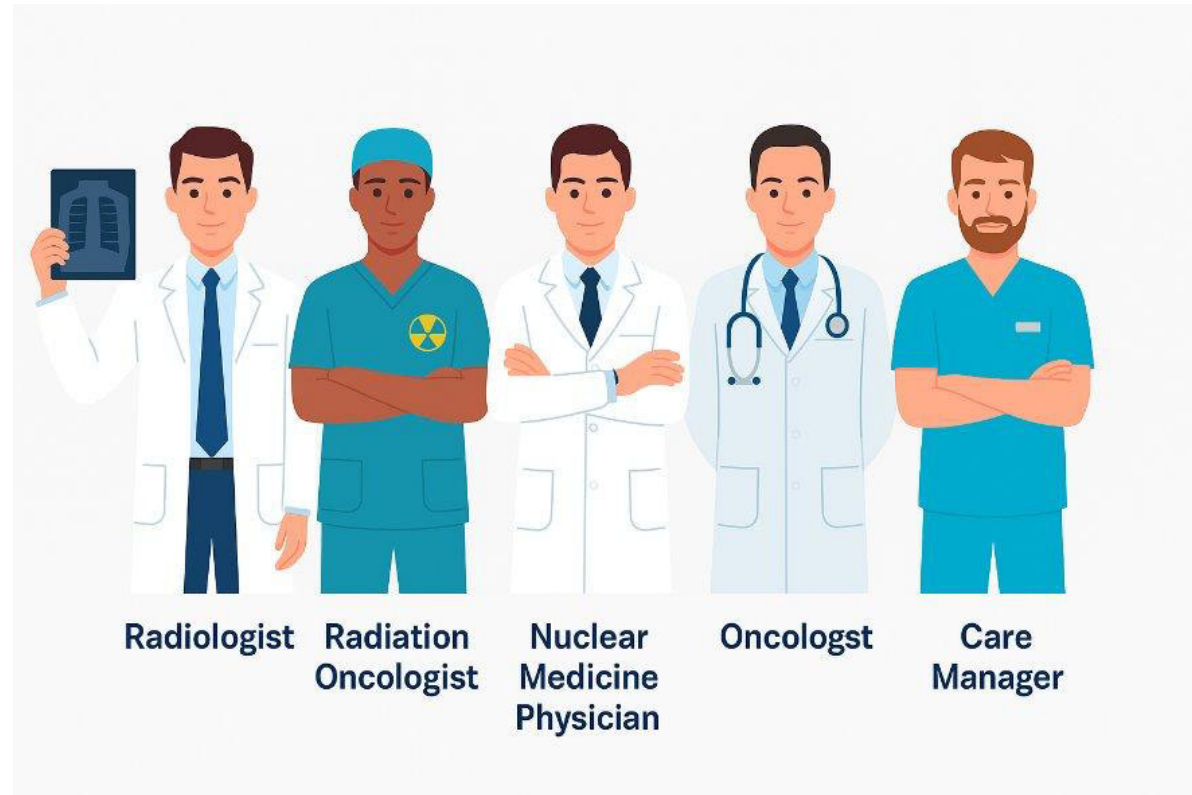


THERA4CARE

International Boards

Solidarity – The Good People

Equity and Accessibility



*From bench to bedside:
The value of PET, SPECT
and CT imaging in
preclinical research*

For Patients

With Families

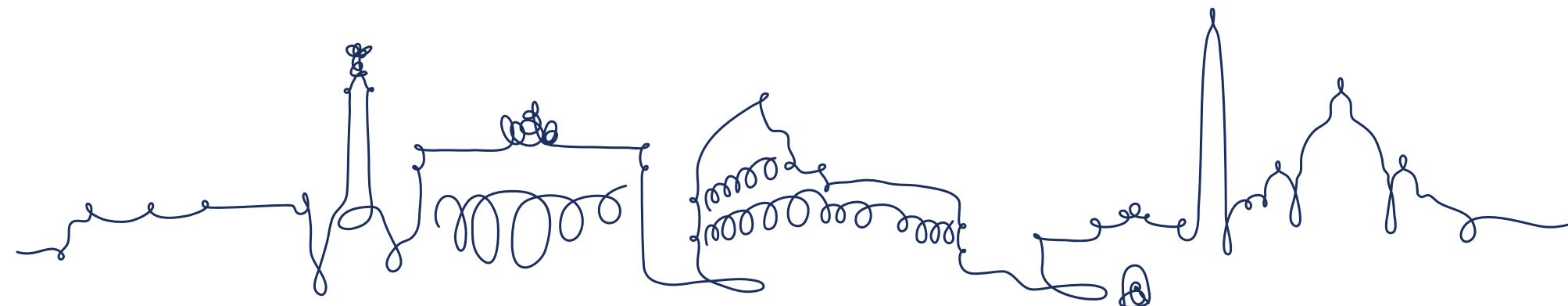
With Colleagues

In Clinical Trials

With Animals

For Planet





Thanks for your attention!

dr. Salvatore Annunziata

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