THE ONCIDIUM FOUNDATION
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Oncidium foundation

ACCESS • EDUCATION • HOPE

# Radiotheranostics Today

Voicing the Challenges and Opportunities of Radiotheranostics for Cancer Care

In this Issue:



## Oncidium foundation Launches Radiotheranostics Today

### Voicing the Challenges and Opportunities of Radiotheranostics for Cancer Care.

Recent research and developments have brought forward the pivotal role of radiotheranostics for cancer care. Whether you refer to them as Radiotheranostics, Theranostics, Theragnostics, Radioligand therapy or Radionuclide therapy, they all describe an innovative approach to cancer care through the beneficial application of radioisotopes, within the Nuclear Medicine field.

As a newcomer in the cancer diagnosis and therapy, there is still a lot to be done to bring forward the availability and potential of the technology.

It is in this endeavor that the Oncidium foundation has decided to rethink its newsletter by bringing together and providing exclusive content by key players involved in this field of precision oncology.

From challenges to opportunities, from awareness to readiness, discover what the voices of Oncidium have to say about bringing forward Radiotheranostics Today.

**Ready to talk radiotheranostics with Oncidium foundation?**

- Zoom on the radiotheranostics situation in your country
- Evolution, projects and challenges in your region
- Focus on a particular application
- Patient/practitioner interview etc.

To contribute to the next issue of "Radiotheranostics Today" **Contact us.**

# NOBLE Registry: Dosing of First Patients Shows Encouraging Early Results in the Investigational Use of $^{99m}$Tc-iPSMA for prostate cancer screening*

By Dr. Omar Yehia Hussein

PSMA-PET/CT imaging scans have rapidly gained popularity all over the world because of their higher accuracy to detect prostate cancer recurrence and metastases all over the body compared to conventional imaging techniques.

Following the recent incorporation of PSMA-PET in the National Comprehensive Cancer Network (NCCN) guidelines, the expected adoption of this technique and global awareness is likely to increase even more in the near future. Thus, PSMA-PET scans could become in the coming years the reference in terms of prostate cancer detection and assessment.

## Challenges for Global Adoption

The main factors affecting the global implementation and use of this technique concern budget and infrastructure. The challenges are:

- Access to a relatively expensive machine which is "PET/CT"
- There are five times more SPECT cameras already installed worldwide, and this gap is particularly present in developing countries.
- Access to PSMA-PET tracers, which currently are:
• $^{68}$Ga-PSMA, which will need investment in buying a relatively expensive gallium generator and to have a local radiopharmacy to produce $^{68}$Ga-PSMA tracers in-house
• $^{18}$F-PSMA which is produced by a cyclotron (other costly investment) which can be inside the hospital or in a close area with the ready-to-inject doses delivered to the imaging site.

## The Idea Behind the NOBLE Registry

As previously mentioned PSMA PET is an emerging standard of care in prostate cancer imaging. However, these technologies are scarce in some parts of the world and their implementation may come at a high cost and require adapted infrastructures, creating a need for a more available and accessible alternative.

The NOBLE Registry aims at filling this gap by introducing novel PSMA radioisotopes that can be labeled with Technetium-99m ($^{99m}$Tc) and can be imaged using SPECT/SPECT-CT scanners, which is particularly of great value in some countries as well as remote and rural locations where SPECT is the predominant imaging modality.

The idea is to generate a data repository, which may inform further development of PSMA-SPECT products in prostate cancer detection for those emerging markets. Seven centers are currently involved in the NOBLE Registry worldwide with the aim of providing real world evidence to deliver useful publications and clinical practice guidelines. Thus, NOBLE is dedicated to developing an efficient and affordable alternative through SPECT-imaging, allowing people living with prostate cancer, regardless of origin, technology availability or financial situation, to access PSMA-SPECT imaging for accurate diagnosis and further treatment planning with the associated therapeutic agent based on the same vector.

## NOvember is MOvember!


**The NOBLE Registry is sponsored by the Principal Investigator and participating expert sites around the world. Telix provided funding support and drug to support the study purpose, but is not responsible for the design, output or results which are led and controlled by the independent team running the study. $^{99m}$Tc-iPSMA is authorized for investigational use only and has not received a marketing authorization in any jurisdiction.*

## Initial Experience

**Ga-PSMA-PET/CT** **Tc-PSMA fused with CT**

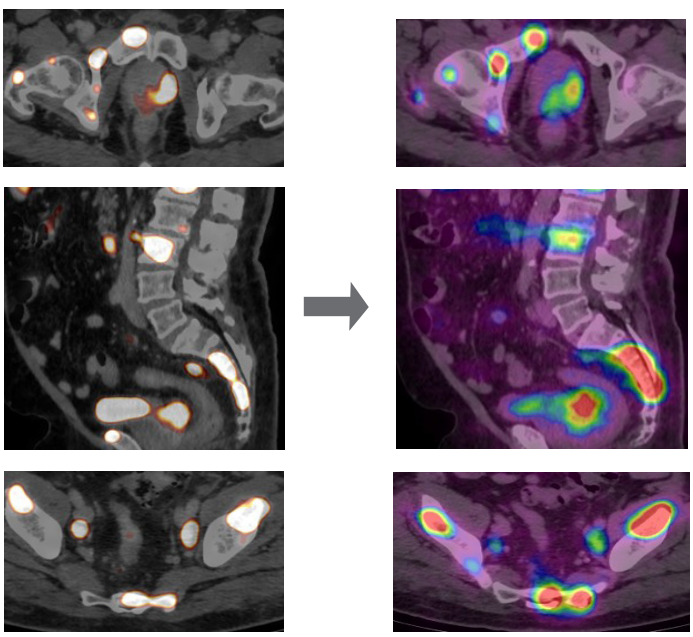

*Image courtesy of Dr. Omar Yehia (MISR Radiology Center)*
*$^{99m}$Tc-iPSMA is authorised for investigational use only and has not received a marketing authorisation in any jurisdiction*

Dr. Omar Yehia is one of the first Investigators enrolled in the NOBLE Registry at the MISR Radiology Center in Egypt.

Early experience indicates that $^{99m}$Tc-iPSMA SPECT can potentially identify lesions and important disease characteristics using technology, which is readily available in emerging markets. Most of the lesions of about 8-10mm and larger were detected on the $^{99m}$Tc-iPSMA SPECT scan which can be considered promising.

Furthermore, in comparison to bone scan, not only were they able to detect the bony lesions but they could also identify the prostate/prostate bed, lymph nodes and any soft tissue metastasis in one scan.

Overall, this first experience shows promising results using $^{99m}$Tc-iPSMA SPECT and could potentially play a role in prostate cancer detection and selection of potential positive responders to PSMA-based radioligand therapy in regions where PSMA-PET is not available.

## Future Directions

The first experience from one of the centers involved in the NOBLE Registry is promising. Should the other centers demonstrate the same results, $^{99m}$Tc-iPSMA could represent a step in the right direction by facilitating patient access to PSMA-SPECT scans in some regions of the world for an accurate disease staging and accordingly accurate treatment planning for prostate cancer. Thus, enabling hope to achieve NOBLE's objective: NOBody LEft behind.

Moving forward, $^{99m}$Tc-iPSMA SPECT imaging could pave the way also for PSMA-radioligand therapy by helping to select the eligible patients with high PSMA uptake that are more likely to respond to radioligand therapy ($^{177}$Lutetium-PSMA), for which the first drug is expected to get FDA approval soon after the positive results of the VISION Trial.

For more information: **www.nobleregistry.org**

Contact us: **prostatecancer@nobleregistry.org**

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# VISION Trial: Results and Perspectives for the Field of Radiotheranostics

By Dr. Oliver Sartor and Cristiana Gonçalves Gameiro

**Dr. Oliver Sartor, Medical director of the Tulane Cancer Center and co-Principal Investigator in the Phase III Vision Trial joins Dr. Cristiana Gameiro, Scientific Advisor of the Oncidium foundation in a discussion following the positive results of the Vision Trial, a Phase III clinical trial intended to prove efficacy of a prostate cancer treatment with a new treatment, $^{177}$Lu-PSMA-617 developed by Novartis, based on Lutetium-177 labeled peptide targeting PSMA (Prostate Specific Membrane Antigen)-receptors. The aim of the talk is to better grasp some technical details about the trial and orient the discussion from a patient perspective and finally discuss hope for people living with cancer and for the field.**

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**Dear Professor Sartor, can you tell us about the real overall goal of the VISION Trial?**

*The overall goal was to obtain regulatory approval throughout the world for $^{177}$Lu-PSMA-617. A whole variety of studies had been previously performed, and unfortunately, none of those were eligible for regulatory approval. Therefore, I wanted to create a Phase III Trial that would be definitive and that would result in the approval of this drug, both in the United States, and in Europe but also throughout the world. And that is what we did.*

> *"The overall goal was to obtain regulatory approval throughout the world for $^{177}$Lu-PSMA-617."*

**Were the patients selected with an imaging PSMA biomarker for the trial?**

*To qualify for the trial, the patients had to go through a PSMA PET scan, and they had to show metastatic lesions with at least one metastatic lesion with an uptake greater than liver. There was also a negative selection. All the patients had to perform a bone scan and a CT scan. We excluded those individuals who had a super scan and those who had visceral lesions, such as in the liver or lung of 1cm or greater that were PSMA negative. In addition, we excluded those patients who had PSMA negative lymph nodes of 2.5 cm or greater and those who had a bone lesion that was PSMA negative, if*

*greater than 1 cm. In the end, we actually included about 87% of the patients who had a PSMA PET.*

**What were the major key findings and results that you can highlight?**

*First, the key findings related to the overall survival endpoint are important because patients lived longer (four months compared to the control arm). They had a hazard ratio of 0.62, had excellent confidence intervals that did not come close to 1 and great P value, and therefore were unequivocally positive on overall survival. In addition, we had unequivocal positivity with our Radiographic Progression-Free Survival (rPFS) with a hazard ratio of 0.4 and about eight-months rPFS interval compared to about three and half months for the control arm. We observed PSA declines, radiographic responses, and tumors shrinkage. In fact, patients either had a complete remission (about 9%) or a partial remission (about 42%). Taken together, the complete remission plus partial remission rate was a little over 50%, which is very promising in this heavily pre-treated population. In addition, confirmed PSA declines were present in about 46%.*

*Then, we observed positive impact on a whole variety of quality-of-life parameters. Indeed, health related quality of life deteriorated at a much lower rate in the treated arm as compared to the control group. Therefore, in addition to patients living longer, they lived better and to me that is important. I think it is "this living longer, living better" fact that will be convincing to regulatory agencies around the world.*

> *"In addition to patients living longer, they lived better and to me that is important. I think it is "this living longer, living better" fact that will be convincing to regulatory agencies around the world."*

*To be continued page 5*

**Do you know when this drug is expected to be approved?**

*It is difficult to know because it will depend on the regulatory agencies. There are a lot of issues now at the FDA because of personnel shortages and the tremendous workload that they are having with regards to COVID. Thus, it is hard to say, but I think the first half of 2022 is a good projection, which is also anticipated by Novartis.*

**What should patients expect when they undergo this type of therapy in terms of toxicity and side effects? And how about the quality of life of the patients that were treated versus the other arm?**

*Some side-effects were observed. The main issue that patients experienced was xerostomia (dry mouth). It was the case for less than 50% of patients but it is part of this therapy because it ends up affecting the salivary glands. Some patients had nausea, in some cases associated with vomiting. They could also potentially go through some temporary fatigue due to the therapy itself. Moreover, there were some gastro-intestinal side effects, the nausea previously mentioned being one of the related consequences. There were also side effects in the bone marrow with a smaller reduction on the platelet count. Anemia was a little more commonly noted in the treatment group as well.*

*Thus, there are a variety of potential side effects. However, I believe that if you ask the patients questions about their quality of life, it is being maintained to a greater degree in the treated group as compared to the control group and that is because the disease is being controlled. The worst thing that can happen to a patient is advancing cancer, and if you are able to halt the progression or may be diminish the related burden, the patients feel better. So, compared to the control group, there was a clear improvement in the health-related quality of life that I think needs to be emphasized. Yes, there are some side effects, but overall, patients did better than those treated in the control group.*

> *So, compared to the control group, there was a clear improvement in the health-related quality of life that I think needs to be emphasized.*

**To finish perhaps on a "hopeful" note for patients and for the field:**

**How do you see the outlook of PSMA radioligand therapy in the prostate cancer treatment landscape, including earlier stages of the disease?**

**And what should we expect to see beyond $^{177}$Lu-PSMA-617 in radioligand therapy for prostate cancer patients?**

*We are moving forward now. There is a trial called the PSMAfore that is looking at patients in that post Abiraterone/enza space, pre-taxane and that trial is now growing. There is another trial called the PSMAddition that chose people with hormone sensitive diseases, who are going to be treated optimally with hormones and then with or without PSMA-Lutetium.*

*Therefore, there are some new trials that could move the therapy forward, but we are going to have to get those results before we are able to convince the regulators that those trials are appropriately designed and going to ensure that we do have the endpoints that we need. So, being able to run good clinical trials is key to early access, and those trials are now ongoing.*

*I believe that the agent that will be coming forward relatively soon is being evaluated in the SPLASH Trial, which is PSMA-I&T-Lutetium-177. There are also trials that are ongoing with alpha emitters such as Actinium-225. PSMA monoclonal antibodies are also being looked at. There is an antibody called J591, that is under development both with Lutetium-177 and Actinium-225. Moreover, there are a lot of companies active in the field right now, and I am anticipating that there will be more to come.*

**Last but not least, what are your expectations regarding the Oncidium foundation?**

*I hope the Oncidium foundation can raise awareness and help to provide resources to ensure that radiopharmaceuticals are available to all patients that need them, regardless of where they live.*

**I guess this is promising for patients and for the development of the field in general. We are reaching the end of our interview and I would like to thank you very much for this informative and interesting conversation.**

*Thank you very much!*

**Authored by:**

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• Medical Director of the Tulane Cancer Center
• Assistant Dean for Oncology Tulane University School of Medicine.

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• Product Manager at IBA Radiopharma Solutions
• IBA Honorary Fellow
• Scientific Advisor at the Oncidium foundation

# Are Asian Countries Ready for Novel Radiopharmaceuticals?

By Dr. Ya-Yao Huang

Asia has been a rising player in terms of economic development and growth. While other countries are facing issues such as industrial restructuring, adjustments of law and regulations, and rapid increases in costs that lead to economic bottlenecks, Southeast and South Asian countries have shown significant potential in their economies and have become the focal new market after China, Japan, and Korea due to their huge market and active participation in global economic integration.

However, due to various barriers such as the geographical environment and transportation, Asian countries encounter challenges in information exchange and medicine delivery, not to mention differences in language, cultures, and regulations. The development of novel radiopharmaceuticals in Asia still faces considerable levels of difficulty and challenges to overcome, including:

## Uncertain Supply Chain

Due to the limitations of half-life periods, most of the diagnosis-purposed radiopharmaceutical drugs can only be produced domestically. However, there's no clear regulation and supply strategy coordination among Asian countries.

When it comes to therapeutics radiopharmaceuticals, Western Pharmaceutical companies like AAA/Novartis, Bayer, or Cardinal Health have been the main developers and providers and offer stable supply in Europe and the US.

Building a commercial supply chain in Asia has two big uncertainties remaining. Firstly, therapeutic radiopharmaceuticals sometimes need to be used in parallel to non-invasive companion radiopharmaceutical diagnostic tracers. However, the inconsistency of supply chains, immature markets, and unclear regulations for drug administration all leave uncertainties for radiopharmaceutical development in Asia.

Secondly, the outbreak of COVID-19 is an ongoing global shock that created the most significant economic decline since the 1930s. The pandemic undoubtedly had a huge impact on global shipping and on the price of commodities. The chaos of the pandemic affected the supply chain of radiopharmaceuticals in Western countries but also the cost of producing and shipping therapeutic radiopharmaceuticals for clinical use in Asia, although treatment-purposed radiopharmaceuticals have longer half-life periods.

## Uncertain Pharmaceutical Regulation

As mentioned above, language, culture, global business approach and healthcare policy differ from one Asian country to another. There is ambiguity and lack of flexibility for novel radiopharmaceutical production and manufacturing in pharmaceutical regulation throughout Asia.

## Uncertain Clinical Promotion

Most Asian countries still do not have a clear healthcare reimbursement policy and radiation protection strategy for new radioligand therapies, resulting in an insufficiency of facilities at hospitals and lacking execution of radioligand treatments. Furthermore, current novel radiopharmaceutical-related literature references are mostly from Western sources and ongoing clinical trials are not as efficient as they are often based on a limited sample which prevents them from achieving clinically credible standards. This causes credibility concerns and makes it difficult to promote clinical use as part of health insurance in Asian countries.

Dr. Ya-Yao Huang is dedicated to overcoming these existing challenges and enrolling Southeast and South Asia and bringing Taiwan's many accomplishments in the rapidly evolving field of precision oncology. This can only be achieved through increased and continuous education/awareness missions, local project developments and global radiopharmaceutical collaborations.

Through her various functions as an Ambassador for the Oncidium foundation, CEO of Primo Biotechnology and Adjunct Assistant Professor at the National Taiwan University, Dr. Huang's mission is to raise awareness about the radiotheranostics technology to integrate Taiwan and other Asian countries, as active players in the radiotheranostics momentum and to ultimately enhance access to everyone throughout Asia.

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# Challenges in the Development of Radiotheranostics in the Russian Federation

By Elena Kargapoltseva

Looking at the growing interest regarding radiotheranostics globally, the most important challenge in Russia is the lack of awareness amongst practitioners, allied healthcare professionals and patients about the options and advantages of applied nuclear medicine.

## Keeping Abreast of Foreign Advanced Clinical Studies

In most cases, available information/resources about the latest achievements in the field of nuclear medicine can be found solely in English. A lot of Russian physicians do not have a sufficient level in English, and therefore cannot benefit from foreign articles providing evidence-based results of research and clinical studies. Thus, the language barrier only enables a few medical doctors in Russia to have a notion about international clinical guidelines and prevents many Russian practitioners from having updated information within the Russian nuclear medicine community.

## Advantages in Detecting Micrometastatic Disease

Regarding the use of PET CT imaging techniques, the Russian clinical guidelines on prostate cancer refer to articles from 2014, 2016 and 2018. The recent promising development and results of the past three years in molecular imaging for prostate cancer are therefore not considered and referred to. For instance, the Russian recommendations for the treatment of prostate cancer officially stipulates that: “The use of choline or PSMA-PET/CT in the progression of CRPC has not been fully studied and, most likely, does not represent a significant benefit, for patients with a biochemical relapse or for those who have not previously received hormonotherapy.”

Despite the extensive data on the matter and the NCCN Guidelines recognizing the increased sensitivity and specificity of $^{68}$Ga-PSMA-11 PET/CT indicators for detecting micrometastatic diseases compared to traditional imaging techniques (CT, MRI) both at the initial stage and with a biochemical relapse, these results have yet to enter the Russian perspective. The updated NCCN guidelines now include $^{68}$Ga-PSMA-11 PET/CT, which can be considered as a more precise alternative to cross-sectional imaging (CT, MRI) and bone scintigraphy. What’s more, there is no mention of $^{68}$Ga-PSMA-11 in the Russian clinical guidelines, although an important evidence base was accumulated in the last 10 years on a wide range of patients.

## The Priority to Follow-up with Evidence-Based Practices in Radiotheranostics

Education and awareness amongst Russian Physician’s Societies (Oncologists, Cardiologists, Radiologists etc.) are essential to spread the word about the progresses and updates regarding molecular imaging protocols in clinical recommendations. In the near future, the Russian Society of Nuclear Medicine could try to, for example, benefit from and be inspired by the achievements of the SNMMI or EANM clinical guidelines, which could improve patients’ management guidelines and inspire local research programs in radiotheranostics.

## Moving Forward to GMP-Quality Gallium-68 Generators

To this day, diagnostic methods using Gallium-68 are not yet implemented in Russia, although the $^{68}$Ge/$^{68}$Ga generators were first invented in Russia and have been manufactured since 2000. Moreover, there are no high-quality (producing pure Gallium-68) generators, nor any relevant cold kits (TATE, PSMA etc.) available on the market. Therefore, education is the key to enhance the introduction of innovative diagnostics and treatment technologies in nuclear medicine, of new radiopharmaceuticals or radioisotopes generators and for the development of the field in general.

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## Entering the Mission & Vision of the Association of Theranostics Development

It is in this spirit that the **Association of Theranostics Development** was established in May 2021, to raise awareness amongst practitioners, other healthcare professionals and patients. The aim is to inform clinicians about the advantages of molecular imaging and radionuclide therapy. Moreover, this can only be achieved if the information (scientific articles, videos and interventions) is available/translated in the Russian language to the practitioners and their patients.

## Diffusing Information in Russian Language

Recently, a service for simultaneous translation from English to Russian was implemented on the Yandex platform. This service works only in Yandex browsers and with videos posted on YouTube. An important step in the right direction, given that with the permission of the owners of English video content, translation of reports of foreign medical doctors into Russian language are now possible and are posted on the Association of Theranostics Development's **website.** If more and more information in Russian is distributed through various channels and social networks, this will allow to convey this information not only to medical doctors, but also to patients as well as other healthcare professionals, i.e, nurses, therapists, pharmacists, drug manufacturers, health ministries and agencies, etc.

The Association of Theranostics Development hopes that through greater awareness, an increase in demand from patients can be achieved. Patient organizations could become aware of the radionuclide diagnosis and treatment options and perceive them as a viable alternative to other available technologies. As a matter of fact, people living with cancer are key players in the evolution of the field as they are voices not only to other patients but to other actors involved.

## International Collaborations for the Development of Radiotheranostics for Cancer Care

The Association of Theranostics Development has decided to collaborate with the Oncidium foundation. Although it is an independent organization, the Association of Theranostic Development is the local representation of the Oncidium foundation, notably with Elena Kargapoltseva and Dr. Pavel Rumiantsev as official Oncidium Ambassadors. The first main objective will be to overcome the language barrier by working on the translation of the information provided by the Oncidium foundation in English to the Russian language, so that Russian citizens and professionals are able to access the information.

Also, the Association of Theranostics Development's website through its YouTube channel links encourages international cooperation notably with the owners of educational video content to allow its usage for relevant awareness programs of Russian medical doctors and patients.

International collaboration is therefore essential to the development and accessibility of theranostics in Russia. Especially given the fact that Russia plays a role in the development of theranostics, notably through $^{176}$Yb that constitutes a raw material to produce $^{177}$Lu-Chloride solution (n.c.a.) but has yet to implement the use of these technologies to benefit its local population. International collaboration, education and increased information are the key to enable global use and access to radiotheranostics. Ultimately, every person living with cancer in Russia should be informed and aware about the existence of a potentially life-saving diagnosis and therapy option.

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# Radioligand Therapy Readiness Assessment Framework

**By The Health Policy Partnership**

Radioligand therapy is an innovative, targeted cancer treatment which requires a truly multidisciplinary, multi-sectoral approach; policies across the health, energy and other sectors all directly impact its availability. With variable access to existing treatments and many new types of radioligand therapy on the horizon, it is essential that we evaluate the current integration of – and readiness for – radioligand therapy.

To do this, **The Health Policy Partnership** (HPP), with input from a multidisciplinary international Expert Advisory Group, have developed the **Radioligand Therapy Readiness Assessment Framework.** This framework takes a systems approach to identify what is needed to support the integration of radioligand therapy into cancer care, and ultimately seeks to provide a clear evidence-base to guide national-level health system readiness for radioligand therapy.

The intention of the framework is that it can be applied to many different countries. HPP have carried out pilot applications in the UK and US, with input from national-level expert advisory groups. These pilots have led to the development of policy-focused situation analyses and the identification of key strategic challenges to achieving system readiness within each health system. In 2022, HPP aims to expand framework applications to more countries, with a particular focus on Europe and East Asia.

HPP encourages interested parties to adapt and apply the Radioligand Therapy Readiness Assessment Framework to their own context, to boost global health system readiness for the integration of radioligand therapy.

This project was supported with funding from Advanced Accelerator Applications, a Novartis company, with additional support from Nordic Nanovector. It was delivered in collaboration with an independent, multi-stakeholder Advisory Group who had full editorial control of the project outputs.

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### Oncidium foundation's Note about the Radioligand Therapy Readiness Assessment Framework

Witnessing the radiotheranostics momentum and the opportunities and challenges it implies, the Oncidium foundation has also decided to officially endorse the Radioligand Therapy Readiness Assessment Framework. Following the launch of the framework in June 2021, Rebecca Lo bue, General Manager of the Oncidium foundation, commented: "Our work is very complementary as the multidisciplinary approach, access equity, patient/general public/oncology/ referral practitioners' reach and awareness are at the heart of both our initiatives. Also, keeping in mind that our mission is patient-focused, I liked the strong message that was conveyed at one point: "Patients shouldn't be the ones worried about the readiness of the system!".".

Thus, it was a matter of course, for the Oncidium foundation to support this important initiative. Bringing many key players around the same table is a great step in the right direction to reach a common goal: supporting the development of radiotheranostics in view of accelerating worldwide access.

# The Rising Role of Radiotheranostics Supported by the Oncidium foundation

By Dr. Richard Zimmermann and Rebecca Lo bue

Recent research and developments have brought forward the pivotal role of Radiotheranostics for cancer care. Whether you refer to them as Radiotheranostics, Theranostics, Theragnostics, Radioligand therapy or Radionuclide therapy, they all describe an innovative approach to cancer care through a beneficial application of radioisotopes, within the Nuclear Medicine field.

## State of Play

The pandemic situation did not slow down interest for radiotheranostics. As a matter of fact, over the past 15 months, investment in new radiolabeled compounds pursued an almost exponential growth. This is not only a consequence of the very high amounts of funds presently available from investors looking for rewarding opportunities worldwide but is also proportional to the increasing awareness about the potential of radiolabeled compounds for therapy. Present decisions to invest in this area are based on the past 10 years of successful advancements. Stakeholders look at growing revenues for therapeutic drugs, certainly more attractive than for diagnostics ones.

Interest in radiotheranostics has grown over the past 20 years in the same way it did for biologics and particularly antibodies between the years 1980 and 2000. At that time, the pharmaceutical industry preferred to observe the technology evolution led by startups and smaller companies which resulted in some company shutdowns but also acquisition of the remaining ones for billions of dollars, when technology maturity was reached.

Radiotherapeutics are now mature, but therapeutic development implies much higher funds than diagnostics.

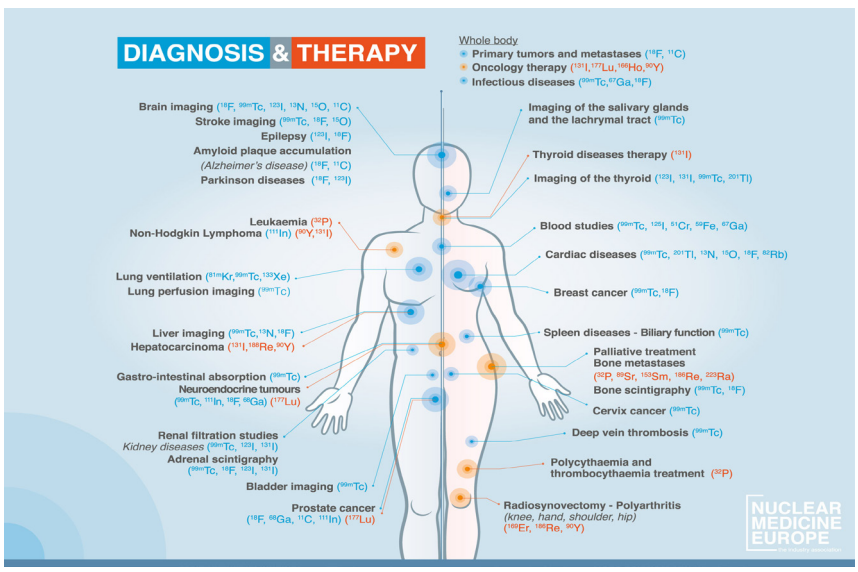


*Image courtesy of Nuclear Medicine Europe*

During the past 50 years, the radiopharmaceutical industry did not have the budget to develop such drugs in the way expected by the authorities. Only 'conventional' pharmaceutical companies had the sufficient capital to bring such drugs onto the market. In addition to their financial capacities, they also have access to a broader customer target which includes all oncologists.

As such, Bayer and Novartis became the precursors. The success of their drugs ($^{223}$Ra-Xofigo, $^{177}$Lu-Lutathera) is limited by their generic character and for this reason did not (yet) reach the blockbuster status (sales above US$ 1B/year). Nevertheless, the next generation of drugs will all be based on proprietary assets. The first one is expected to reach the market by next year ($^{177}$Lu-PSMA-617, prostate cancer – Novartis).

Besides Novartis which invested again in new therapeutic areas (FAP target, solid tumors, with iTheranostics/Sofie Biosciences -2021 or alphatherapy with Aktis Oncology), there has been a flurry of acquisitions of drugs to increase strengths of portfolios, notably the collaborations between Astellas/ Actinium Pharma, Jubilant/Sofie Biosciences, Lantheus/Noria Therapeutics, Bracco/Blue Earth Diagnostics/Scintomics, Fusion Pharma/Ipsen and very recently EZAG/Pentixapharm (2021). At the same time (2020), new names of startups dedicated to radiotherapeutics have appeared on the scene, such as Abscint, Abdera Therapeutics, Precirix, RayzeBio and others.

It is only recently that dedicated radiotheranostic companies have emerged. These new companies were able to raise hundreds of millions of US$ following successful IPO's.

Telix Pharmaceutical (a company developing radiolabeled drug pairs for prostate cancer, glioblastoma, kidney cancer, bladder cancer) was a precursor, but creation of similar dedicated radiotheranostic companies was also observed such as Fusion Pharmaceuticals (solid cancers, company specialized in alpha therapies based on $^{225}$Ac),

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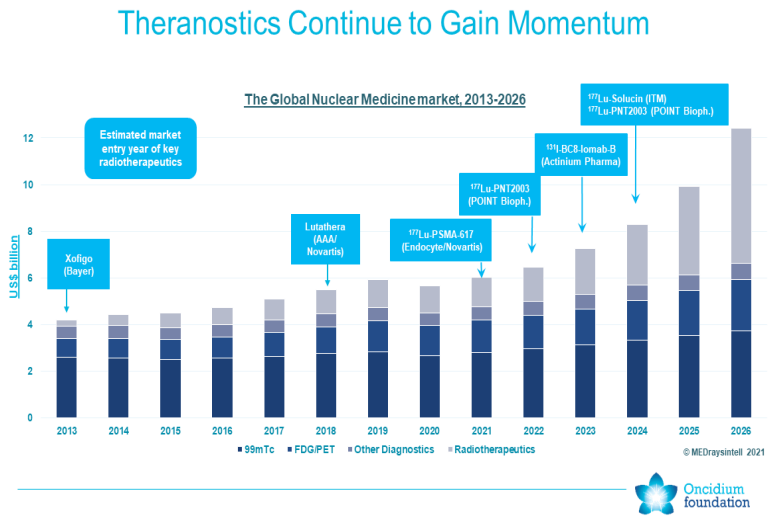



*Image courtesy of MEDRraysintell*

Point Biopharma (created in 2020, for NET and prostate cancer, based on $^{177}$Lu), RayzeBio (created in 2020, with a pipeline based on $^{225}$Ac) or Precision Molecular Inc. (created in 2019 for prostate and various cancer treatments).

More than 60 radiotherapeutics have presently entered clinical trials, among which 6 are already recruiting patients in Phase III. These molecules address more than 20 different cancer indications. Unfortunately, 27 of them are targeting the very crowded areas of NET (9) and prostate cancer (18) and only a small fraction of those will reach the market. Future development should now aim at targeting alternatives indications and the choices are quite large. In oncology, radiotheranostics are not far from becoming a viable alternative to surgery, external radiotherapy, hormonotherapy, or chemotherapy, and may soon be used as second- or even first-line treatments.

The concept of radiotheranostics is generating a lot of interest, namely as it shifts from an approach where every patient is treated in the same way, to a more personalized and systemic approach, with specific radiotheranostics developed for each target. However, there is a lot of work still to be done. Next to the logistical, regulatory, financial accessibility challenges and convincing conventional pharmaceutical companies to invest in the industry, there remains an important lack of knowledge and several apprehensions among the non-nuclear physicians and the general public about their potential.

## Accelerating Radiotheranostics Development

It is towards this goal that the Oncidium foundation was created, a non-profit, public benefit organization that would bring to light and illustrate the benefits of this technology. Based in Belgium but acting globally, the mission of the foundation is to support, promote and accelerate the development of radiotheranostics for cancer care with the aim of enhancing access for people living with cancer, regardless of origin, technology access or financial situation.

To be able to enhance Access, the foundation is determined to identify all the centers worldwide that provide radiotherapeutics for cancer care. Nuclear Medicine Practitioners can register their centers to help patients find them and evaluate therapy options. Also, through a precise and up-to-date work on Education, the foundation helps bring a better understanding of the functioning and benefits of such therapies, list marketed and under-development molecules and clear up common misconceptions. Furthermore, to build Hope, support regarding clinical developments is provided, namely with its ongoing international collaboration "Noble Registry", to enable prostate cancer patients, regardless of origin or financial situation, to access PSMA-SPECT imaging when PSMA-PET is not an option and thus, with NOBody LEft Behind.

Additionally, the foundation cannot act alone and be efficient. With already 18 recognized experts on board representing 11 countries, a worldwide network is emerging with Oncidium Ambassadors that endeavor to raise awareness through education campaigns, local collaborations, liaison with national cancer organizations and shared knowledge. Finally, an Advisory Board regrouping key opinion leaders in the field is set up to guarantee accurate and precise communication and to identify developments and recommend projects advancing the technology.

Because radiotheranostics represent a new approach to cancer care, it comes with its set of practical challenges. Along with the development of new diagnostics and therapeutics for even more indications, the aim in the coming years will be to bring together the different actors and enable a more global use and access, so that every person living with cancer can be offered the right diagnosis and therapy, wherever and whenever they need it.

**Co-authored by:**

**Dr. Richard Zimmermann**
President & founder of the Oncidium foundation

**Rebecca Lo bue**
General Manager of the Oncidium foundation

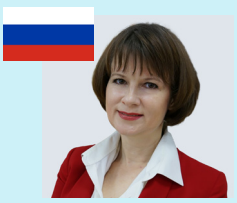
# What's up Oncidium foundation?

## Growing Community, Spreading the Word Together!

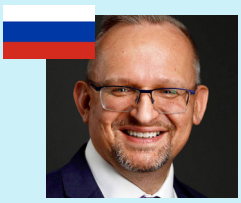
Building... Access • Education • **Hope**

## Oncidium foundation Ambassadors, Meet the Newcomers

From all around the world, the voices of theranostics exchange ideas, share their projects, visions and aspirations for the work of the foundation locally and internationally, to further support and promote the development of Radiotheranostics for cancer care.

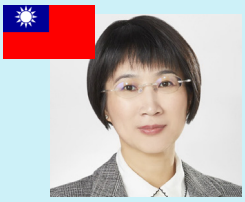


Elena Kargapoltseva



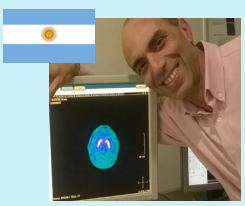
Dr. Pavel Rumiantsev

Clement Tam



Dr. Ya-Yao Huang

Michael Cross



Dr. Guillermo Casale

Dr. Javier Palomino

Who will become the next Ambassador?
**Find out why and how**

## Set up of the Oncidium foundation Advisory Board

The radiotheranostics and nuclear medicine sectors are continuously evolving. With more and more successful advancements and the booming climate for new products development witnessed in the last 10 years, the Oncidium foundation had to surround itself with more experts for general guidance.

The choice of the name, "Advisory" Board, is crucial, as this Board will provide counseling for the foundation's new directions, projects and publications. The Oncidium foundation will now benefit from the Advisory Board's (AB) expertise for final validations and decisions.

The Board is composed of recognized experts, as all the Advisors have already a foot in the nuclear medicine field and are active in this community. The foundation is looking to welcome a new member to complete the Advisory Board.
**Contact us for more information.**

Dr. Jeremie Calais

Dr. Omar Yehia Hussein

Dr. Vasko Kramer

Dr. Meera Venkatesh

Dr. Marc Domb

*I look forward to these future discussions with the members of the Advisory Board that are passionate, curious and eager to witness and contribute to the development of this new field in precision oncology.*
**Marc Domb, AB Chairman**

*To be continued page 13*

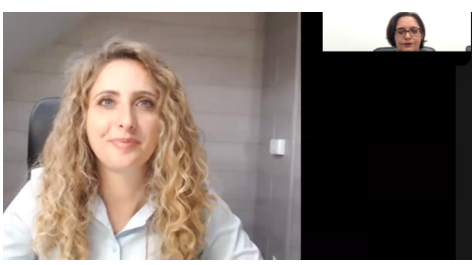
## Talking Radiotheranostics, Worldwide

This year was marked by another great step forward for the Oncidium foundation in terms of presence at an international level. The foundation was officially launched in **Australia** during 2021 edition of the **Australian and New Zealand Society of Nuclear Medicine** (ANZSNM), represented by Oncidium Ambassador Rosanne Robinson, in the **United Arab Emirates** during the **Emirates Conference** through Oncidium Ambassador, Dr. Batool Al Balooshi and in **Germany** during the **ICPO Forum 2021** with Rebecca Lo bue, General Manager of the Oncidium foundation.

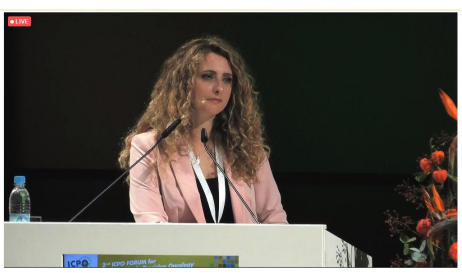
With a special focus on developments and future perspectives for radiotheranostics in cancer care, these meetings gathered worldwide key interlocutors around the same table with a common mission: enhance access to potentially life-enhancing methods.

The global implementation comes with its set of practical challenges: availability and access, prices, reimbursement etc.  Bridging gaps and building hope can thus only be achieved through continuous collaborations and exchanges between nuclear medicine physicians, industrials, practitioners, nurses, patients and foundations.


**Rosanne Robinson** - ANZSNM Annual Meeting (Australia)



**Dr. Batool Al Balooshi & Rebecca Lo bue** - Emirates Conference (UAE)



**Rebecca Lo bue** - ICPO Forum 2021 (Germany)

## Hope Through Education

Did you know? The Oncidium foundation team puts in daily efforts to provide accurate and updated information on all you need to know about nuclear medicine, radionuclides and radiopharmaceuticals, notably through an extensive list of marketed, under-development and discontinued radiotherapeutics for cancer care. Wish to learn more or to add a missing molecule? **Visit our website.**

### Register your Hospital

www.oncidiumfoundation.org/register/

## 2021 Accomplishments in Numbers

**500** Registered hospitals online

**19** National Ambassadors

**2500** LinkedIn community

### Translate to Disseminate!

www.oncidiumfoundation.org/contact/

The foundation welcomes translations in as many idioms as possible to enhance information access, globally. The website is already translated and proof-read in French, English, Spanish, German and Portuguese.

# Supporters of the Oncidium foundation

## Support the foundation and join the fight against cancer

Supporting the foundation will allow to finance research and development of new radiotheranostics, but also to reach directly patients thanks to contributions that will help finance treatments using radiotherapeutics technology.

We know that this path is not easy. We know the importance of finding the right and nearest doctor, understanding the diagnosis and evaluating treatment options. Thus, it is our mission to educate, raise awareness, and support people living with cancer and their loved ones in this daily battle.

Your contribution will help support key areas related to the organization's work: education, R&D, enhanced access to treatments and clinical trials, advocacy, outreach etc.

For more information about our Support Levels: **contact us.**

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