Radiotheranostics Today

Oncidium foundation

Voicing the Challenges and Opportunities of Radiotheranostics for Cancer Care

October, 21st 2025

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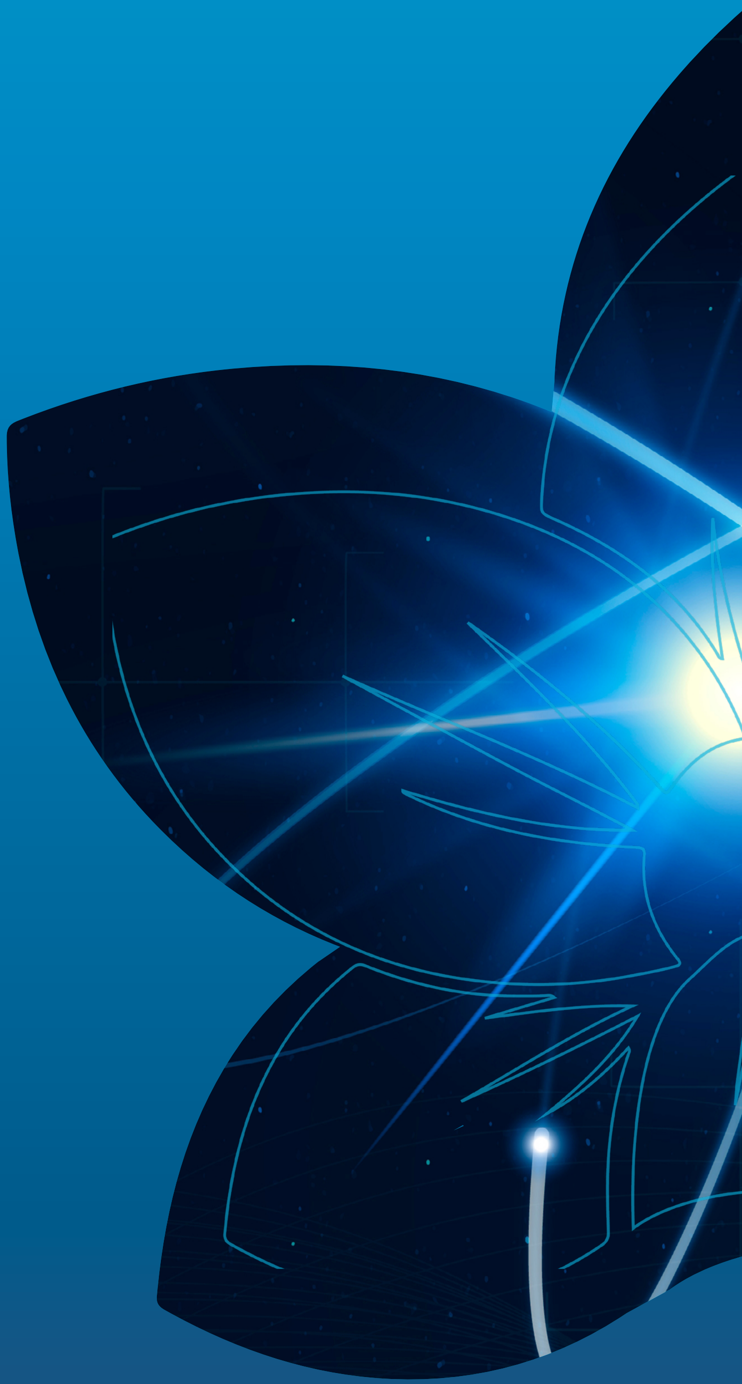

Access - Education - Hope

A Global Moment For Imaging And Theranostics

From Vision To Resolution

by Dr. Ilya Gipp
Oncidium Ambassador - USA

The Moment

In 2017, noncommunicable diseases accounted for 74% of all deaths globally[1]. They continue to represent a significant share of premature mortality, particularly in low- and middle-income countries. Beyond their human toll, these diseases impose a substantial economic burden, driven by rising healthcare costs, lost productivity, and an exacerbating effect on poverty and development.

Among noncommunicable diseases, cancer stands out as one of the most formidable challenges of our time, casting a long shadow over global public health and society at large. Responsible for more than one in six deaths worldwide (16.8%) and nearly a quarter of all deaths from noncommunicable diseases (22.8%), its impact is both profound and far-reaching[2].

Amid a moment marked by the growing urgency, a broad spectrum of research initiatives, professional networks, and industry leaders have been actively engaged in addressing these pressing challenges. Among the most impactful approaches, medical imaging emerges at the intersection of cutting-edge technologies and evolving clinical, financial, and population health demands. Yet despite its growing role in healthcare – and the widely shared belief that "imaging saves lives" – the full extent of imaging's contribution to easing systemic burdens has not been clearly defined or systematically evaluated.

> **"A comprehensive scale-up of imaging, treatment, and care quality combined could prevent 9.55 million deaths (12.5%) and save 232.3 million life-years globally."**

The Vision

In 2018, the first-ever comprehensive effort to assess global needs for imaging and nuclear medicine resources was established through the Lancet Oncology Commission, comprising 27 leading nuclear medicine and diagnostic imaging societies and organizations[3]. Just a few years later, the Commission published the first results of the study, demonstrating major gaps in imaging and nuclear medicine resources, especially in low- and middle-income countries. Through modeling 11 common cancer types, the Commission concluded that scaling up imaging alone could avert 2.46 million deaths (3.2%) and save 54.92 million life-years between 2020 and 2030. A comprehensive scale-up of imaging, treatment, and care quality combined could prevent 9.55 million deaths (12.5%) and save 232.3 million life-years globally. Alongside these findings, evidence also demonstrated that investing in medical imaging for oncology yields significant economic benefits, with substantial returns on investment observed across all regions.

Improved access to imaging not only enhances clinical outcomes but also contributes to more efficient healthcare delivery, reduced treatment costs, and long-term gains in productivity and societal well-being[4].

In 2024, another study expanded the initiative into two cornerstone areas of medical imaging: radiation therapy and theranostics. The Lancet Oncology Commission highlighted persistent global disparities in access to both radiation oncology and emerging radioligand treatments, identifying major bottlenecks such as limited access to technology and equipment, a shortage of trained professionals, and gaps in regulatory infrastructure. It called for coordinated global action to unlock substantial health and economic benefits[5].

> **The global health community recognizes the power of theranostics not as a future ambition, but as a present-day imperative.**

The Resolution

A major milestone in global health policy was reached with the adoption of the World Health Organization's Resolution on “Strengthening Medical Imaging Capacity”, passed during the 78th World Health Assembly in May 2025. The Resolution formally recognizes medical imaging as an essential component of universal health coverage and calls on Member States to develop and strengthen national imaging strategies, workforce training initiatives, infrastructure, and regulatory frameworks. It underscores the central role of imaging not only in diagnosis but also in guiding and monitoring treatment, particularly in the context of noncommunicable diseases such as cancer. The Resolution also encourages the greater integration of imaging into national cancer control plans, advancing a long-overdue shift in the perception of imaging from an ancillary service to a core pillar of effective and equitable healthcare delivery[6].

Crucially, the Resolution explicitly acknowledges theranostics – a paradigm-shifting approach that integrates diagnostic imaging with targeted therapy – as a key area for development. In practice, it primarily refers to radioligand therapies, encompassing nuclear medicine’s radionuclide-based treatments. The inclusion of this field reflects a growing recognition of radiotheranostics’ transformative role in precision oncology and beyond, offering the potential for accurate patient selection, predictive therapy response modelling, and highly personalized treatment. By naming theranostics in the final document, the World Health Assembly not only affirms its importance but also establishes a policy precedent for countries to invest in the infrastructure, workforce development, and regulatory frameworks necessary to support the adoption. As the global health community works to close gaps in cancer care, this Resolution signals a commitment to more integrated, technology-driven, and patient-centered solutions.

This is more than a policy milestone – it is a declaration that the global health community recognizes the power of theranostics not as a future ambition, but as a present-day imperative. The convergence of technological innovation, political will, and clinical necessity has created a defining opportunity: a global moment to act. Moving from vision to resolution now demands collective commitment – from governments, health systems, industry, and professional communities alike – to ensure that the benefits of radioligand therapies are equitably realized. The path forward is clear. The time is now.

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Improving Global Access to Radioligand Therapy: A Conversation with Professor Andrew M. Scott

Professor Andrew M. Scott is a clinician-scientist internationally recognized for his leadership in cancer-targeted therapies and imaging. He heads the Tumour Targeting Laboratory at the Olivia Newton-John Cancer Research Institute, co-directs the Centre for Research Excellence in Brain Cancer, and serves as Director of Molecular Imaging and Therapy at Austin Health, as well as Professor at La Trobe University and The University of Melbourne.

Beyond his research, Professor Scott contributes to global health policy, training, and advocacy in molecular imaging and nuclear medicine through collaborations with organizations such as the WHO, IAEA, and various international and governmental bodies.

In this interview, conducted by Dr. Jaspriya Bal and Dr. Jessica Guarnaschelli, ambassadors of the Oncidium foundation, Professor Scott discusses the WHO Resolution on "Strengthening Medical Imaging Capacity." He reflects on global challenges in equitable access to radiotheranostics, regulatory and training frameworks, and his vision for the future of nuclear medicine.

Dr. Jaspriya Bal & Dr. Jessica Guarnaschelli: *Can you briefly explain the WHO Resolution on "Strengthening Medical Imaging Capacity," and how governments, industry, and professional communities can collaborate to ensure equitable access?*

Prof. Andrew Scott: The WHO Resolution on "Strengthening Medical Imaging Capacity" was adopted at the World Health Assembly in Geneva in May this year, and aims to improve access to imaging for noncommunicable diseases in patients in all UN countries. This will require concerted efforts from governments, industry, professional organisations, and major international organisations such as WHO and IAEA, to develop plans for addressing requirements for workforce, infrastructure, equipment and regulatory/ funding requirements to achieve this goal. The initial programs will focus on workforce, equipment and digital connectivity, as well as country-based funding initiatives. The development of imaging technology suited to point-of-care as well as major hospitals is also a key area for professional organisations and industry to collaborate.

You've been a strong voice in advocating for equitable access to radiotheranostics. What major access barriers do you see globally—especially in low- and middle-income countries?

The major access barriers to accessing imaging for patient care in low- and middle-income countries are infrastructure/equipment access, workforce availability, and funding for implementation. For molecular imaging, access to radiopharmaceuticals and supply chains are also key areas to address. Improving digital connectivity, training health professionals, and regulatory issues are also important factors in ensuring more widespread implementation of imaging studies in a timely and equitable manner.

> **"The WHO Resolution on "Strengthening Medical Imaging Capacity" was adopted at the World Health Assembly in Geneva in May this year."**

How do current regulatory frameworks (e.g., FDA, EMA) affect the scalability of radiopharmaceuticals in oncology? Should diagnostics and therapeutics be regulated under separate frameworks?

The regulatory frameworks in the US and Europe are designed for ensuring safety of patients, and ensuring quality programs are in place for radiopharmaceutical use. A key factor which must be addressed for all countries in the context of regulatory frameworks is the balance of safety versus availability of access, with the impact on health outcomes if regulations are too restrictive for implementation. This is particularly relevant in low- and middle-income countries. The IAEA has recently released a series of guidelines on radiopharmaceuticals which address this issue. Whether diagnostic and therapeutic radiopharmaceuticals should be regulated under separate frameworks depends on the country processes for review, as the risks are quite different, and the access and availability issue remains relevant.

Are we doing enough to train the next generation of nuclear medicine professionals? How can academic and policy institutions strengthen their support, and what examples can you share from your own center?

There are major issues with availability of a suitably trained workforce for theranostics practice in low- , middle- and high-income countries. This was demonstrated in our recent Lancet Oncology Commission on Radiotherapy and Theranostics, which

> **There are major issues with availability of a suitably trained workforce for theranostics practice in low-, middle- and high-income countries.**

included a global analysis of workforce required for theranostics. Training programs for nuclear medicine professionals is required in almost all countries, and requires local, government and regional initiatives to improve workforce numbers. In my own hospital we have been involved in training programs for physicians, scientists and technologists from throughout Australia, and also from regional countries as part of IAEA supported programs.

What is your vision for the global theranostics landscape by 2030, and what key milestones would you like to see achieved by then? What milestones do you hope we achieve by then?

By 2030 we will see major programs initiated through WHO, IAEA and regional organisations in workforce training that will bring most high- and middle-income countries to a level where theranostics is available in major cities. This will require strengthening supply chains for radiopharmaceuticals, and also engaging with Governments and funding entities to ensure improved support for these treatments.

The theranostic clinical trial landscape will markedly change, so that smaller countries will participate in academic and industry-based studies, and contribute to more equitable population-based clinical datasets. It is my hope that the global nuclear medicine community will develop guidelines, training programs, and evidence for use that will drive the implementation of approved theranostics in all countries.

How can organizations, such as with the Oncidium foundation, support the equitable access and capacity building?

It is essential that we develop global strategies for improving the information available on how theranostics can improve patient outcomes, and also engage with governments and international funding bodies to ensure support for theranostics availability. The Oncidium foundation can play a major role in advocacy and policy development for these aims. In addition, development of clinical guidelines in theranostics, and training program support, are further key areas of activity which can have a major impact on theranostics access, and where the Oncidium foundation has a pivotal role to play.

If you had one sentence to address world health leaders about radiotheranostics, what would it be?

Radiotheranostics is an essential part of healthcare for cancer patients, and with vision and collaboration we can ensure patients in all countries can access this life-changing treatment.

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Auger Emitters: Small Particles, Big Impact

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Auger electron emitters are a class of radionuclides with enormous therapeutic potential, but clinical application remains somewhat of an elusive goal for Nuclear Medicine. Compared to beta or alpha emitters, Auger electrons deposit energy over nanometre ranges, suggesting a highly selective targeting with a highly lethal payload and minimal collateral damage to surrounding healthy tissues. Recently, terbium-161 has re-energized the scientific debate regarding the most optimal targeting strategies for Auger electron emitters.

How are Auger Electrons emitted?

Auger emission happens when an inner-shell electron (for example from the K-shell) is knocked out of an atom either by external triggers (such as the photoelectric effect or by collision from a charged particle) or by internal triggers such as nuclear decay that consumes the electron itself. A vacancy is formed which must be filled to take the atom from an excited state to a more relaxed state. This energy can be released by giving off energy as an x-ray photon or by using the energy to kick out a different electron from another shell – which is called an Auger electron.

To explain the effect practically, iodine-125 will be used as an example (Figure 1). During decay of iodine-125, the nucleus captures a K-shell electron (A) which creates the vacancy in the inner-shell (B). An electron from the L-shell (next level) drops into the K-shell vacancy and energy is released (B). This energy kicks out another electron from a higher shell (C). If there is another vacancy, the process can be repeated to create a cascade of Auger Electron release (C). In the end each decay process can release up to 20-30 electrons, each with energies from 10 – 500 eV and having an extremely short range. These electrons only travel a range of nanometers in tissue. This is why Auger emitters are considered potentially powerful for targeted radiotherapy – if they can be targeted well, the damage can be confined to a single cancer cell – annihilating it completely.

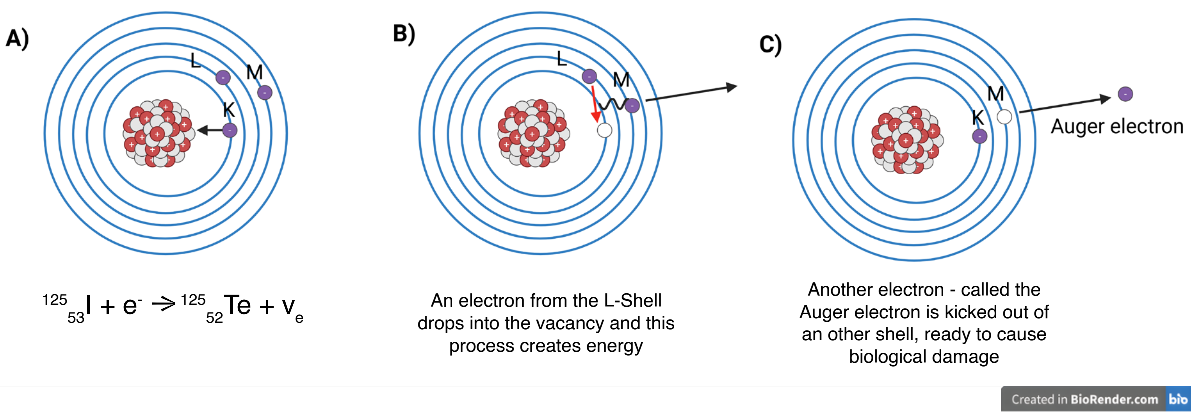

Figure 1: The Metiner-Auger effect explained with iodine-125 as an example.

If all cancer cells could be targeted homogeneously, this can result in complete irradiation of cancer, without damage to other healthy tissues. Additionally, Auger Emitters may also cause damage through indirect effects, such as the production of reactive oxidative species.

Auger vs alpha emissions

The dose deliver by Auger electrons is hyper localized, and compared to TAT (targeted alpha therapy) might even be more selective for only the target. In this case it may be possible for future Auger based therapies to be administered in multiple doses with short periods in-between doses due to little or no damage to critical organs such as the bone marrow or kidneys. In case some unwanted cytotoxicity to healthy tissues still exists during Auger emission-based therapies, this can be countered with radical scavengers, which is not true for therapies based on other particles such as TAT or therapies based on beta-minus emitters.

Key Auger Emitting radionuclides

Whilst most radionuclides emit Auger electrons, it must be of the right energy and in a high amount of electrons to consider it for therapeutic applications.

Historically, iodine-125, indium-111, gallium-67 and technetium-99m were investigated for their strong Auger electron emitting characteristics.

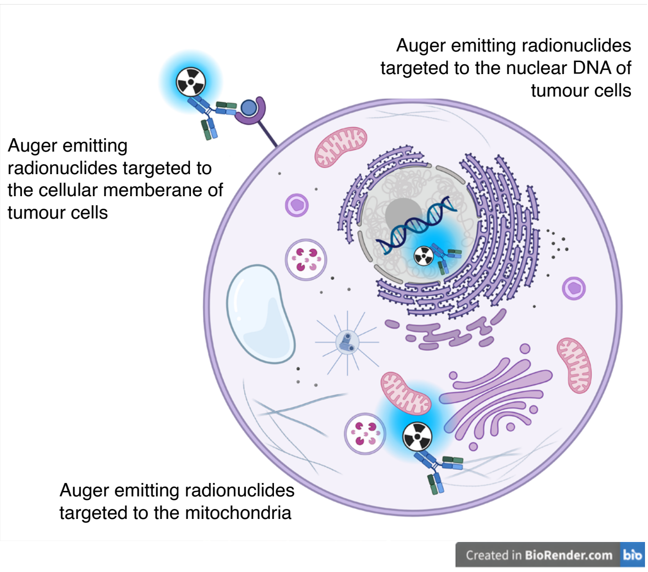

Figure 2: The understanding of where Auger Electrons must be targeted has changed recently, with newer areas opening up.

Although these radionuclides are applied for diagnostic purposes, it was postulated that should they be delivered accurately to the nucleus of the cancer cells, their Auger electrons could be harnessed for therapeutic purposes. Progress was however hampered by instable radiopharmaceuticals (eg. poor stability of I-125 based molecules), inappropriate pharmacokinetics of the designed radiopharmaceuticals with rapid clearance before accumulation at the target site could be achieved, and radiopharmaceutical vectors that failed to deliver the radionuclides to the nucleus to interact with the DNA. While the search for therapies based on Auger emission failed to yield results, lutetium-177 and actinium-225 rapidly started to provide evidence of clinical viability and took the centre stage in radiopharmaceutical development for oncology purposes. It is therefore clear that in order to gain clinical translation, optimal vector design and chemical stability are key factors that need to be addressed.

More recently, the attention has shifted towards more novel radionuclides for Auger emission such as terbium-161, copper-64 and astatine-211. Terbium-161 is particularly interesting since its emit both beta-minus particles and Auger electrons creating a dual mechanism of therapeutic action. Some clinical evidence suggest that Tb-161 has definite higher cytotoxicity compared to Lu-177, despite having very equal beta-minus emission characteristics, with the additional efficacy ascribed towards the additional Auger emission characteristics of this radionuclide.

Where should we target Auger Emitting Radiopharmaceuticals?

Importantly, to harness the lack of toxicity to healthy tissues, radiopharmaceutical targeting should, ideally, not accumulate in any other tissue than that of malignancy. Contrary to previous scientific consensus, it is now accepted that these radiopharmaceuticals can be targeted to three subcellular structures to deliver maximum toxicity for their payload. This includes the cell membrane, the mitochondria or the nuclear DNA (Figure 2). When targeted outside of the nucleus, it is important that radionuclides with a higher number of emitted electrons per decay are used.

To spread the power of Auger Emission evenly across the whole tumour, receptor heterogeneity is required; most cancer cells need to express the targeting receptor adequately so that the whole tumour is irradiated on subcellular level. It is speculated that the bystander effect (production or reactive oxidative species and activation of the immune system) could alleviate this problem. Additionally, a dual therapeutic action such as demonstrated by terbium-161 (with beta-minus and auger emissions) could be the best of both worlds approach.

Current investigations

Thus far clinical studies have only employed ^{125}I-antibodies, ^{111}In-labelled radiopharmaceuticals such as octreotide, and recently ^{161}Tb-radiopharmaceuticals. Currently, the efficacy of targeting Tb-161 to the cellular membrane of somatostatin receptor 2 positive (SSTR2) neuroendocrine tumours is being investigated (NCT05359146). It is postulated that the auger emissions from Tb-161 at the cellular membrane, as delivered by the SSTR2 antagonist (DOTA-LM3) to these tumours, will result in higher clinical efficacy compared to the traditional ^{177}Lu-DOTA-TATE based therapies. Should this be the case, it is envisioned that more curative therapies can be offered for neuroendocrine tumours. Currently [^{161}Tb]Tb-SibuDAB, an novel prostate cancer targeting radiopharmaceutical is also being investigated.

Conclusion

The scientific consensus is that Auger eletron emmiting radiopharmaceuticals are not yet completely ready for clinical translation, with the exception perhaps of Tb-161 containing radiopharmaceuticals. All parameters necessary for an effective Auger emitting Radiopharmaceutical need to be considered during design. This includes decay properties, nuclear chemistry, radiochemistry, dosimetry and radiobiology.

Should we be able to design effective Auger emitting Radiopharmaceuticals, it would be possible to harness the same therapeutic efficacy as obtained with TAT, but with negligible risks for healthy tissue. Another option could be to combine the power of TAT with TAET (Targeted Auger Electron Therapy) in a combination strategy.

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Toward Personalized Radioembolic Therapy

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With advances in radioligand therapy (RLT) making headlines almost every day, it's easy to overlook the recent resurgence of another radionuclide-based therapy: radioembolic therapy. This minimally invasive procedure that uses radioactive microspheres to deliver a localized radiation dose. Also referred to as Transarterial Radioembolization (TARE) or Selective Internal Radiation Therapy (SIRT), radioembolic therapy is an increasingly popular treatment option for patients who have been diagnosed with primary or secondary liver cancer due to its demonstrated ability to improve survival and quality of life. While more than 100,000 patients have been treated to date, innovation in the radioembolization space has only just begun, with new technologies in development that will enable more personalized treatment planning, and even real-time dosimetry.

How Does Radioembolization Work?

Radioembolic therapy is a minimally invasive procedure that is currently indicated for treatment of hepatocellular carcinoma (HCC) and liver metastases arising from colorectal cancer (mCRC). The clinical workflow is usually the following:

1. **Planning stage:** an interventional radiologist (IR) or nuclear medicine physician (NMP) performs an angiogram to map out the blood vessels that are feeding the tumour, and develops a dosimetry plan for microsphere infusion.

2. **Safety:** The patient then undergoes nuclear imaging to assess whether the microspheres can be administered safely. In some cases, the hepatic artery may bypass the liver and flow directly to the lungs; which may cause radiation-induced toxicity to the lungs. To evaluate this risk, doctors use ^{99m}Tc-labeled macroaggregated albumin (^{99m}Tc-MAA), a diagnostic radiopharmaceutical that mimics the behavior of therapeutic microspheres. The biodistribution of the ^{99m}Tc-MAA is used to estimate the degree of "lung shunting" that will occur. If the fraction is sufficiently low, the patient is approved for treatment.

3. **Therapeutic procedure:** the patient is catheterized, and infused with a suspension of millions of microspheres (15-45 µm in size) – corresponding to multi-GBq quantities of the beta-emitting radionuclide yttrium-90 (^{90}Y) – into the vasculature supplying the cancerous tissue.

4. **Post-treatment imaging:** At some clinical sites it is conducted to verify the location of the microspheres; however, this requires specialized acquisition protocols to visualize either bremsstrahlung (planar/SPECT) or internal pair production (PET), as ^{90}Y does not emit imageable gamma rays. The microspheres remain inside the patient permanently, lodged within the liver tissue even after the therapeutic radionuclide has decayed.

The two products on the market today highlight the diversity of approaches that can be used in designing radioembolic microspheres. One is comprised of an aluminosilicate-yttrium oxide glass; the therapeutic isotope ^{90}Y is generated in situ, using a nuclear reactor. The other is produced by loading an organic resin with no carrier added ^{90}Y from a radionuclide generator. The result is two complementary radioembolization agents that allow clinicians to tailor treatments to individual patient needs (see Table 1). High specific activity microspheres are well suited for liver segmentectomy, where a small tumour volume is treated with a high absorbed dose; lower specific activity microspheres can be used for cases involving larger tumour volumes, such as lobar treatments.

Table 1. Microspheres characteristics		
Material Density	**Activity**	**per sphere**
Glass	3.x g/mL	2500 Bq
Resin	1.x g/mL	50 Bq

Growing Clinical Impact

The clinical utilization of radioembolic therapy is expected to continue to increase over the next decade due to a combination of factors including a growing body of evidence for its clinical efficacy, rising rates of HCC, and two recent regulatory approvals. After 20+ years in the clinic, the glass microspheres received FDA approval for the treatment of HCC in 2021, while the clinical indication for resin microspheres was expanded to include HCC, as well as mCRC, in 2025. Moreover, new indications may be on the horizon.

Researchers are exploring radioembolization to treat liver metastases arising from a wider range of cancers including pancreatic, breast, and neuroendocrine tumours; radioembolic therapy is also being investigated for its ability to treat primary renal cell cancer, cholangiocarcinoma, and even brain tumours. Radioembolization can also be used in combination with other therapeutic approaches, such as check-point inhibitors or even RLT: for example, ^{177}Lu-DOTATATE typically has poor uptake in bulky liver metastases that are amenable to treatment with radioembolic therapy.

Next-Generation Technologies

As clinical use of radioembolization is expanding, so too is research into next-generation microspheres that can offer clinicians improved flexibility, precision, and personalization in the IR suite. The introduction of holmium-166 (^{166}Ho)-based glass microspheres onto the European market in 2015 marked two major milestones: the first non-^{90}Y radioembolic agent to be adopted into clinical practice, and the first "scout microsphere" designed to improve lung shunt measurements and improved patient selection. Substituting ^{166}Ho (a beta and gamma-emitting radionuclide) in place of ^{90}Y introduces the possibility of selecting the therapeutic range of the microspheres to complement patient pathology – a principle already familiar to the RLT community. If radioembolic therapy is to become a precision therapy, moving beyond ^{90}Y – with its beta particle range in tissue of up to 11 mm – will be essential. Though it was discontinued in 2025 for business reasons, their seminal contributions to this field will likely drive future innovations.

In Canada, research is taking a different approach towards personalized radioembolization: the development of a glass microsphere with one key innovation: the microspheres are radiopaque and can thus be imaged by CT. This allows clinicians to conduct high-resolution, real-time imaging to monitor and optimize microsphere delivery during administration, ensuring maximum dose delivery to target tissues which should ultimately improve patient outcomes. The product should also facilitate CT-based post-operative verification of microsphere distribution – and therefore, dose delivery – as an alternative, or in addition to, nuclear imaging protocols currently used with existing ^{90}Y products. This product is currently in clinical trials, where it is being evaluated in patients with HCC and mCRC.

Looking Ahead

The future of radioembolization is promising. With new clinical tools under development, the outlook for radioembolic therapy is bright. It was already shown that this treatment is suitable not only for palliation, but can be used as neoadjuvant to transplantation or surgical resection, or even with curative intent. Other emerging technology developers are also pushing the envelope on microsphere imageability to enable precision treatment planning, targeted microsphere delivery, and personalized dose administration. The advent of new product portfolios with customizable therapeutic profiles will combine synergistically with advances in clinical techniques to improve future patient outcomes and, we believe, to expand the role of radioembolization in cancer therapy.

Radioligand Therapy Supply in the UK: Current Status and the Road Ahead

Dr. Tom Haywood
Oncidium Ambassador - UK

The UK is entirely dependent on imports for therapeutic medical isotopes. The only medical isotopes produced domestically for clinical use are ^{18}F and ^{11}C, both generated in medical cyclotrons. This lack of therapeutic isotope production capability is due to the absence of research fission reactors in the UK.

In recent years, the supply of isotopes has faced additional challenges following Brexit, including longer customs checks, which have a serious impact on delivery times because of the short half-lives of these isotopes.

There have been several medical isotope shortages in the UK in recent years, the most recent occurring in October and November 2024, when several research reactors simultaneously went offline for both planned and unplanned maintenance. This severely affected radioisotope manufacturers' ability to produce and supply ^{99}Mo/^{99m}Tc generators.

The shortage disproportionately affected the UK due to the additional challenges of shipping. While data has not been published, it is understood that supplies of ^{131}I were also impacted.

There has been a proposal to construct a new research reactor in North Wales, Project Arthur[2], to produce medical isotopes including ^{99}Mo, ^{131}I, and ^{177}Lu. The project is still awaiting government approval and, if funded, is expected to take around 10 years from approval to the first isotope supply.

Currently, the only fully accessible radioligand therapy (RLT) in the UK is ^{177}Lu-DOTATATE, used for the treatment of gastroenteropancreatic neuroendocrine tumours (GEP-NET). Although ^{177}Lu-PSMA-617 is approved, it is not routinely available through the National Health Service (NHS) due to cost-effectiveness concerns raised by the National Institute for Health and Care Excellence (NICE). It is, however, available to private patients and through the Early Access to Medicines Scheme (EAMS)[4] in England.

With an estimated 20% of the overall treatment cost coming from the isotope itself, increased supply and accessibility of ^{177}Lu in the UK could help reduce costs. Despite growing demand for medical isotopes used in RLT, there is little indication that sufficient plans are in place to meet this rising demand, either within the UK or more broadly across Europe.

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Radioligand Therapy with Lutetium-177 in Brazil: Barriers and Opportunities

Dr. Emerson Bernardes
Oncidium Scientific Advisor - Brazil

Radioligand therapy (RLT) with lutetium 177 (^{177}Lu) combines molecular targeting with beta radiation to treat advanced cancers. In patients with neuroendocrine tumors and metastatic castration-resistant prostate cancer, ^{177}Lu-labelled agents can extend survival, ease symptoms, and improve quality of life. Given these benefits often emerge late in the disease course, ensuring fair access is a matter of health equity as well as medical progress.

Brazil introduced ^{177}Lu DOTATATE in 2007 through the Nuclear and Energy Research Institute (IPEN), a public radiopharmaceutical producer. ANVISA later gave a special authorization for the use of ^{177}Lu PSMA I&T in 2020, finally, in December 2023, ^{177}Lu PSMA 617 was received market authorization from ANVISA. Although both therapies are now reimbursed by private insurers, around 75% of Brazilians depend exclusively on the public Unified Health System (SUS), which does not currently cover RLT or the PET tracers needed for patient selection.

Nationwide usage remains well below clinical demand. In 2024, roughly 150 patients received each therapy—despite prostate cancer's higher incidence suggesting far greater need for ^{177}Lu PSMA. This gap likely reflects both the earlier introduction and much lower cost of ^{177}Lu DOTATATE, produced by IPEN at around $1,500 per dose. By contrast, the price of ^{177}Lu PSMA 617 has risen to over $30,000 per dose since registration, nearly 3 times the price of earlier local alternatives.

Service capacity remains concentrated in a few major cities. Yet access is limited less by supply than by affordability and reimbursement. Expanding access will depend on generating real-world data to support cost-effectiveness assessments by CONITEC - the national commission responsible for evaluating health technologies for SUS. Without clear evidence of value and sustainable pricing models, RLT is still largely unavailable to the majority of patients who could benefit from it.

Radioligand Therapy in Poland and East Europe

Dr Magdalena Gumiela
Oncidium Ambassador - Poland

Accessto radioligand therapies across Eastern Europe remains uneven from one country to another, reflecting differences in healthcare infrastructure, reimbursement systems, and availability.

According to data from 2022, there are 64 nuclear medicine departments in Poland, ensuring that patients have easy access to a wide range of diagnostic and therapeutic procedures. The radiopharmaceuticals currently applied in treatment include:

- ^{177}Lu-PSMA-617 for metastatic castration-resistant prostate cancer (mCRPC),
- ^{177}Lu-DOTATATE for neuroendocrine tumours,
- ^{90}Y for radiosynovectomy,
- ^{153}Sm for bone metastases,
- ^{223}Ra-dichloride for CRPC patients with bone metastases
- ^{131}I for thyroid cancer.

All these therapies are fully reimbursed under Poland's public health insurance system, granting universal access to eligible patients. ^{177}Lu-PSMA-617 therapy, while not yet part of standard reimbursement, is accessible through emergency access to drug technologies (RDTL). Under this mechanism, hospitals can submit individual patient applications for full reimbursement. Approval covers up to three months or three treatment cycles, with the option for extension if clinical benefit is demonstrated.

Regarding alpha emitters, these are currently used in experimental therapies in Poland — for example, ^{225}Ac-DOTA-Substance P, ^{225}Ac-PSMA and ^{225}Ac-DOTATATE have been tested in glioma, metastatic castration-resistant prostate cancer, neuroendocrine hepatocellular neuroendocrine tumors and unresectable liver metastases respectively.

Across Eastern Europe, some countries, including Bosnia and Herzegovina, Croatia, Kosovo, Moldova, Montenegro, North Macedonia, and Romania — do not yet offer ^{177}Lu-based therapies as standard treatment options. In others, such as Slovakia, availability exists but is limited to private hospitals or restricted by insurance coverage.

In Estonia, ^{177}Lu-DOTATATE is reimbursed by the Health Insurance Fund for GEP-NET indications, whereas ^{177}Lu-PSMA is not reimbursed. Patients may either pay out-of-pocket or seek assistance from non-profit organizations such as The Gift of Life Foundation (https://kingitudelu.ee/en/). Access in both cases remains constrained by indication and cost barriers.

In Azerbaijan, although radioligand therapies are publicly reimbursed for eligible patients, access is still limited due to the small number of treatment centers and trained specialists. As a result, not all eligible patients can receive therapy promptly.

In contrast, Serbia offers a comprehensive portfolio of nuclear medicine therapies through the University Clinical Center Kragujevac, including both established treatments (^{131}I, ^{131}-MIBG, ^{153}Sm-EDTMP) and modern ones (^{177}Lu-DOTATATE, ^{90}Y-DOTATATE, ^{177}Lu-PSMA, ^{223}Ra-chloride). All these therapies are fully reimbursed by public health insurance for Serbian patients, with patients from neighboring countries (Montenegro, Bosnia and Herzegovina, Kosovo, Croatia, Romania) also being accepted for treatment.

Overall, Eastern Europe presents a diverse landscape in terms of radioligand therapy access. While some countries ensure public reimbursement and cross-border treatment availability, others face structural and financial barriers that restrict access. Continued investment in infrastructure, personnel training, and regional collaboration will be essential to achieve more equitable access to these innovative therapies across the region.

Radioligand Therapy in South Africa

Radioligand therapies (RLT) is available in South Africa, however, access is limited. Services are concentrated in a few academic and private hospitals due to infrastructure and specialist shortages, requiring patients to travel long distances to receive care. The radioligand therapies with ^{177}Lu-PSMA and ^{177}Lu-DOTATATE are manufactured locally by NTP and also imported via Axim.

In the public/state sector, RLT is funded through the Department of Health's public healthcare budget, but strict eligibility criteria apply due to financial constraints. For prostate cancer, ^{177}Lu-PSMA therapy is typically reserved for patients who have exhausted all other treatment options. In neuroendocrine tumours, ^{177}Lu-DOTATATE is preferred over long-acting octreotide due to its lower overall cost, making it more feasible within budgetary limits.

In the private sector, RLT is more widely available, but access depends on medical insurance approval. Oncologists must motivate for coverage, and if denied, patients often face high out-of-pocket costs or are referred to the public healthcare system. This creates a significant barrier for many individuals seeking timely treatment.

Exploratory work with other Lu-177 radiopharmaceuticals is also underway in breast, bladder, and lung cancers under Section 21 approval. Targeted alpha therapy (TAT), namely ^{225}Ac-PSMA and ^{225}Ac-DOTATATE, was previously available commercially through NTP. However, due to high costs, and challenges maintaining a consistent supply, NTP has ceased distribution. TAT is now limited to clinical trials or compassionate use programs at Steve Biko Academic Hospital/ NuMeRi (Pretoria) and Inkosi Albert Luthuli Central Hospital (Durban).

Overall, RLT access in South Africa is constrained by limited infrastructure, specialist availability, and high costs. These challenges affect both public and private healthcare sectors, leaving many patients without viable options for advanced cancer. Dedicated budgets for RLT and strategic planning are urgently needed to expand equitable access to advanced cancer therapies across South Africa.

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RLT-CONNECT

RLT-Connect: A Growing Network of Hope for Patients in Financial Need

Radioligand therapy has demonstrated its value in cancer care worldwide, validated by clinical trials and confirmed in everyday practice, particularly for thyroid, prostate, and neuroendocrine cancers. Yet despite its proven benefits, equitable access to radiopharmaceuticals is still an obstacle for most countries, and patients in financial need can't afford the treatment.

In line with Oncidium's mission, RLT-Connect aims to be a catalyst of change in cancer care. Creating bridges between radioisotope donors and healthcare professionals, we hope to bring a life-changing opportunity to people living with cancer.

The effort put in strengthening the connections, is giving a positive outcome. In its second year, RLT-Connect has expanded exponentially, bringing the option of RLT treatment donations in 20 countries across South America, Africa and Asia. More and more requests are coming up from Africa, where today 23 patients have been treated, on a total of 58.

New clinically relevant isotopes, such as Ac-225, have also been donated, providing new treatment options for two patients on their therapeutic journey.

Also, the program revealed that even long established treatments, such as I-131 for thyroid cancer, is still very much a need where no reimbursement is available.

With the objective to distribute 160 doses in 2025, the program expanded from 6 countries to 20, giving hope to more than 40 new patients.

None of this could be possible without the heartwarming support of the radioisotope supplies, radiopharmacies, distributors, healthcare professionals and clinical sites generously joining the RLT-Connect program. This is the network who acts for a present where cancer care means providing options to patients, and believe in a future where equitable access is a reality.

In the coming years, we envision RLT-Connect not only advancing access through collaboration and dose donation, but also driving the integration of RLT into national healthcare systems worldwide; ultimately transforming oncology by establishing RLT as a universally recognized standard of care.

Tackle Cancer Challenge: Oncidium on the Move!

TACKLE CANCER CHALLENGE
4th Edition

As the 2025 Tackle Cancer Challenge nears its end, participants worldwide have logged thousands of kilometers through walking, running, cycling, and even gardening, supporting awareness of radioligand therapy. The collective goal of 50,000 km highlighted the power of community in advancing cancer care.

The Oncidium foundation thanks all participants for their dedication and contribution to this global initiative.

Click here to join the challenge!

Running sessions at the EANM 2025

Working Beyond Borders with Oncidium foundation Ambassadors

Bringing together 90 voices from around the world, the 2025 Ambassador Meeting focused on tuning ideas into global actions to improve awareness and access to radioligand therapy. Together, we:

- Placed patient voices at the heart of the debate
- Reflected on 6 years of ideas and impact
- Explored new collaboration opportunities
- Celebrated Ambassadors' dedication and achievements
- Learned from our expert speakers
- Brainstormed concrete actions to advance awareness and access to RLT for people living with cancer

Thank you to all our Ambassadors and special guests for making this day impactful!

Growing Needs, Growing Team

As the Oncidium foundation takes on more projects and expands its reach, our teams are growing too. Each member contributes to advancing access to radiotheranostics and supporting people living with cancer, helping us make a real impact worldwide.

Meet us at:

- **SNMMI 2025 Therapeutics Conference** – *November 6-8, 2025, Bethesda, USA*
- **ICRT** – *March 6-9, 2025, Limasol, Cyprus*
- **6th Targeted Radiopharmaceuticals Summit Europe** - *November 10-12, 2025, Amsterdam, The Netherlands*
- **Jornadas Celsos Papadópulos** – *November 14-15, 2025, Mendonza, Argentina*
- **AORTIC International Conference on Cancer** – *November 17-20, 2025, Hammamet, Tunisia*
- **European Cancer Summit** – *November 19-20, 2025, Brussels, Belgium*
- **Europa Donna – Advocacy Leader Conference** – *November 22-23, 2025, Paphos, Cyprus*
- **BELNUC - One Day Course on Radioligand Therapy (RLT)** – *November 30, 2025, Brussels, Belgiu*
- **AOFNMB** – *December 4-7, 2025, Chennai, India*

- **Theranostics World Congress** – *January 29-1, 2026, Cape Town, South Africa*
- **Congreso Mundial de Medicina y Biologia Nuclear (WFNMB)** – *February 13-16, 2026, Cartagena, Colombia*
- **EAU European Association of Urology** – *February 13-16, 2026, London, UK*
- **JFMN Journées Francophones de Médecine nucléaire** – *February 19-21, 2026, Paris, France*
- **6th International Conference on Future of Preventive Medicine and Public Health** – *February 23-24, 2026, Rome, Italy*
- **BNMS Annual Spring Meeting 2026** – *April 20-22, 2026, Manchester, UK*
- **DGN 2026** – *April 22-25, 2026, Münster, Germany*
- **BCMN Balkan Congress** – *April 23-25, 2026, Sofia, Bulgaria*
- **WHS Regional Meeting + Nairobi Radiotheranostics Summit** – *April 27-29, 2026, Nairobi, Kenya*
- **ANZSNM - 56th Annual Scientific Meeting of the Australian and New Zealand Society of Nuclear Medicine** – *JMay 15-17, 2026, Canberra, Australia*
- **ESTRO** – *May 15-19, 2026, Stockholm, Sweden*
- **CNIC: Canadian Radiotheranostics Leaders' Summit** – *May 25-26, 2026, Toronto, Canada*
- **SNMMI** – *May 29-02, 2026, Chicago, USA*

New Chapter of Mr Bind is out!

Get in touch if you'd like to help translate our comic to make patient information more accessible, or if you'd like to contribute the next adventures to raise awareness of radiotheranostics.

Contact us if you would like to translate our comic for better patient information access or would like to submit the next adventures for better radiotheranostics awareness & reach.

Want to contribute to the next edition of Radiotheranostics Today? Tell us about:

- **The radiotheranostics situation in your country**
- **Projects and challenges in your region**
- **Focus on a particular application**
- **Patient/practitioner interview.**

Contact us to contribute to the next edition!

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