

ITM's online Plattform

www.Theranostics.online

www.itm-radiopharma.com/healthcare-professionals/

Theranostics.online

A medical education website on the mode of action of **THERA**peutic and diag**NOSTIC** pairs in oncology.

Tailored for healthcare professionals in nuclear medicine and oncology.



Theranostics

Section to introduce the concept of theranostics in personalized medicine.

Imaging

For imaging, radiopharmaceuticals, also called radiotracers, are coupled with either gamma or positron emitters. Gamma sources such as gallium-67 (Ga-67) target protein expression. Positron emitters such as gallium-68 (Ga-68) and fluorine-18 (F-18), which are detected using PET (positron emission tomography), are used to address tumor metabolism (Theranostics et al., 2017).

Targeted molecular imaging is used not only for the initial diagnosis of tumors but also for staging, re staging, and monitoring therapy response. The procedure is minimally invasive and allows only trace amounts of radiopharmaceuticals. Nonetheless, the possible benefits of the procedure should be weighed against the increase in possible health risks due to varying radiation exposure before every procedure (Fitz et al., 2016).

Some examples of radiotracers already in clinical use are ^{67}Ga -DOTA, ^{68}Ga -somatostatin analogs, and indolium-labeled prostate-specific membrane antigen (PSMA) ligands (Majumdar et al., 2015).



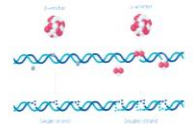
"We see what we treat, and we treat what we see"
- Richard Baum (Turner JN, 2018)

References:


- Theranostics, K. et al. (2017). "The Basics of Nuclear Medicine Physics." *Development and Therapy*. 10: 1851-1870. [DOI:10.1002/dt.10002](#)
- Tan, Yu-Ling et al. (2017). "Tumor-Liver-Specific Radiopharmaceuticals." *Journal of Nuclear Medicine*. 58: 1000-1005. [DOI:10.1161/0000000000000000](#)
- Wells, Anthony et al. (2016). "The Future of Nuclear Medicine: Molecular Imaging, and Theranostics." *Journal of Nuclear Medicine*. 57: 1000-1005. [DOI:10.1161/0000000000000000](#)
- Turner, JN. (2018). "Nuclear Medicine in the 21st Century." *The Journal of Nuclear Medicine*. 59: 1000-1005. [DOI:10.1161/0000000000000000](#)

Treatment

Theranostic radiopharmaceuticals are related with either beta- or alpha-emitting isotopes. The issue generation of these isotopes is mostly due to their low energy levels (LTL). Beta-emitting isotopes, e.g., fluorine-18 (F-18) and gallium-68 (Ga-68), have a low LTL and an intermediate half-life, which allows them to target specific tissues and emit gamma rays for imaging. The surrounding healthy tissue is spared due to its low permeability of only a few micrometers. On the other hand, alpha-emitting isotopes, e.g., Actinium-225 (Ac-225) and Bismuth-213 (Bi-213), have a high LTL and a short half-life, which allows them to target specific tissues and emit alpha rays for imaging. This targeted approach avoids damage to the surrounding healthy tissue (Majumdar et al., 2015).



Targeted radionuclide therapy (TRT) involves the systemic administration of a high dose of radiopharmaceuticals (internal gamma emitters). Unlike external beam radiation, where a therapeutic radiation dose is delivered to the tumor area, TRT delivers a therapeutic radiation dose without surgery (Fitz et al., 2016).



References:

- Theranostics, K. et al. (2017). "The Basics of Nuclear Medicine Physics." *Development and Therapy*. 10: 1851-1870. [DOI:10.1002/dt.10002](#)
- Wells, Anthony et al. (2016). "The Future of Nuclear Medicine: Molecular Imaging, and Theranostics." *Journal of Nuclear Medicine*. 57: 1000-1005. [DOI:10.1161/0000000000000000](#)
- Turner, JN. (2018). "Nuclear Medicine in the 21st Century." *The Journal of Nuclear Medicine*. 59: 1000-1005. [DOI:10.1161/0000000000000000](#)

Disease Areas

Currently offering information about Neuroendocrine tumors with a focus on GEP-NETs.

Information about disease areas such as prostate cancer, glioblastoma, ovarian cancer and others to follow.

itTHERANOSTICS

Gastroenteropancreatic neuroendocrine tumors (GEP-NETs)

Gastroenteropancreatic neuroendocrine tumors (GEP-NETs) include tumors with well-differentiated cells arising from the gastrointestinal tract and secrete hormones or hormone-like substances. These endocrine tumors may be functionally active or non-functional. If functionally active, GEP-NETs can produce high levels of specific hormones or hormone-like substances that may be associated with hormonal syndromes (e.g., insulinoma, gastrinoma, pheochromocytoma or paraganglioma) or lead to functional syndromes such as multiple endocrine neoplasia (MEN) types 1, 2 and 4 as well as von Hippel-Lindau syndrome (VHL), neurofibromatosis 1 (NF1), and tuberous sclerosis (TSC) (Knappe et al. 2022).

Classification

The current WHO classification published in 2019 identifies three main groups of GEP-NETs: well-differentiated neuroendocrine tumors (GEP-NETs), poorly differentiated neuroendocrine carcinomas (GEP-NECs), and mixed neuroendocrine/neuroendocrine carcinomas (MiNECs) (Riss et al. 2020). The basis for this classification includes cellular morphology (histological differentiation) and proliferative grade features (mitotic count and Ki-67 related proliferation index). Based on this classification, GEP-NETs are grouped into three groups: NET G1, NET G2, and NET G3 (Table 1).

Grading	Differentiation	Growth	Mitotic count	Ki-67 index
NET G1	Well-differentiated	Low	<10	<1%
NET G2		Intermediate	11-20	1-20%
NET G3		High	>20	>20%
ECNEC	Poorly differentiated	High	>20	>20%
ECNEC		High	>20	>20%
MiNEC	Well or poorly differentiated	Variable	Variable	Variable

Epidemiology

GEP-NETs are a rare disease characterized by a relatively constant growth rate. Retrospective epidemiological data from national and regional registries suggest a GEP-NET incidence of 1.0 - 2.8 in Europe and 1.56 in the US per 100,000 population (Dall et al. 2022). The incidence of GEP-NETs seems to be increasing, probably due to improved imaging methods and awareness about histology (Cote et al. 2019; Shroff et al. 2019). The most common primary GEP-NET sites are the small intestine (30.8%), rectum (26.3%), colon (17.6%), pancreas (12.1%), stomach (8.9%) and appendix (5.7%) (Shilling et al. 2012) (Figure 1).

Figure 1: Distribution of GEP-NETs based on anatomical site


Stomach 8.9%
Pancreas 12.1%
Small intestine 30.8%
Colon 17.6%
Appendix 5.7%
Rectum 26.3%

Figure 1 shows the distribution of GEP-NETs based on anatomical site. The pie chart indicates the following percentages: Stomach (8.9%), Pancreas (12.1%), Small intestine (30.8%), Colon (17.6%), Appendix (5.7%), and Rectum (26.3%).

Figure 1 shows the distribution of GEP-NETs based on anatomical site. The pie chart indicates the following percentages: Stomach (8.9%), Pancreas (12.1%), Small intestine (30.8%), Colon (17.6%), Appendix (5.7%), and Rectum (26.3%).

ENETS Symposium

ETM



Clear need for prospective studies on Lung NETs

LEVEL STUDY


Prospective, randomized, international, open-label, phase 3 study

Key inclusion/exclusion criteria

- 1. Eastern European population
- 2. Eastern European countries
- 3. Eastern European countries with low prevalence of lung cancer
- 4. Eastern European countries with low prevalence of lung cancer
- 5. Eastern European countries with low prevalence of lung cancer
- 6. Eastern European countries with low prevalence of lung cancer
- 7. Eastern European countries with low prevalence of lung cancer
- 8. Eastern European countries with low prevalence of lung cancer
- 9. Eastern European countries with low prevalence of lung cancer
- 10. Eastern European countries with low prevalence of lung cancer

Key exclusion criteria

- 1. Eastern European countries with low prevalence of lung cancer
- 2. Eastern European countries with low prevalence of lung cancer
- 3. Eastern European countries with low prevalence of lung cancer
- 4. Eastern European countries with low prevalence of lung cancer
- 5. Eastern European countries with low prevalence of lung cancer
- 6. Eastern European countries with low prevalence of lung cancer
- 7. Eastern European countries with low prevalence of lung cancer
- 8. Eastern European countries with low prevalence of lung cancer
- 9. Eastern European countries with low prevalence of lung cancer
- 10. Eastern European countries with low prevalence of lung cancer



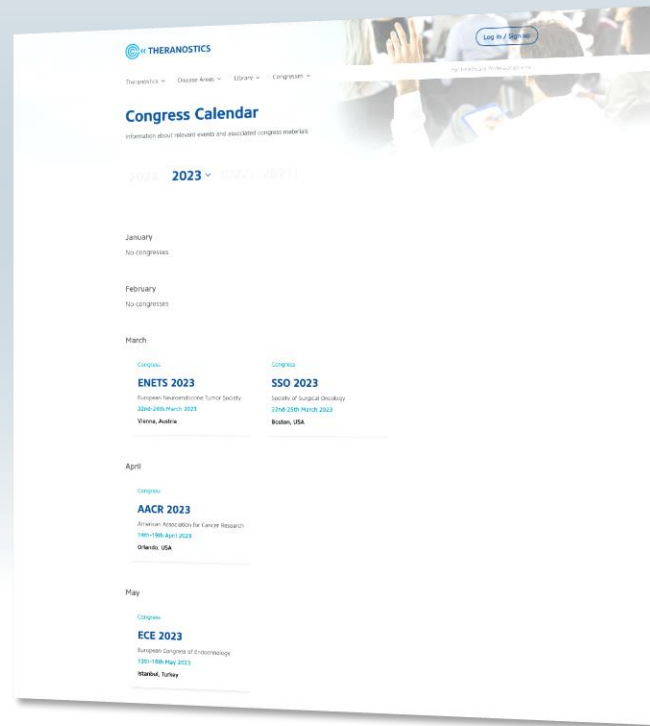


A poster titled Pivotal phase II COMPASS trial will compare ¹⁷⁷Lu-edotreotide with best standard of care for well differentiated aggressive grade 2 and grade 3 gastroenteropancreatic neuroendocrine tumors was presented by Halldanarson TR et al. at the Theranostics World Congress taking place from June 24-26 2022 in Wiesbaden.

Congress coverage

Up-to-date information about congresses and events relevant to nuclear medicine and clinical oncology research.

Access to download congress reports from memo inOncology (Springer Verlag)



Insightful resources to inform about ITM's products, educational topics, events and many more..



Learning & Information

Country specific topics

e.g. reimbursement

The screenshot displays the itm website's 'Learning & Information' section. At the top, a navigation bar includes 'ITM Home', 'Products', 'Learning & Information', and 'Events'. The main heading is 'PET/CT in the German Health Care System'. Below this, the topic is 'Informationen zur ambulanten spezialfachärztlichen Versorgung (ASV) bei GI-Tumoren'. The webinar is presented by 'Dr. Sonja Froschauer-Häfele' (Libertamed GmbH, Geschäftsführender Vorstand Bundesverband ambulante spezialfachärztliche Versorgung e.V.). Contact information for 'Dr. Thomas Gottlieb' (VP Global Commercial Operations - Radiopharmaceuticals) and 'Dr. Dirk Bernhardt' (VP Global Market Access) is provided. A video player shows a presentation slide titled 'Interdisziplinäres Team für gastrointestinale Tumoren' with a central diagram of a 'Kernteam' (Core Team) and 'Hinzuzuziehende' (Consultants). The slide lists various medical specialties involved in the care of gastrointestinal tumors.

ITM Home Products Learning & Information Events

PET/CT in the German Health Care System

Informationen zur ambulanten spezialfachärztlichen Versorgung (ASV) bei GI-Tumoren

Online-Vortrag
Referentin: Dr. Sonja Froschauer-Häfele (Libertamed GmbH, Geschäftsführender Vorstand Bundesverband ambulante spezialfachärztliche Versorgung e.V.)

Kontaktmöglichkeit zum Thema ASV bei ITM:

Dr. Thomas Gottlieb
VP Global Commercial Operations - Radiopharmaceuticals
thomas.gottlieb(at)itm-radiopharma.com

Dr. Dirk Bernhardt
VP Global Market Access
dirk.bernhardt(at)itm-radiopharma.com

Interdisziplinäres Team für gastrointestinale Tumoren

Kernteam

- Onkologie
- Strahlentherapie
- Gastroenterologie
- Allgemein- oder Viszeralchirurgie
- HNO
- Nuklearmedizin
- Endokrinologie

Hinzuzuziehende

- Andrologie
- Nuklearmedizin
- Gefäßchirurgie oder Angiologie
- Kardiologie
- Neurologie
- Neuroradiologie
- Neurologie
- Labor
- Pathologie
- Radiologie
- Psychiatrie und Psychotherapie
- Gynäkologie
- Urologie

Präventive Tumorerkrankungen
* Nur bei Metastasierung von Tumoren der Solidartumoren
** Falls nicht von der Kernkommission empfohlen

10:20 / 36:54

Products

Production Route



Using the indirect production route by taking ^{176}Yb as starting material we are able to offer n.c.a. ^{177}Lu with excellent product characteristics.

Important Safety Information for EndolucinBeta® / no-carrier-added Lutetium-177 (n.c.a. ^{177}Lu) chloride

Summary of product characteristics

Marketing Authorization Holder

ITM Medical Isotopes GmbH
Lichtenbergstrasse 1
85748 Garching/Munich, Germany

Please contact our Sales Team, if you need any further information

Email: sales@itm-radiopharma.com
Phone: +49 89 329 8986 000

Video – Production of n.c.a. Lutetium-177 / EndolucinBeta® for Targeted Radionuclide Therapy



[ITM Home](#)
[Products](#)
[Learning & Information](#)
[Events](#)

TOCscan

Ready-to-use Radiopharmaceutical for Diagnosis & Staging of Neuroendocrine Tumors (NETs)

^{68}Ga -Edotreotide, distributed under the brand name TOCscan® (Sogacan® in Austria / France), is the companion diagnostic in ITM's theranostic approach for the treatment of neuroendocrine tumors (NETs). This ready-to-use radiopharmaceutical is registered in Germany, France and Austria and is used to diagnose NETs and localize metastases throughout the body.

TOCscan® contains the targeting molecule Edotreotide, an octreotide-derived somatostatin analogue, labeled with the short-lived, diagnostic radionuclide Gallium-68 (^{68}Ga), which has a half-life of 68 minutes. Edotreotide binds with high affinity to somatostatin receptors, which are predominantly overexpressed by neuroendocrine tumor cells. TOCscan® retains both its receptor binding properties and its physiological function when labeled with ^{68}Ga . Upon binding to the somatostatin receptors in vivo, the radiopharmaceutical is internalized and retained by tumor cells enabling precise location of diseased cells.

TOCscan® is therefore used for diagnosis and staging of neuroendocrine tumors by PET or PET/CT as well as for therapy planning and dosimetry in preparation for [n.c.a. \$^{177}\text{Lu}\$ -Edotreotide](#) therapy.

Important Safety Information for TOCscan® / Gallium-68 (^{68}Ga) Edotreotide

[Package Leaflet](#)

[Summary of Product Characteristics](#)

[Gebrauchsinformation DE](#)

[Gebrauchsinformation AT](#)

Marketing authorization in Austria under the brand name Sogacan®


Events:

TWC

ASCO

EANM

ITM Home Products Learning & Information Events



ITM Symposium on Ac-225 Targeted Radionuclide Therapy at Theranostics World Congress 2022

Actinium-225 Targeted Radionuclide Therapy – Current Perspective and Future Outlook

The symposium titled "Actinium-225 Targeted Radionuclide Therapy – Current Perspective and Future Outlook" took place on June 3, 2022, from 12:00 to 12:30 pm CEST.


The event featured several expert speakers: **Prof. Katharina Eber**, Associate Professor, Chair and Physician for Nuclear Medicine, University of Würzburg; **Prof. Katharina Eber**, Associate Professor, Chair and Physician for Nuclear Medicine, University of Würzburg; **Prof. Katharina Eber**, Associate Professor, Chair and Physician for Nuclear Medicine, University of Würzburg.

Symposium Program & Speakers

An Evaluation of Current and Prospective ²²⁵Ac Production Methods
Prof. Gergely, Global Product Manager, ITM, Garching, Munich

²²⁵Ac-PSMA for the Treatment of Prostate Cancer – Preclinical Experience
Prof. Katharina Eber, University Hospital Essen

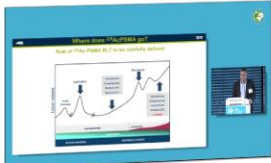
Current Clinical Experience for ²²⁵Ac-PSMA in mCRPC
Prof. Katharina Eber, University Hospital Essen




Prof. Gergely, Global Product Manager, ITM, Garching, Munich

Prof. Katharina Eber, University Hospital Essen

Prof. Katharina Eber, University Hospital Essen



ITM Home Products Learning & Information Events



ITM Precision Oncology Symposium 2022

Targeted Radionuclide Therapy – Present and Future Prospects

ITM proudly presents in parallel to the 2022 ASCO Annual Meeting, "Targeted Radionuclide Therapy – present and future prospects" on Friday June 3, 2022, a local time in person and online at the Hyatt Regency McCormick Place, Chicago, IL.

Chair: Pamela Kurz, MD, Director, Center for GI Cancers at Stanford Cancer Hospital and Yale Cancer Center

Welcome & Introduction

Clinical Application of Targeted Radionuclide Therapy in Neuroendocrine Tumors
Pamela Kurz, MD, Director, Center for GI Cancers at Stanford Cancer Hospital and Yale Cancer Center


Clinical Application of Targeted Radionuclide Therapy in Prostate Cancer
Michael Kretz, MD, Prostate Cancer Section Head, Director of Solid Tumor Oncology, Memorial Sloan-Kettering Cancer Center

Personalizing the Targeted Radionuclide Therapy, Advancements and Challenges
Thomas Hoppe, MD, Director of Molecular Therapy in the Department of Radiology and Biomedical Imaging, University of California San Francisco

The future of Targeted Radionuclide Therapy
Wolfgang Weber, MD, PhD, Director of the Department of Nuclear Medicine, "Klinikum rechts der Isar" (the University Hospital of the Technical University of Munich)

Discussion & Closing Remarks

Not an official event of the 2022 ASCO Annual Meeting. Not sponsored, endorsed, or accredited by ASCO®, CancerCare®, or Cancer Research UK®. Not CME, accredited.



ITM Home Products Learning & Information Events



ITM Satellite Symposium at EANM 2020

Challenges and Innovative Approaches in the Management of Osteoblastic Metastatic Disease

Chair: Prof. Andrei Iagaru
Stanford University Medical Center, Stanford, CA, U.S.

Welcome & Introduction
Prof. Andrei Iagaru, Stanford University Medical Center, Stanford, CA, U.S.

Pathophysiology of Osteoblastic Metastatic Disease
Prof. Robert E. Coleman, University of Sheffield, Sheffield, UK (15 min)

Current and Future Management Paradigms for Metastatic Bone Disease in Castrate-Resistant Prostate Cancer
Prof. Oliver Sartor, Tulane Cancer Center, New Orleans, LA, U.S. (15 min)

Future Radiopharmaceutical Treatment Options for Primary and Metastatic Bone Cancer
Prof. Wolfgang Weber, University Hospital rechts der Isar, Munich, Germany (15 min)

Panel Discussion & Closing Remarks



ITM Isotope Technologies Munich SE
Lichtenbergstrasse 1
85748 Garching / Munich

Your contact:

Phone: +49 89 329 8986-6000

Email: info@itm-radiopharma.com

www.itm-radiopharma.com

The information in this presentation also reflects prevailing conditions, to the best of our knowledge, as of this date, all of which are accordingly subject to change. In preparing this presentation, we have relied upon and assumed, without independent verification, the accuracy and completeness of all information from public sources or which was otherwise reviewed by us. No representation nor warranty is given as to the accuracy or completeness of such information contained in this presentation.