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Hope for the Diagnosis and Treatment of Small Cell Lung Cancer

At the Department of Nuclear Medicine of the Medical University of Innsbruck, a new radiopharmaceutical has been developed, which allows for better and earlier detection of tumors, leading to more targeted treatment. This innovative technology follows the so-called theranostics approach, which closely integrates diagnostics and targeted therapy. The technology will now be further developed for clinical use in collaboration with a US industry partner.

Innsbruck, May 21, 2024: Radiopharmaceuticals are radioactive drugs used in combination with imaging techniques for diagnostics and in radionuclide therapy for targeted tumor treatment. At Department of Nuclear Medicine of the Medical University of Innsbruck (Director: Irene Virgolini), a new radiolabeled substance has been developed and used for the first time to diagnose a patient with small cell lung cancer. The new radiopharmaceutical ([⁶⁸Ga]Ga-DOTA-MGS5) is currently being used in PET imaging (Positron Emission Tomography). The substance also shows promising potential for the therapy of this fast-growing tumor, which accounts for 12 to 15 percent of lung cancer cases. The radiopharmaceutical will now be further developed for clinical application under a licensing agreement with the US company *Evergreen Theragnostics*. The corresponding license negotiations were supported by *Ascenion* as a technology transfer partner of the Medical University of Innsbruck.

Targeted Tumor Radiation

The new technology, developed by radiopharmacist Elisabeth von Guggenberg as part of a project funded by the FWF, involves a molecule labeled with the radionuclide Gallium-68, which specifically binds to the cholecystinin-2 receptor. "The newly developed drug can be used for various tumors that exhibit this receptor. For small cell lung carcinoma, this is the case with a frequency of more than 50 percent. Through the receptor – a protein structure located on the cell surface – the drug is transported into the cancer cell. "This allows, on the one hand, the non-invasive imaging of tumor tissue, while on the other hand, tumor cells could be targeted and treated with higher precision while sparing healthy tissue," says Guggenberg, describing the therapeutic relevance. The findings were recently published in the *European Journal of Nuclear Medicine and Medical Imaging* and were also highlighted as "Image of the Month". The official journal of the European Association of Nuclear Medicine is the most important platform for the exchange of new clinical information within nuclear medicine, underscoring the potential impact of this new approach. This approach is expected to be tested in a clinical study on patients with small-cell lung carcinoma in the near future.

"Our research represents a significant advancement in the field of oncology. With the clinical implementation of the molecular imaging approach using the ⁶⁸Ga-labeled peptide for PET/CT imaging, we have demonstrated improved tumor visualization, thereby laying the foundation for peptide receptor radionuclide therapy with therapeutic radionuclides," says Irene Virgolini, Director of the University Hospital for Nuclear Medicine and a pioneer in the clinical application of radioactively labeled peptides for diagnosis and therapy.



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Innsbruck expertise

The development of radiopharmaceuticals for both diagnostic and therapeutic use has been intensively researched for many years. Particularly in recent years, there have been new innovative developments with high potential. The radiopharmacy group in Innsbruck also has many years of experience in the preclinical development of radioactively labeled peptide analogs for nuclear medicine applications. The new PET tracer for visualizing the cholecystinin-2 receptor has already been tested in a clinical study at Innsbruck Nuclear Medicine on patients with medullary thyroid carcinoma and other neuroendocrine tumors (ClinicalTrials.gov: NCT06155994).

The collaboration between the Medical University of Innsbruck and Evergreen Theragnostics in the USA, which has licensed the technology from the Medical University of Innsbruck, underscores the shared commitment to improving patient care. "This partnership is an important milestone in translating cutting-edge research into concrete clinical solutions," concludes Virgolini.

For research work

:Cholecystinin-2 receptor targeting by [68Ga] Ga-DOTA-MGS5 PET/CT in a patient with extensive disease small cell lung cancer.

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Press images for download:

<https://www.i-med.ac.at/pr/presse/2024/29.html>

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About Medical University of Innsbruck

Medical University of Innsbruck has approximately 2,200 employees and around 3,400 students and, together with the University of Innsbruck, is the largest educational and research institution in western Austria and the regional university for Tyrol, Vorarlberg, South Tyrol and Liechtenstein. The following courses are offered at Innsbruck Medical University: Medicine and Dentistry as the basis of an academic medical degree and a PhD degree (PhD) as the postgraduate aspect of scientific work. The bachelor's degree in Molecular Medicine is new in the curriculum since autumn 2011. Since the winter semester 2014/2015 there is the possibility to continue with a master degree in Molecular Medicine. Together with the University of Innsbruck the Medical University of Innsbruck offers a master degree "Pharmaceutical Sciences" (in English).

Medical University of Innsbruck is involved in numerous international educational and research programmes and networks. The research focuses on the areas Oncology, Neuroscience, Genetics, Epigenetics and Genomics as well as Infectious Diseases, Immunology & Organ and Tissue Repair. In addition to scientific research, Medical University of Innsbruck is also nationally and internationally very successful in the highly competitive field of research funding.

Evergreen Theragnostics, Inc. is focused on improving the available options for cancer patients using radiopharmaceuticals. The company is engaged in Contract Development and Manufacturing (CDMO) services as



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well as drug discovery and commercialization of proprietary products. Evergreen is headquartered in Springfield, NJ in a state-of-the-art GMP radiopharmaceutical facility. The company was founded in 2019 by a team that brings a strong track record in theragnostic radiopharmaceutical manufacturing, research, and clinical development. For more information, visit <https://evergreentqn.com/>