CTE 7
Technologists Committee + ESTRO
Tuesday, October 20, 15:00–16:30

Session Title
Theranostics: Bridging Nuclear Medicine and Radiotherapy for Better Cancer Treatment

Chairpersons
Ângelo Cardoso (Bern, Switzerland)
Anniina Keinänen (Kuopio, Finland)

Programme
15:00–15:05 Session Introduction
15:05–15:30 **Marco Cuzzocrea** (Bellinzona, Switzerland): Theranostics: Principles and the Role of Nuclear Medicine in Precision Oncology
15:30–15:55 **Elizabeth Miles** (United Kingdom): Theranostics in Clinical Trial Quality Assurance: Multidisciplinary Collaboration and Future Directions
15:55–16:15 Q&A, and Discussion
16:15–16:30 NMTIC

Educational Objectives

1. Define the concept of theranostics and explain how it integrates diagnostic imaging with targeted radionuclide therapy in oncology.
2. Describe the role of molecular imaging techniques, including PET and SPECT, in identifying suitable targets for therapy.
3. Identify commonly used theranostic pairs, such as diagnostic and therapeutic radiopharmaceuticals used in conditions like prostate and neuroendocrine cancers.
4. Explain the mechanisms of action of targeted radionuclide therapies, including the use of agents like Lutetium-177 and Gallium-68.
5. Discuss patient selection and treatment planning based on imaging findings, tumour biology, and clinical indications.
6. Evaluate the benefits and limitations of theranostics, including therapeutic efficacy, safety considerations, and logistical challenges.
7. Recognize the importance of multidisciplinary collaboration in delivering personalized cancer care through theranostic approaches.

Summary
Theranostics represents a transformative approach in oncology, combining diagnostic imaging and targeted radionuclide therapy to enable more precise and personalized cancer care. By linking tumour detection with therapy selection, this strategy allows clinicians to identify patients most likely to benefit from specific treatments.
This session will explore the principles of theranostics, highlighting the role of molecular imaging with PET and SPECT in guiding therapy decisions. Key examples, including radiopharmaceutical pairs such as Gallium-68 and Lutetium-177, will illustrate how imaging biomarkers can be directly translated into targeted treatment strategies.

Participants will also gain insight into patient selection, treatment planning, and response assessment, as well as the practical and multidisciplinary considerations required to implement theranostics in clinical practice. The session emphasizes how this integrated approach is reshaping the management of cancers such as prostate and neuroendocrine tumours.

Key Words
Theranostics; PET; SPECT; Targeted Radionuclide Therapy.