CME Session 11

Translational Molecular Imaging & Therapy Committee / Radiobiology Task Group
Tuesday, October 7, 15:00 – 16:30

Session Title

A Comprehensive Approach to Preclinical Dosimetry

Chairpersons

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Programme

15:00 – 15:20 **Olga Kochebina** (Paris, France): The power of preclinical dosimetry for personalised treatment radio-immunotherapy studies
15:20 – 15:45 **Kuangyu Shi** (Bern, Switzerland): Interaction of radiation dosimetry and DNA repair to build a mathematical model for radiopharmaceutical therapy treatment planning
15:45 – 16:10 **Clarita Saldarriaga Vargas** (Mol, Belgium): Small scale dosimetry models for normal organs, dose effect limits in mice, relevant for human?
16:10 – 16:20 **Mark Konijnenberg** (Rotterdam, Netherlands): Preclinical dosimetry experience, ready for clinical application?
16:20 – 16:30 Questions, answer and discussion with the presenters and audience

Educational Objectives

1. Understand the possibilities for performing dosimetry of targeted radionuclide therapy in small animals and extrapolation of dose-effects to humans.
2. See the beauty of a mathematical description of radiation and drug interaction on the radiobiology and consequences for optimal TRT and drug combinations.
3. Understand the radiobiology principles in various scales, from cells to functional sub-units to tumours and organs, not only in absorbed doses but also in their radiation response models.

Summary

Personalised methods for applying targeted radionuclide therapies (TRT) are promoted without real knowledge on the exact constraints on the absorbed doses needed to treat without creating severe toxicity. Preclinical applications of TRT can provide valuable information on dose-response models at cellular, functional and overall tissue level. Relative Biological Effects for TRT depend strongly on the LET of the emission spectrum (alpha or beta radiation) and on dose rate (physical decay half-life). Many radiobiological response mechanisms are involved and repair of sub-lethal DNA damage is most prominent during the radiation exposure. Mathematical models are increasingly used in the set-up of preclinical therapy experiments and could be of great value to set up treatment planning in the clinic.

Key Words

Absorbed dose; Small scale dosimetry models; Treatment planning; Personalised targeted radionuclide therapy; DNA repair mechanism