The Abdus Salam
International Centre for Theoretical Physics

United Nations Educational, Scientific and Cultural Organization

IAEA International Atomic Energy Agency

JOINT ICTP-IAEA ADVANCED SCHOOL ON INTERNAL DOSIMETRY FOR MEDICAL PHYSICISTS SPECIALIZING IN NUCLEAR MEDICINE

12 - 16 April 2010

Miramare, Trieste, Italy

The aim of this School is to contribute to the development of qualified and competent medical physicists and medical physics educators, specializing in nuclear medicine, by

- providing the theoretical and practical tools for internal dosimetry, and
- facilitating the creation of a network for the exchange of information on internal dosimetry among medical physicists in developing and developed Member States.

In nuclear medicine, patients are typically injected with radiopharmaceuticals and then imaged with radiation detecting cameras. Having isotopes distributed in the body presents the need for internal dosimetry, which currently is most often based on standard look-up tables published in medical internal radiation dose (MIRD) pamphlets. These tables give the average absorbed dose to the main human organs for any specified amount of injected radioactivity. The tables were calculated in computationally intensive simulations for a reference man (with an average weight, height and radioactivity distribution). The tables also provide a rough estimate of the dose distribution for all commonly used radiopharmaceuticals in nuclear medicine. This method for calculating internal patient dose is adequate for optimizing the amounts of radioactivity used for most diagnostic procedures in nuclear medicine.

The drive for more accurate and patient-specific dosimetry comes mainly from an increased availability and use of therapeutic radiopharmaceuticals. Such treatments deliver high doses of radiation to specific targets, with the intent of providing a curative or palliative effect. However the resulting absorbed dose to both the target and healthy organs is several orders of magnitude higher than what is received from a diagnostic scan. The demand for more accurate and possibly patient specific internal dosimetry grows accordingly.

The tools for calculating absorbed dose have become more sophisticated, covering the whole spectrum from estimating the whole-body dose to evaluating the specific radiation energy deposited in single cells. However, these important tools are partially based upon assumptions and depend on user calculation and input of the true radioactivity distribution for individual patients in order to perform accurate dose calculations.

This advanced school will take a comprehensive approach to the principles of internal dosimetry, with particular emphasis on dosimetry for therapeutic nuclear medicine.

PARTICIPATION

This advanced school seeks to target medical physicists, and teachers involved in medical physics education, specializing in nuclear medicine. Scientists and students from all countries which are members of the United Nations, UNESCO or the IAEA may attend the School. As it will be conducted in English, participants should have an adequate working knowledge of this language. Although the main purpose of the Abdus Salam International Centre for Theoretical Physics is to help research workers from developing countries, through a programme of training activities within a framework of international cooperation, medical physics students and post-doctoral scientists from developed countries are also welcome to attend.
As a rule, travel and subsistence expenses of the participants should be borne by the home institution. Every effort should be made by candidates to secure support for their fare (or at least half-fare). However, limited funds are available for some participants from developing countries, to be selected by the organizers. **There is no registration fee.**

HOW TO APPLY FOR PARTICIPATION

The application form can be accessed at the activity website:

http://agenda.ictp.it/smr.php?2136

Once in the website, comprehensive instructions will guide you step-by-step, on how to fill out and submit the application form.

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E-mail: smr2136@ictp.it **ICTP Home Page: http://www.ictp.it**

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TOPICS

Decay schemes for most commonly used radionuclides in diagnostic and therapeutic nuclear medicine

"MIRD" formalism, including cumulated activity, residence time and S-factors

Organ dose estimation

Fundamentals of microdosimetry, including Monte Carlo methods

Fundamental concepts of radiobiology

Patient-specific internal dosimetry

Accuracy in internal dosimetry

APPLICATION DEADLINE

1 February 2010