IAEA
International Atomic Energy Agency

International Symposium on Trends in Radiopharmaceuticals (ISTR-2005)

Vienna, Austria
14-18 November 2005

Announcement and Call for Papers

1. INTRODUCTION

Radiopharmaceuticals, along with imaging instrumentation, are the pillars that support the edifice of clinical nuclear medicine and the former is the major driver enabling investigations of molecular phenomena for better understanding of human disease and developing effective treatments. The growth of nuclear medicine has been intimately linked to availability of new radioisotopes and the discovery of new radiopharmaceuticals. The field of radiopharmaceuticals has witnessed continuous evolution thanks to the immense contributions of scientists from diverse disciplines such as radiochemistry, inorganic chemistry, organic chemistry, biochemistry, physiology and pharmacology. Several milestones can be cited in the trajectory of this growth, which include continuing development of a plethora of ^{99m}Tc radiopharmaceuticals, automated synthesis of ^{18}F labelled compounds, labelled peptides for accurate mapping of metastasis and the advances in radionuclide therapy. The International Symposium on Trends in Radiopharmaceuticals, ISTR-2005, under the auspices of International Atomic Energy Agency, will provide scientists and professionals working in the field of radiopharmaceuticals and related sciences an opportunity to review the exciting developments in the field. The International Atomic Energy Agency has been organizing such Symposia on Radiopharmaceuticals since 1973 and the last one was held in Lisbon, Portugal, in 1998.

2. BACKGROUND

The field of technetium radiopharmaceutical chemistry has grown at an accelerated pace in the last decade thanks to new chemistries such as the nitrido, carbonyl and hynic together with the synthesis of several novel ligands fitting to these chemistries. These pioneering studies are making the anthropogenic element technetium the most explored metal ion for its complexation behaviour. Several new ^{99m}Tc radiopharmaceuticals continue to be developed, aiming for greater efficacy in exploring biochemistry in vivo and introducing accuracy of diagnosis of metastatic cancer to lead to greater objectivity in medical decisions.

The cyclotron, originally developed for nuclear physics research, has been simplified for the benefit of increasing medical applications, being the ideal source for many short-lived, neutron-deficient radioisotopes, and is today a versatile tool in the hands of the radiopharmaceutical scientists. There is a significant growth in the installation of new cyclotrons to cater to the production of radionuclides for medical applications and interesting developments are taking place through the development of better cyclotron targetry, radiochemical processing methods and automated chemistry modules. The short half-life of most of these radioisotopes makes it essential that the process be automated, starting from irradiation all the way to the final dispensing stage, such that the final radiopharmaceutical formulation is compliant with the codes of Good Manufacturing Practices (cGMP). There is a continuing need to evolve appropriate guidelines of cGMP for radiopharmaceuticals, due to the conflicting requirements for handling radioactivity and formulating products for intravenous administration.

The most spectacular development is undoubtedly the advances in the synthesis of ^{18}F labelled fluoro deoxy glucose (FDG), opening a new avenue in nuclear medicine, namely the regular clinical use of positron emission tomography (PET). Initially developed for studying glucose metabolism in vivo, especially to map the regional cerebral functions under various conditions, today ^{18}FDG is the most useful clinical PET tracer for the detection, staging, treatment planning and management of cancer. Research into other ^{18}F labelled molecules, including peptides and agents for tracking gene therapy, has resulted in several new radiopharmaceuticals. The quest for newer and more specific ^{18}F labelled radiopharmaceuticals keeps PET chemists busy the world over. The work on other short-lived PET radionuclides, mainly ^{11}C and to a lesser extent ^{15}O, is also continuing, despite the logistical problems due to their short half-lives.

The radiohalogens play a pivotal role in the growth of nuclear medicine by the continued use of iodine isotopes such as ^{131}I, ^{123}I, ^{124}I for diagnosis and therapy. Strategies to increase the availability of ^{123}I products are important for clinical nuclear medicine practices. The bromine and astatine isotopes are being vigorously explored for establishing their utility in clinical nuclear medicine. The use of the short-lived SPECT isotopes such as ^{201}Tl, ^{111}In and ^{67}Ga is continuing to grow for diagnostic imaging starting from myocardial studies to tumour and infection imaging.

One of the challenges in the coming years will be to take advantage of the potentials of radiolabelled peptides to formulate clinically useful radiopharmaceuticals. Peptide receptors have been found to represent excellent targets for in vivo cancer diagnosis and therapy.

Recent in vitro studies have shown that many cancers can over-express not just one but several peptide receptors concomitantly. This presents a basis for starting and/or optimizing the in vivo targeting of tumours by selecting suitable radiopeptides initially for tumour diagnosis and later with appropriate radionuclides for therapy as well.

In addition, nuclear medicine is being transformed from a non-invasive diagnostic methodology to a powerful therapeutic modality. There continues to be growth in the use of ^{131}I for cost effective treatment of hyperthyroidism and metastatic thyroid cancer. Radiopharmaceuticals such as $^{89}SrCl_2$, ^{153}Sm-EDTMP and ^{186}Re-HEDP are increasingly used in many centres as cost effective bone pain palliative agents. The use of ^{131}I-mIBG and $^{131}I/^{188}Re$ labelled lipiodol continues to attract attention, with growing medical interest in neuro-endocrine tumours and extensive difficulties with liver cancer, respectively. There is great excitement in the prospect of very specific therapeutic targeting with radiolabelled peptides with radionuclides such as ^{90}Y, $^{186/188}Re$ and ^{177}Lu. Generator produced radionuclides offer a new dimension to availability of therapeutic radiopharmaceuticals. Non-conventional applications include synoviorthesis using radiopharmaceuticals labelled with beta particle emitting radioisotopes to improve the quality of life of patients suffering from rheumatoid arthritis. Intravascular radionuclide therapy (IVRNT) for prevention of arterial restenosis post-percutaneous transluminal coronary angioplasty (PTCA) is an attractive alternative to drug eluting stents.

While surgery remains the most effective method for managing cancer, radiopharmaceuticals play a useful role there too, being the preferred markers for identifying metastatic lymph nodes and helping surgeons to achieve better precision in tumour mass excision. Accordingly, a new modality, radioguided surgery (RIGS), is emerging for use in the operating theatre.

The major constituent of a radiopharmaceutical is the radionuclide and the search for new radionuclides to improve the availability of diagnostic and therapeutic radiopharmaceuticals is continuing. Several metallic isotopes such as $^{60/61/62}Cu$, ^{68}Ga, ^{86}Y and ^{94}Tc are emerging for PET studies. In view of the promising advances in targeted therapy for cancer management, the need for therapeutic radioisotopes is expected to grow manifold. Internalized targeted therapy can be highly specific in its ability to deliver radiation dose to the tumour and hence, when the potential of targeted therapy is fully realized, the demand for radioisotopes for this modality will be huge. Keeping this in mind, radionuclides that can be produced in abundant quantity are being explored. ^{90}Y, the daughter of the long-lived fission product ^{90}Sr, and ^{177}Lu, which can be produced by (n,γ) activation of ^{176}Lu, are the two isotopes which can meet such large demands. Efforts are being made to develop new production routes and radiochemical processing methods, as well as radionuclide generator technologies, to effectively bridge the gap between demand and supply.

A review of the radiopharmaceuticals field would be incomplete without a discussion about centralized radiopharmacy practices. There is a continuing need to formulate radiopharmaceuticals cost effectively and to a high standard of consistent quality. There is need for improvements in the systems for dispensing of PET and therapeutic radiopharmaceuticals. This symposium will focus on practices and facilities for greater pharmaceutical safety and better radiation hygiene.

The exciting developments in all the above areas in the radiopharmaceuticals field are contributing to transforming nuclear medicine to a preferred modality for diagnosis and therapy of many diseases not only in developed countries but also in most developing nations.

3. TOPICS

The symposium will cover developments in the entire spectrum of radiopharmaceuticals chemistry, including radionuclide production, radiochemical processing, manufacturing and quality control of radiopharmaceuticals, latest advances in radiopharmaceuticals research, GMP and regulatory aspects, etc.

The IAEA welcomes high quality contributions on the following topics.

- Radionuclide production and synthesis of radiopharmaceuticals
- Novel technetium chemistry and radiopharmaceuticals
- Flourine-18 and iodine-123 based radiopharmaceuticals and automation of synthesis
- Other radiohalogens and metallic nuclides for PET
- Carbon-11 radiopharmaceuticals and other short-lived PET tracers
- Therapeutic radiopharmaceuticals
- Molecular biology based radiopharmaceuticals
- Pharmacology and dosimetry of radiopharmaceuticals
- Codes of GMP for radiopharmaceuticals
- Centralized radiopharmacies
- Regulatory aspects
- Indigenous capacity building in radiopharmaceuticals

It is expected that the symposium will stimulate international exchange of information and ideas that will contribute to further enhancing the growth of developmental opportunities in nuclear medicine in general and in radiopharmaceutical chemistry in particular.

4. PAPERS AND POSTERS

Concise papers on issues falling within the topics outlined in Section 3 above may be submitted as contributions to the symposium. All papers, apart from invited review papers, must present original work; they should not have been published elsewhere.

(a) Submission of synopses

Persons who wish to present a paper or poster at the symposium must submit an extended synopsis (in English) together with the completed Form for Submission of a Paper (Form B) and the Participation Form (Form A) to the competent national authority for official transmission to the IAEA in time for them to be received by the IAEA by **31 May 2005**. In addition, the synopsis should be sent electronically to the Scientific Secretariat, email: istr2005@iaea.org.

Authors are urged to make use of the Extended Synopsis Template in Word 2000 on the symposium web page. The specifications and instructions for preparing the synopsis and how to use the synopsis template are given in the attached "Instructions on How to Prepare the Extended Synopsis and How to Submit it Electronically". Also attached to this announcement is a sample extended synopsis.

The synopsis will be considered only if the Participation Form A and Paper Submission Form B have been received by the IAEA through the official governmental channels.

(b) Acceptance of papers/posters

Authors will be informed whether their paper has been accepted by the Programme Committee on the basis of the extended synopsis submitted. At the same time authors will be advised if their paper has been accepted for oral presentation or for presentation as a poster. Furthermore, they will receive guidelines for the preparation of papers and will be informed of the deadlines for their submission, the assigned paper number and the session of presentation. The accepted synopses will be reproduced in unedited form in the Book of Extended Synopses.

(c) Proceedings

It is intended to publish papers presented at the symposium in a special issue of an international journal (subject to peer review). Further details will be provided after the extended synopses have been reviewed.

The IAEA reserves the right to refuse the presentation or publication of any paper that does not meet the expectations raised by the information originally given in the extended synopsis.

5. PARTICIPATION

All persons wishing to participate in the symposium must send a completed Participation Form (Form A) to the competent official authority (Ministry of Foreign Affairs or national atomic energy authority) for subsequent transmission to the IAEA. A participant will be accepted only if the Participation Form is transmitted through the competent official authority of a Member State of the IAEA or by an organization invited to participate.

Participants whose official nomination has been received by the IAEA will receive further information on the symposium approximately two to three months before the meeting. This information will also be posted on the symposium web page:

http://www-pub.iaea.org/MTCD/Meetings/Announcements.asp?ConfID=130

6. EXPENDITURES

No registration fee is charged to participants.

As a general rule, the IAEA does not pay for participants' travel and living expenses. However, limited funds are available to help meet the cost of attendance of selected specialists, mainly those from developing countries with low economic resources. Generally not more than one travel grant may be awarded to any one country. Persons wishing to apply for a travel grant must send the Grant Application **Form C** — typewritten or clearly printed — through their appropriate government authority (see Section 10), together with the Participation Form and, if relevant, the Form for Submission of a Paper, to reach the IAEA at the latest by **31 May 2005**. Incomplete or late applications will not be considered. The grants will be lump sums usually covering **only part of the cost** of attendance.

7. EXHIBITION

A limited amount of space will be available for commercial vendors' displays/exhibits during the symposium. Interested parties should contact the Scientific Secretariat.

8. WORKING LANGUAGE

The working language of the meeting will be English. All communications, synopses, abstracts and papers must be sent to the IAEA in English.

9. DISTRIBUTION OF DOCUMENTS

A preliminary programme of the symposium will be sent to the participants before the meeting.

The final programme and the Book of Extended Synopses will be distributed at registration.

10. ACCOMMODATION

Detailed information on accommodation and other items will be sent directly to all designated participants approximately two to three months before the meeting.

11. VISA

Designated participants who require a visa to enter Austria should submit the necessary application to the nearest diplomatic or consular representative of Austria as soon as possible. Please note that Austria is a Schengen State and therefore persons who require a visa will have to apply for a 'Schengen visa' at least 14 days before entry into Austria. In States where Austria has no diplomatic mission, visas can be obtained from the consular authority of a

Schengen Partner State representing Austria in the country in question. At present the Schengen States are: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain and Sweden.

12. CHANNELS OF COMMUNICATION

The Participation Form (Form A), the Form for Submission of a Paper (Form B), together with two copies of each synopsis, and, if applicable, the Grant Application Form (Form C), should be sent to the competent official authority (Ministry of Foreign Affairs or national atomic energy authority) for transmission to the IAEA.

Subsequent correspondence on scientific matters should be sent to the Scientific Secretaries and correspondence on administrative matters to the IAEA Conference Services Section.

13. SYMPOSIUM WEB PAGE

Please visit the IAEA symposium web page regularly for new information regarding this symposium: http://www-pub.iaea.org/MTCD/Meetings/Announcements.asp?ConfID=130.

14. SYMPOSIUM SECRETARIAT

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