

# News and views

## **12<sup>th</sup> European Symposium on Radiopharmacy and Radiopharmaceuticals, September 9–11, 2004, Gdańsk–Sopot, Poland**

The 12<sup>th</sup> European Symposium on Radiopharmacy and Radiopharmaceuticals was a post-congress meeting of Helsinki 2004' EANM Congress and was held in the Haffner Hotel in Sopot, Poland. There were almost 200 participants from 37 countries including Argentina, Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Finland, Germany, France, Greece, Holland, Japan, Macedonia, Mexico, Norway, Pakistan, Russia, Saudi Arabia, Serbia, Sweden, Switzerland, Slovenia, Turkey, Uruguay, the United Kingdom and the USA. There were 14 invited speakers, 37 oral and 58 poster presentations.

The scientific programme included many interesting topics including radionuclide therapy, including alpha emitters and radiolabelled peptides, a molecular imaging session including imaging of angiogenesis, its potential targets and radiotracer development.

A pre-conference business meeting of the EANM Radiopharmacy Group, headed by Gerrit Wetera was focused on the acceptance of the EANM radiopharmacy postgraduate education programme within Europe and the new draft of the EANM guidelines on radiopharmaceutical preparation.

Some important issues were raised at the PET session including clinical PET — cardiology problems, recent developments in <sup>18</sup>F-labelled PET radiopharmaceuticals and what could be done with small animal PET imaging.

The never ending story of the regulatory aspects of using radiopharmaceuticals were inevitably discussed including European Pharmacopoeia and Radiopharmaceuticals as well as Radiopharmacy Guidelines and the EANM approach.

Education issues in radiopharmacy, experiences with on-line education in radiopharmacy and VirRAD were the subject of a separate session.

The main social event of this meeting was a trip to the Malbork Castle, probably the biggest medieval castle in Europe. Prof. Suresh Srivastava said: "I have seen many castles in France and Germany, but something like that castle — never". Malbork is really impressive; probably the biggest historical red brick structure in the world, once a headquarters of Teutonic Knights, today a magnificent museum carefully renovated after severe WW II damage. Delegates were given a tour by guides dressed up as Teutonic Knights and were able to try their skills in shooting with bows and arrows.

The congress was very well organised by the EANM and its local representative, Dr. Renata Mikolajczak from POLATOM, Warsaw. This was the first EANM post-congress meeting orga-

nised in Poland and, for most delegates, their first opportunity to get to know Poland as a country in a generally positive way. More meetings of this type should be held in Central European countries to introduce its nuclear medicine communities to broader audiences.

The next European Symposium on Radiopharmacy and Radiopharmaceuticals will be held in March 2006 in Pisa, Italy.

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## **Czech Society of Nuclear Medicine, XLI Days of Nuclear Medicine, October 7–9, 2004, Hradec na Moravici, Czech Republic**

This Congress took place in Hotel "Red Castle", in Hradec na Moravici, a peaceful town south of Opava, Czech Silesia. It was organised by Czech SNM and the Department of Nuclear Medicine, Silesian Hospital, Opava, Czech Republic with guests from Slovakia and Poland.

The proceedings were carried in two parallel sessions — in total there were 17 programme lectures and 67 oral and poster presentations. Three groups of presentations are particularly worth mentioning: on PET, oncology and radionuclide therapy. The Czech Republic has three PET installations and their Slovak colleagues the fourth one, therefore a series of interesting PET presentations was presented by groups from Prague, Brno and Bratislava. A series of interesting observations on <sup>99m</sup>Tc-MIBI as an oncophilic agent, depreotide and sentinel node imaging was also presented by colleagues from Jihlava, Hradec Králové, Olomouc and Ostrava. Last but not least, interesting observations on yttrium-90 therapy, MIBG therapy, synoviorthesis and Zevalin treatment was presented by groups from Chomutov, Hradec Králové, Ostrava, Prague and Zlin.

The author has always had a very high opinion of Czech nuclear medicine and was a faithful observer, sometimes also a lecturer, at previous Czech Society Nuclear Medicine Congresses in Hradec Králové, Zlin, Srni and Pardubice, held (as the only in this part of Europe!) every year. Together with the Hungarians, the Czech nuclear medicine community is the strongest in this part of Europe, in basic *per capita* parameters four or eight times better than in, say, Poland. The Czech Republic is a regional power in PET — three PET scanners are located in Prague and Brno, two another PET installations are in project. That is much better than in neighbouring Hungary, Poland and Slovakia, where there are

only single PET installations. The second/third secret of Czech nuclear medicine is a strong industrial background (Lacomed Ltd.) and probably also the high work ethics, the highest among Slavic nations which is something that Poland can only dream of.

The organisation was, as usual, excellent. The author has organised two Polish national SNM congresses and knowing what a hard job it is, was impressed by the hard work of MUDr. Jiří Hrbáč as its organiser. The Congress venue was a beautiful Red Castle, a XIX-century neo-gothic building dominating the Moravica Valley, a place renowned for its beauty, with a magnificent park, visited in a past by Ludwig van Beethoven and Ferenc Liszt, also today a place where music concertos are performed.

Something surprising was the limited international presence, practically limited to neighbouring Slovakia. In the author's opinion the achievements of Czech nuclear medicine are very good and definitely they deserve to be internationalised.

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### **Higher Education Network for Radiography in Europe — Annual General Meeting, October 28–30, 2004, Marsascala, Malta,**

This meeting took place in the Corinthia Jerma Palace Hotel in Marsascala, a nice fishing village on the eastern coast of Malta. The Higher Education Network for Radiography in Europe (HENRE) is a network of about 60 medical schools and institutions involved in the training of radiographers, nuclear medicine technologists and radiotherapists throughout Europe.

The meeting was attended by delegates from Belgium, Czech Republic, Cyprus, Estonia, Finland, Germany, Greece, Holland, Lithuania, Malta, Norway, Poland, Portugal, Sweden and United Kingdom.

HENRE is a project co-ordinated by St Martins College, England and co-financed by the European Commission and is aimed at the development of pre- and postgraduate training of radiographers in Europe, refining the curricula of radiographic programmes of studies at Bachelor level, developing e-learning and Problem-Based Learning opportunities etc., etc. (see an article earlier in this volume).

The meeting comprised two parts: during first two days a plenary proceeding took place, on third day a subgroup meetings were held. In the plenary sessions, subgroup reports were given and a subgroup workshops were held. A lecture on the European Credit Transfer System (ECTS) applied to the European medical education system on the example of the University of Malta was given by Ms V. Grech — I learned what the ECTS is, but did not learn, how it is applicable to radiography and how the ECTS was calculated. Heikki Pekkarin from Finland spoke about developments in the Tuning project. This project aims to bring about increased harmonisation of competences acquired by students at the end of their studies across Europe without loss of the diversity with characterises European education. In brief, this project aims, as I un-

derstood, to integrate the core of radiographers education throughout Europe, simultaneously maintaining national variabilities. The idea is fine, but frankly, I did not like this lecture. The 98% water and full of very general-always-true statements.

Then followed probably the best lecture of the meeting, which I would like to stop at for a while, the presentation of Carmel J. Caruana (carmel.j.caruana@um.edu.mt), the Institute of Health Care, Malta — “A medical imaging physics elements of competence inventory for radiography education in Europe”. Mr. Caruana profoundly analysed the didactic course of radiographers, stratifying the elements of competence into basic, advanced and expert level. Pure, simple and of great help for a people like me, the Dean of Radiographers school, in shaping our curriculum of studies. This was 100% meat and got to the heart of the matter. The Bologna protocol proposes stratifying university studies in two levels and this concept is basically OK, perhaps with the exemption of law, medical and dental studies. Very well. Accordingly we will have two levels of radiographers — BSc and MSc, with different roles to perform. The concept of C. Caruana proposes some order in the teaching at those levels. Congratulations.

The organisation of the meeting was excellent, here thanks to Paul Bezzina, the local Organiser. Malta is simultaneously a European and exotic country (at least for me, a newcomer from the cold coast of Baltic Sea), a rock dropped into the Mediterranean, with tough conditions for survival, a difficult history and a resilient people. A very interesting excursion comprising the tour of La Valetta, including St. John's Cathedral, Merchants Street and the Barakka Gardens, a tour of Limestone Heritage and the ancient capital of Malta, Medina was extremely impressive.

Summarising the pros and cons; the gains and losses. Firstly, the pros: my trip to Malta was worth undertaking. The cons: the time of the participants could have been used better.

The Gains: probably nothing better could have been created for the improvement of radiographers training in Europe.

The Losses: too much time was occupied by watery statements in style. An example: one of the speakers was strongly advocating the Lisbon Strategy of EU. This is dead and buried — even EU officials admit that so we have weak chances in competing with the USA. We have to work harder and not follow illusions.

In conclusion: HENRE, despite some weaknesses, is an excellent initiative. Radiographers were able to organise a working project on their education; nuclear medicine technologists did not manage to do that. However, not everything is lost — HENRE will go on and the nuclear medicine technologists community should join it, for its own benefit.

Contacts to HENRE:

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### 11<sup>th</sup> Meeting of the Berlin-Brandenburg Society of Nuclear Medicine, October 29–30, 2004, Potsdam, Germany

In 2003, the Berlin-Brandenburg Nuclear Medicine Society (BBGN) and the Polish Society of Nuclear Medicine (PTMN) began a promising cooperation. Due to the kind invitation of the chairman of the BBGN, Dr. Frank Gottschalk, we participated in the 11<sup>th</sup> Annual Conference of the BBGN in Potsdam. The Conference took place in the Griebnitz Hotel in Potsdam-Babelsberg. The Hotel is situated in a very beautiful location by the Griebnitz lake. Babelsberg is well-known because of its history of movie production — it used to be a sort of German Hollywood! Since 1911, many famous movies have been produced here. This particular movie atmosphere filled the foyer of the Griebnitz Hotel, where an exhibition of pictures of movie stars and old film equipment was held.

On the first day of the conference, the members of the BBGN discussed current local professional issues of the community.

During the second day, interesting continuing medical education lectures for practising nuclear physicians were held. The first topic, concerning PET/CT imaging was presented by Prof. Andreas Bockisch from Essen. He strongly recommended combined PET/CT scanning procedures. In his opinion, the integration of two imaging modalities such as PET and CT increases the quality of co-registration and facilitates accurate diagnosis. In the discussion which followed the lecture, the future of the non-hybrid PET exam was questioned.

Another interesting topic concerned radionuclide therapy. The first lecture about therapy with J-131 MIBG was presented by Prof. Dirk Sandrock from Berlin. Then Dr M. Hofmann from Bern/Hannover spoke about radiotherapy of neuroendocrine tumours using radiolabelled peptides (such as the analogues of somatostatin and gastrin). The last lecture about radioimmunotherapy in Non-Hodgkin Lymphoma was presented by Prof. Johannes Meller from Göttingen.

The 11<sup>th</sup> Meeting of the BBGN in Potsdam was very educative for Polish delegates and we are very grateful to the chairman of BBGN, Dr. Gottschalk, for the invitation. In general, bilateral cooperation of regional nuclear medicine communities in EU countries can bring professionals together more easily than big scientific meetings.

As a continuation of these contacts, both societies have organized the 1<sup>st</sup> German-Polish Nuclear Medicine Symposium, focussing on benign thyroid diseases, which takes place in Frankfurt/O and Stubice on 4<sup>th</sup> and 5<sup>th</sup> of February 2005.

We kindly invite you to this symposium and hope it will be a good start to regional cooperation between the BBGN and the Poznań regional section of PTMN.

Contact the organizers of the 1<sup>st</sup> German-Polish Meeting in Stubice 4<sup>th</sup> and 5<sup>th</sup> of February 2005 at:

mednukl8@amp.edu.pl,  
www.amp.edu.pl/mednukl8.

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### Targeted Radiotherapy with Alpha-Particle Emitting Radionuclides Seminar, November 18, 2004, Cracow, Poland,

“Alpha particles are emerging as a potentially powerful tool for the treatment of human cancers. Perhaps the most intriguing radiolabel for this purpose is the  $t_{1/2} = 7.2$  h radiohalogen,  $^{211}\text{At}$ . The methods of producing this radionuclide, labelling of tumour-specific biomolecules, radiobiological aspects and results of the first clinical study were presented in the lecture.

A practical goal of this lecture was to serve as a form to foster and strengthen interactions between the Institute of Nuclear Physics, a potential production site of  $^{211}\text{At}$ , and the Radioisotope Centre POLATOM, which has the facilities and expertise to make  $^{211}\text{At}$ -labelled radiopharmaceuticals a viable cancer treatment in Poland.”

Dr Michael R. Zalutsky  
Professor of Radiology and Biomedical Engineering,  
Duke University Medical Center, Durham, NC, USA

Professor Zalutsky gave his lecture on  $^{211}\text{At}$  at a radiopharmaceuticals seminar on November 18<sup>th</sup> 2004 in the Henryk Niewodniczański Institute of Nuclear Physics, Polish Academy of Sciences (IFJ PAN) in Cracow, Poland.

The seminar was jointly organized by the IFJ PAN and the Radioisotope Centre POLATOM, Świerk, and also advertised by the Cracow section of the Polish Society of Radiation Research and by the Research Centre of Nuclear Medicine.

The seminar attracted an audience of more than 60, including research and technical staff, and students from: the Radioisotope Centre Polatom, Świerk, the Institute of Nuclear Chemistry and Technology, Warsaw, the Medical Universities of Warsaw, Poznań, and Łódź, the Medical College of the Jagiellonian University, Cracow, the Cracow Division of the Marie Curie Memorial Institute of Oncology, and the Medical Physics Section at the University of Mining and Metallurgy, Cracow.

About 20 of the seminar guests visited the IFJ PAN facilities: the isochronous cyclotron AIC-144, the future radiopharmaceutical laboratory and the future hadron therapy unit.

The organizers were happy to see such a large attendance, which demonstrated the high level of interest in the topic.

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## A window on Serbia and Montenegro

After a very successful participation in EANM (21 presentations), the nuclear medicine activities of the Nuclear Medicine Society of Serbia and Montenegro in the post-congress period were characterized by several anniversaries of our important national nuclear medicine institutions.

Firstly, our biggest local producer of RIA kits, INEP, celebrated the forty-fifth anniversary of its foundation. During a very difficult period of economic crisis and isolation, the representatives of INEP made a great effort to provide satisfactory conditions for the normal functioning and further improvement of our *in vitro* nuclear medicine. Congratulations!

Secondly, a similar event, but this time dedicated to *in vivo* nuclear medicine, took place in the Department of Nuclear Medicine-Zaječar which is a very important nuclear medicine unit for our Society, with a long tradition. Although far away from University centres, enthusiasts from Zaječar bravely fought for the development of nuclear medicine diagnostics in their little department and did a lot for the promotion of nuclear medicine in clinical relations.

Furthermore, the society concluded this very successful season with a ceremony devoted to the presentation of the "Milovan Antic", an award donated by the CIS company, for the best paper published in international journals of the previous year. This year the winner was Rajko Spaic, a medical physicist with a paper entitled: "Method to Assess the Intake of Depleted Uranium"

During this time, the Serbian nuclear medicine community was also honoured by a visit from the current President of the World Nuclear Medicine Federation, Prof Myung Chul Lee from Republic of Korea, who was acquainted with the actual state of our nuclear medicine and was so kind to deliver an update lecture about the Korean experience of using PET technology.

The working part of activities was related to attending workshops on the BSS and ISO standards in nuclear medicine, organized by the Society Task Group for Legislation, whose primary goal is to accommodate our rules about the application of and protection from ionization radiation to European standards

A national congress of Nuclear Medicine dedicated to developing and improving interregional collaboration is going to be held next year.

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November 16, 2004

Dear Colleague:

The Society of Radiopharmaceutical Sciences (SRS) formerly named the Society of Radiopharmaceutical Chemistry and Biology would like to invite you to join the Society. The SRS is an international organization dedicated to providing academic and scientific support for radiopharmaceutical sciences.

Radiopharmaceutical Sciences At the heart of Nuclear Imaging.

Our goals are to provide our members with:

- forums for communicating and discussing the latest issues concerning the radiopharmaceutical sciences;
- publications concentrating on radiopharmaceutical sciences;
- support for students interested in attending radiopharmaceutical meetings; and
- the highest possible standards in education and research in the field.

As a professional within the nuclear imaging community concerned with the present and future directions of radiopharmaceutical sciences, you will not want to miss this opportunity to make a difference in your career and in the field.

### SRS Membership Enhancing your career

As a member of the Society of Radiopharmaceutical Sciences, you will benefit from a subscription to the society's official publication, ***Nuclear Medicine and Biology*** (NMB). NMB is published eight times a year and contains original research covering all aspects of radiopharmaceutical chemistry.

Members will also receive discounted pricing on books published by SRS and on registration to the **International Symposium on Radiopharmaceutical Chemistry** (ISRC), held biannually throughout the world. ISRC is the premier event for the presentation of research and applications within the field and is the perfect opportunity to meet with colleagues, discuss the latest research advancements, and to ultimately enhance your career. Visit <http://www.radiology.uiowa.edu/ISRC2005/> for updates and more information.

To begin receiving the benefits of the SRS membership, simply click on one of the links below to learn more about SRS Membership and fill out the Membership Application. I welcome the opportunity to have you join with other professionals as a member of the Society of Radiopharmaceutical Sciences. Please see our website at <http://www.srsweb.org> for more information.

Sincerely,

P. August Schubiger, PhD

President, Society of Radiopharmaceutical Sciences

## Certificate of Fellowship of the European Board of Nuclear Medicine

### APPLICATION FORM 2005

Please fill in this form (type or write in block letters) and return it **before May 10, 2005** to:

EANM Executive Secretariat, Hollandstrasse 14/Mezzanine, A-1020 Vienna, Austria

Tel: +43-(0)1-212 80 30, fax: +43-(0)1-212 80 30-9,

e-mail: office@eanm.org, URL: www.eanm.org

<b>CANDIDATE</b>	<input type="radio"/> Prof.	<input type="radio"/> Dr.	<input type="radio"/> Mrs.	<input type="radio"/> Ms.	<input type="radio"/> Mr.	<input type="radio"/> Other title:
First name :	_____		Middle name:	_____		
Family name:	_____					
Department:	_____					
Institute:	_____					
Street:	_____					
Post code:	_____		City:	_____		
Country:	_____		Phone:	_____		
Fax:	_____		e-mail:	_____		

**Country and date of the National Board Certificate:**

#### LANGUAGE

- I have difficulties with oral expression in English and I request the presence of an **additional examiner familiar with my language**, which is: .....

#### ENCLOSURES

- curriculum vitae (*with a list of training institutions including names of heads of departments*)
- copies of certificates (*mandatory: Specialist in Nuclear Medicine Certificate*)
- detailed list of performed nuclear medicine procedures according to the Syllabus
- detailed description of continuing medical education after national accreditation (*CME credits*)
- attestation of having successfully passed MCQ (*to be sent if applying for the oral examination only*)

#### REGISTRATION AND PAYMENT (tick appropriate box)

- Registration fee for both **MCQ and oral examination**: .....   
EUR 300
- Registration fee for **MCQ exam** only: .....   
EUR 200
- Registration fee for **oral examination** (year when MCQ was passed): .....   
EUR 150

#### FORM OF PAYMENT:

- Bank transfer** to EANM bank account: (all charges for the ordering customer)  
**Die ERSTE Bank**, Taborstraße 26, A-1020 Vienna, Austria  
**Account no:** 021-50077, **Sorting Code:** 20111, **IBAN:** AT59 20111 000 02150077, **BIC:** GI BA AT WW  
*stating your name and payment purpose. Please make any transfer free of charge for the beneficiary.*
- Credit Card:**     American Express     Visa     Master Card  
CC number: \_\_\_\_\_  
Exp. Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_  
Name of Cardholder: .....  
..... Signature: .....

#### CANCELLATION:

Registration fees, less a EUR 30 processing fee, will be refunded if a written request is received by September 16, 2005.

Date: ..... Signature: .....

## Certificate of Fellowship of the European Board of Nuclear Medicine 2005

### Information

The European Board Certificate in Nuclear Medicine proves that the candidate's knowledge and ability in Nuclear Medicine satisfy European standards.

### Candidates:

To be awarded a Certificate of Fellowship of the EBNM it is necessary to fulfil the following prerequisites:

- having obtained the title of specialist in Nuclear Medicine before December 31, 2002 in a European country which is a full or associate member of UEMS;
- having proof of continuing education following national certification;
- having passed the full Fellowship Examination.

Candidates may enrol for and take the written exam (MCQ, multiple choice questions) after they have completed the training requirements necessary for their specialist qualification by their national body. According to UEMS regulations, however, they cannot undergo the oral examination, nor be awarded the Fellowship, until a minimum of three years after having received their specialist qualification.

### Venue:

The next examination of the European Board Certificate of Nuclear Medicine will take place at the occasion of the EANM'05 Congress which will be held in Istanbul, Turkey, October 15–19, 2005.

### Examination:

It will comprise a **written part** (multiple choice questions) and an **oral examination**. Only candidates who pass the written part will be admitted to the oral examination.

### Language:

The multiple choice questions and the oral examination have to be taken in English. In case of difficulties with oral expression in this language, candidates are allowed to ask for the presence, at the oral examination, of an additional examiner familiar with the candidate's language. This examiner will be chosen by the Jury in order to assist the candidate in correct understanding.

### Applications:

Applications should be sent with curriculum vitae including detailed listing of all institutions where training took place, with the names of the Heads of Departments. A detailed list of the types of procedures performed in Nuclear Medicine according to the Syllabus should be attached. The latest Syllabus update can be found at <http://www.eanm.org/education/pdf/syllabus02.pdf>. Even if training has not been obtained in all procedures, candidates can be admitted by the Jury if their experience is considered wide enough and includes whole body scanning, emission tomography and therapy.

### Registration fee:

The fee should be sent following notice of acceptance by the Jury of the candidate's application.

**Only candidates who have paid the fee by August 1, 2005 will be accepted for the test.**

Registration fee for both **MCQ and oral examination**:

..... EUR 300

Registration fee for **MCQ** exam only:

..... EUR 200

**Oral examination** only — provided the written test has been previously passed ..... EUR 150

### Refund Policy:

Registration fees, less a 30 EUR processing fee, will be refunded if a written request is received **prior to September 16, 2005**.

### Important dates:

Deadline for application	May 10, 2005
Notification by the Board	May 23, 2005
EANM'05 early registration deadline	June 6, 2005
Payment of registration fees	August 1, 2005
Refund in case of cancellation	September 16, 2005
Written examination	October 15, 2005*
Oral examination	October 18, 2005*

(\* Dates to be confirmed)

**You can download all relevant documents on  
EANM homepage [www.eanm.org](http://www.eanm.org), button "UEMS/EBNM", "Fellowship"**

For further information, please contact: Andreas Andiel, M.A.

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Tel: +43-(0)1-212 80 30, fax: +43-(0)1-212 80 30-9, e-mail: [office@eanm.org](mailto:office@eanm.org), URL: [www.eanm.org](http://www.eanm.org)

## European board of nuclear medicine Examples of Multiple Choice Questions (MCQ)

The MCQ paper in 2004 consisted of 140 Multiple Choice Questions. These were taken from the following Field Codes

FIELD CODES	N
Skeletal system	8
Cardiology	14
Endocrinology	12
Gastroenterology	4
Haematology	4
Infection	6
Pulmonology	7
Nephro-urology	9
Neurology	11
Oncology	18
Therapy	12
Paediatrics	6
Physics/Radioprotec./Qualitycontrol	11
Radiobiology	4
Radiopharmacy/radiochemistry	10
Biostatistics/Bioethics	4
<b>Total</b>	<b>140</b>

Examples of questions are given below. In all cases there is only one correct answer. Further examples from previous years were published in the Blue Pages of the *Eur J Nucl Med* 2003; 30: BP5–BP6.

1. One of the following benign lesions does not usually show increased tracer uptake on bone scans:
  - a) Paget's disease,
  - b) Engelmann's disease,
  - c) Bone cyst,
  - d) Fibrous dysplasia,
  - e) Osteoid osteoma.
  
2. Which of the following statements regarding Tc-99m-labelled perfusion agents is true?:
  - a) Tetrofosmin has been proved to be more informative than sestamibi in regard to myocardial viability,
  - b) Hepatic clearance is faster for tetrofosmin than for sestamibi,
  - c) Heart/liver ratio is higher with Tc-99m-labelled perfusion agents than with Tl-201,
  - d) Acquisition should be started within 10 minutes after injection of tetrofosmin and sestamibi,
  - e) Tetrofosmin and sestamibi act as potassium analogues.
  
3. In treating Grave's disease with I-131:
  - a) Ophthalmopathy may worsen after I-131 therapy,
  - b) Standard dose capsules have a dosimetric advantage for the patient,
  - c) Pregnancy should be avoided for at least 12 months,
  - d) Beta blocking drugs can be restarted 5 days post therapy.
  
4. You see abnormal Ga-67 uptake in lung lesions in a patient with AIDS. This can be due to a variety of conditions **except**:
  - a) Tuberculosis,
  - b) Kaposi's sarcoma,
  - c) Lymphoma,
  - d) Pneumocystis carinii pneumonia.
  
5. True statements regarding captopril renal radionuclide study include all of the following **except**:
  - a) Captopril reduces plasma renin activity,
  - b) Captopril enhances the abnormalities seen in the renal activity time curve in the presence of significant renovascular disease,
  - c) Salt depletion enhances hypotension due to captopril,
  - d) Captopril reduces or does not change the mean parenchymal transit time in normal kidneys.

6. Brain perfusion SPECT images provide information on the following aspects **except**:
- a) Regional cerebral function,
  - b) Regional cerebral blood flow,
  - c) Neuronal activity,
  - d) Dopamine receptor activity.
7. In which one of the following tumours is the sensitivity of F-18-FDG-PET lowest?
- a) Colorectal carcinoma,
  - b) Gastric carcinoma,
  - c) Oesophageal carcinoma,
  - d) Hepatocellular carcinoma,
  - e) Pancreatic adenocarcinoma.
8. Which radionuclide for pain palliation is not a beta-emitter?
- a) Sr-89,
  - b) Sm-153,
  - c) Sn-117,
  - d) Re-186.
9. A radionuclide with a physical half-life of 8 days has a biological half-life of 2 days. Its effective half-life is:
- a) 0.6 day,
  - b) 1.6 days,
  - c) 2.0 days,
  - d) 8.0 days,
  - e) 16.0 days.
10. Indicate which statement is correct. Exposure of Tc-99m-MDP to air may result in the following abnormal biodistribution:
- a) Increased uptake in liver and spleen,
  - b) Increased renal uptake,
  - c) Increased uptake in stomach, thyroid and salivary glands,
  - d) Increased uptake in the bone marrow.

Answers:

1 = c, 2 = b, 3 = a, 4 = b, 5 = a, 6 = d, 7 = d, 8 = c, 9 = b, 10 = c



**UNION EUROPÉENNE DES MÉDECINS SPÉCIALISTES****SECTION OF NUCLEAR MEDICINE  
EUROPEAN BOARD OF NUCLEAR MEDICINE****Syllabus for postgraduate specialisation in Nuclear Medicine 2002 Update****I. Scope and limits of the medical speciality of Nuclear Medicine**

## 1. Definition (scope):

Nuclear Medicine (NM) utilizes the nuclear properties of matter to investigate disorders of metabolism and function, of physiology and pathophysiology, and of anatomy to diagnose disease with unsealed sources and to treat it with unsealed sources of radioactivity. The range of activities that are implicit within this definition include in vitro procedures, in vivo imaging with radiopharmaceuticals and other techniques related to nuclear physics in medicine as well as the medical applications of radiobiology, dosimetry and radiation protection.

## 2. Clinical knowledge and experience:

A good general background in medicine (internal medicine, surgery) is assumed. More detailed knowledge is required of those conditions which may need to be investigated or treated by NM techniques.

## 3. NM may also make use of complementary methods insofar as these relate to NM procedures. These may include:

- Ultrasound
- ECG (incl. dynamic + pharmacological stress testing) and management of emergencies in cardiac nuclear medicine
- Fine-needle biopsy
- Quantitative imaging: MRT, MRS and correlative imaging methods
- Spirometry
- Non-radioactive laboratory assays
- Bone densitometry
- Other available techniques complementary to NM procedures

4. NM specialists may cooperate in the assessment, prevention and treatment of physical or medical accidental contamination or incorporation of radionuclides.

**II. Basic Sciences training****A. Syllabus**

## 1. Nuclear physicians have to be familiar with and have knowledge of:

- Physics (as applied to NM);
- Biostatistics;
- Pharmacology, immunology;
- Radiochemistry;
- Radiopharmacy;
- Biokinetics;
- Radiobiology and risk assessment;
- Radioprotection;
- Computer Science;
- Instrumentation and methodology;
- Quality control;
- Relevant legislation.

## 2. Nuclear physicians must have gained practical experience in:

- Methods of clinical investigation;
- Labelling (including cell labelling);
- Software application and data acquisition and analysis;
- Quality control:
  - a) Gamma cameras (including SPET) and other NM devices,

- b) Possibly also PET cameras,
  - c) Radiopharmaceuticals.
  - Patient dosimetry (diagnosis and therapy)
  - Radiation protection (decontamination, waste disposal, staff dosimetry etc.)
3. The trainees should be encouraged to participate in basic and clinical research work.

### **B. Organization**

The quality of the basic science training has to be objectively assessed, using the following methods:

1. Final examination (covering basic science and clinical skills) on national basis and/or
2. Satisfactory completion of accredited, regional or national (international) courses or workshops in different fields (physics etc.): 120 hours recommended. Courses on radiation protection and regulation issues are not included, due to different national rules.
3. A practical training has to be added to the courses and has to be formally controlled.

## **III. Clinical Training**

The clinical training of physicians specializing in NM should include theoretical and clinical training within and outside of the Nuclear Medicine Department. Minimum standards are indicated here.

1. Theoretical grounding in NM.

A minimum of 30 hours of formal description of general principles of NM procedures is required. Active participation in clinical presentations, seminar and meetings is recommended.

2. *In vivo* diagnostic procedures.

Responsibility (including indication, performance and interpretation) must be taken for a sufficient number of various *in vivo* NM diagnostic procedures.

A total of 3,000 documented procedures must be reached by the trainee. The minimum recommended number for each procedure is as follows:

a) Central nervous system	100 (80% SPET or PET)
b) Skeletal system	800
c) Cardiovascular system	500 (50% SPET or PET)
d) Pulmonary system	300 (50% combined V/Q)
e) Gastrointestinal system	100
f) Urogenital system	400
g) Endocrine system	400
h) Haematopoietic and lymphatic system	50
i) Tumours and inflammation	300 (80% SPET or PET)
j) Other studies	50

Some flexibility may be accepted, but a broad spectrum of most currently used procedures has to be covered. This list will be subject to periodic revision. It is recommended that a period of training is spent away from the main department in at least one other recognized training centre.

3. Clinical training in addition to NM.

Clinical bedside training in a clinical specialty is re-quired before or during specialist training. A limited period of 6 months in diagnostic radiology or clinical physiology may replace a clinical bedside semester.

The proportion of the total training period devoted to clinical training and to NM may vary according to various factors, among them the total length of the training. The minimum advisable duration of training is 5 years.

In this case a minimum of 3 years should be devoted to NM.

In those countries where the total duration of the specialized training is 4 years (which corresponds to the minimum duration in the Directive of the EC), 3 years should be devoted to NM and 1 year to other specialties.

4. *In vitro* procedures.

Training can also cover analysis with (radio)-immuno-logical methods, quality control and interpretation. In this case a minimum of 3 months' training should be given.

5. Therapy.

Training should include indication, administration, therapeutic applications of radionuclides, dosimetry, radiation protection and follow-up after therapy.

The trainee must have taken part in 100 various NM therapeutic procedures.

6. Clinical audit.

The trainee should have received education in audit of clinical NM and in the administration and financing of a NM Service.

7. Function as expert.

The trainee must acquire legal expertise in health care problems due to unsealed radionuclides.