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King Faisal Specialist Hospital & Research Centre
Gen. Org. مؤسسة عامة
الشؤون الأكاديمية والتدريب
Academic & Training Affairs

NUCLEAR MEDICINE FELLOWSHIP TRAINING PROGRAM

DEPARTMENT OF RADIOLOGY

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I. INTRODUCTION

Nuclear Medicine represents a unique modality that images the normal and abnormal functions in the body non-invasively. It provides a distinct ability to further evaluate findings seen on anatomical imaging studies, and depicts abnormalities not seen by any other anatomical imaging method. The radio-pharmaceuticals utilized for this purpose have increased markedly since the utilization of the I-131 for thyroid imaging, which currently encompasses the various adult and pediatric subspecialties such as oncology, cardiology, neurology, infectious diseases, gastroenterology, urology-nephrology, etc. More recently, molecular Nuclear Medicine has been an important addition, depicting abnormal chemical reactions within the body, which may be detected earlier than is possible by waiting for structural changes to be detectable. This will help develop drugs that will specifically target molecular processes during the various phases of cell division, such as an increase in estrogen or somatostatin receptors in breast cancer or in dopamine receptors in pituitary tumors. Particularly in the last two decades, positron emission tomography (PET) has become well-established and recognized as an important addition to Nuclear Medicine utilizing radioactive substances to depict the tumorous or physiologic functions such as glucose or amino acids substrates or those identical to hormones or neural transmitters important in the body chemical reactions. PET imaging has become an essential modality in the practice of oncology and a very important addition in the practice of neurology and cardiology. More recently, PET integrated with computerized tomography PET-CT Imaging has become a standard imaging method in oncology, neuroradiology and cardiology.

Fellowship training in Nuclear Medicine has been available in major North American and European centers since the 1960s. Their formal accreditation of fellowship programs was established in the United States in the 1960s, and as a result Nuclear Medicine became a listed medical subspecialty. Formal certification was established at that time.

II. GOAL AND OBJECTIVE

The goal of the fellowship program of Nuclear Medicine Section at King Faisal Specialist Hospital and Research Centre (KFSH&RC) is to provide physicians who have completed formal training in Diagnostic Radiology or Internal Medicine comprehensive experience in the application of nuclear medicine to the diseases that primarily affect the physiology of organs.

III. PREREQUISITES

A. Candidates for fellowship in Nuclear Medicine should possess a Saudi Specialty Certificate in Diagnostic Radiology or equivalent.

B. Candidates should have recommendations from their residency training Program Director.

IV. DURATION OF FELLOWSHIP

The Nuclear Medicine fellowship program requires two years of study, inclusive of approved leaves for holidays and meetings. Up to four months of this period may be undertaken at another approved institution with the consent of the Program Director and Department Chairman.

An optional third year of fellowship will be offered to applicants who have successfully completed their second year and passed the final examinations. Such an additional year would be beneficial for practicing PET imaging, nuclear cardiology, or nuclear endocrinology and radiopharmaceutical therapy.

The one year fellowship in Nuclear Medicine can be applied to applicants who have obtained a Saudi Specialty Certificate in Diagnostic Radiology or equivalent. They may receive comprehensive training in SPECT-PET/CT (150 cases named), do Nuclear Cardiology (level II or III according to the American Society of Nuclear Cardiology), and do General Nuclear Medicine with emphasis on radionuclei therapy and endocrinology. This can be tailored according to the desire of the candidate, but still will be conducted in the context of general Nuclear Medicine.

V. NUMBER OF FELLOWSHIP POSITIONS

One (1) position is offered each year.

VI. QUALIFICATIONS OF PROGRAM STAFF

A. ***Program Director*** The program will be directed by a physician certified in Diagnostic Radiology and Nuclear Medicine, or in Internal Medicine and Nuclear Medicine, and with an appropriate academic background including experience of supervision of residency training and fellowship programs.

B. The Department of Radiology should have at least one other full-time Nuclear Medicine radiologist-physician.

C. ***Other Department Staff Members*** Other staff members are selected by the Program Director for their experience in various aspects of Nuclear Medicine, teaching skills and academic interests. These include Neuroradiology, Pediatric Radiology, and Body Imaging.

D. ***Other Hospital Staff Members*** Other staff members of KFSH&RC are selected by the Program Director for their experience in certain aspects of Nuclear Medicine, teaching skills and academic interests. These include Oncology, Cardiology, Neurology and Endocrinology. All teaching staff should have demonstrated experience in education and in research as evidenced by publications in peer-reviewed journals.

VII. STRUCTURE OF THE TRAINING PROGRAM

The Nuclear Medicine fellowship training is a two-year program consisting of the following structure:

First year

A. *Radiopharmacy & Quality Control (1 month):* Intensive theoretical and practical exposure should be provided to the types of radiopharmaceuticals, their preparation and handling. Radiobiology should also be taught. The trainee should spend time in the Hot Lab or other facilities where such agents are produced or prepared.
B. *General NM (7 months):* This rotation should cover scintigraphic techniques of the musculoskeletal, GU, GI, endocrine, hepatobiliary, pulmonary and CNS systems in addition to other miscellaneous applications.
C. *Nuclear Cardiology (4 months).*

Second year

A. *PET & PET-CT (3 months).*
B. *NM therapy (3 months):* All currently available methods of radionuclide therapy are performed in collaboration with the relevant clinical departments.
C. *Nuclear Cardiology (2 months):* More comprehensive coverage of advanced techniques with more independent application should be provided.
D. *General NM (1 month)*: A review of previously learned techniques is facilitated with delegation of more independence to the trainee.
E. *Elective (3 months):* may emphasize further experience in one or more of the above or in other relevant areas according to the fellows' interests and needs.

VIII. PROGRAM CONTENT

The fellowship program will provide the trainee with sufficient clinical material, technical facilities and supervision to attain competence in all standard nuclear imaging modalities and diagnostic and therapeutic procedures used in nuclear

medicine, including their performance and interpretation, as well as opportunity for research. This includes knowledge in the following areas:

A. Physics in Nuclear Medicine.

B. Radiation Protection and Biology.

C. Dosimetry for radiopharmaceutical therapy.

D. Use of drugs in Nuclear Medicine, including sedation and monitoring.

E. Nuclear Medicine imaging:

Whole body scanning for oncology, endocrinology, infection, hematology, and immunology, for adults and pediatric patients using planar whole body images and spect imaging.
Imaging organs with planar and spect imaging such as cardiac, renal, thyroid and parathyroid, brain, hepatobiliary imaging, and lymphatic imaging.
Therapy using radiopharmaceuticals such as I-131, strontium 89, I-131 MIBG, ZEVALIN, etc. for treating patients with thyroid cancer, metastases to bone, neuroendocrine tumors, lymphoma, etc.

F. PET imaging, computed tomography, basics.

G. The fellow is required to actively participate, under guidance, in a research project during the fellowship year.

H. Clinical coverage: The Nuclear Medicine fellow is rotated through different subspecialties in Nuclear Medicine: Cardiology, Oncology, Endocrinology, Neuro-Nuclear Medicine and other clinical studies such as GI and GU. During these different subspecialty rotations, the fellow will attend clinics in the clinical department concerned to participate in evaluating patients, diagnostic workup, and discussions on therapeutic radiopharmaceutical options. The duration of attending clinics may be for one to two months (once or twice a week). Also the fellow will be expected to attend the Radiology Clinical Conferences at KFSH&RC related to the subspecialty rotation. In Nuclear Cardiology the fellow is expected to attend the Cardiology conferences and other activities.

IX. FACILITIES & CLINICAL TEACHING

A. The facilities used will be those of the Nuclear Medicine Section at KFSH&RC. These comprise of: 5 Gamma Cameras, 4 with spect capabilities and one of these is a SPECT-CT Scanner; 1 PET unit; and 1 PET-CT scanner. The Nuclear Medicine Section is part of the Department of Radiology at KFSH&RC with its own up-to-date imaging modalities in diagnostic imaging.

B. ***Library Facilities*** The Health Sciences Library has excellent facilities with current journals and a wide range of textbooks. A small departmental library for on-line consultations provides access to some major radiological journals.

C. ***Teaching Resources*** A teaching file of images referring to all aspects of Nuclear Medicine will be made available for use by fellows. This file will be indexed, coded and periodically updated. The updating of the teaching file will be one of the responsibilities of the fellow.

D. ***Conferences*** A wide-range of clinical conferences is conducted by the Department of Radiology, for radiology consultations in the Department and with other departments in the KFSH&RC. More than 25 radiology or clinical radiology conferences are conducted per week.

The fellow is also expected to attend and participate in clinical conferences held by other departments and divisions where relevant.

Joint rounds are to be held with the Department of Medicine, Oncology, and Cardiology, and the fellow will participate in these rounds under supervision.

The fellow will be expected to conduct teaching rounds weekly for interested residents in the Department of Radiology or other departments at KFSH&RC.

The fellow is expected to bear the responsibility for his/her own learning.

X. EVALUATION

Written evaluations of the fellows will be made:

A. according to the Hospital's Fellows' Evaluation policy.
B. at appropriate intervals by the clinical supervisors of each rotation.
C. after completion of the fellowship training period.
D. after the examination by a committee including the Program Director, the Department Chairman, two members of the Department's consultant staff and one or more external examiners.

An evaluation of each rotation will be made by the fellow in writing.

XI. PROMOTION

A fellow's advancement from the first to the second year is contingent upon professional performance and personal growth, as evaluated by the Program Director and the Department Chairman in collaboration with the Section staff.

XII. CERTIFICATION

After completion of the fellowship, the Fellow will be evaluated by the Program Director and the Department Chairman in collaboration with the Section staff and Academic & Training Affairs. Satisfactory completion of the review process and final examination will result in a certificate identifying the Fellow as having successfully completed his/her fellowship at KFSH&RC.

XIII. LEAVES

Regulations governing leaves and holidays are as stipulated in the Fellowship Training Manual.

XIV. DISCIPLINARY PROCEDURE

Fellows will be subject to disciplinary procedure according to the Hospital's fellowship policy. The fellow will have the right to grievance and appeal processes as with the other trainees.

XV. NUCLEAR MEDICINE FELLOWSHIP TRAINING OVERVIEW

Positions	One per year
Duration	Two years
Requirement	Saudi Specialty Certificate in Radiology or equivalent certification
Rotations	General NM – 8 mos, Nuclear cardiology – 6 mos, NM therapy – 3 mos, PET-CT – 3 mos, Radiopharmacy – 1 mo, Elective – 3 mos
Vacations	Should not exceed two weeks in each modality rotation
Night duty	2nd on-call; approximately one week in three
Academic activities	Required to present two lectures during each year Provide 5-6 annual tutorials to the residents Participate actively in section weekly radiological-clinical meetings Attend all Tuesday afternoon (1-2pm) academic departmental activities
Research	Should generate at least one research project during training
Examinations	Oral examination will be held at end of training

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NUCLEAR MEDICINE FELLOWSHIP TRAINING PROGRAM
Department of Radiology

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