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There have been infrequent reports of signs and symptoms consistent with seizure and severe hypersensitivity after administration of Tc99m Sestamibi. Please see brief summary of prescribing information on adjacent page.



The Confidence You Want-The Information You Need

Brief Summary



FOR DIAGNOSTIC USE

INDICATIONS AND USAGE: CARDIOLITE*, Kit for the preparation of Technetium Tc99m Sestamibi, is a myocardial perfusion agent that is indicated for detecting coronary artery disease by localizing myocardial ischemia (reversible defects) and infarction (non-reversible defects), in evaluating myocardial function and developing information for use in patient management decisions. CAR-DIOLITE* evaluation of myocardial ischemia can be accomplished with rest and cardiovascular stress techniques (e.g., exercise or pharmacologic stress in accordance with the pharmacologic stress agent's labeling).

It is usually not possible to determine the age of a myocardial infarction or to differentiate a recent myocardial infarction from ischemia.

CONTRAINDICATIONS: None known.

WARNINGS: In studying patients in whom cardiac disease is known or suspected, care should be taken to assure continuous monitoring and treatment in accordance with safe, accepted clinical proce-dure. Infrequently, death has occurred 4 to 24 hours after Tc99m Sestamibi use and is usually associ-ated with exercise stress testing (See PRECAUTIONS).

Pharmacologic induction of cardiovascular stress may be associated with serious adverse events such as myocardial infarction, arrhythmias, hypotension, bronchoconstriction and cerebrovascular events. Caution should be used when pharmacologic stress is selected as an alternative to exercise; it should be used when indicated and in accordance with the pharmacologic stress agent's labeling. PRECAUTIONS:

GENERAL

The contents of the vial are intended only for use in the preparation of Technetium Tc99m Sestamibi and are not to be administered directly to the patient without first undergoing the preparative procedure.

Radioactive drugs must be handled with care and appropriate safety measures should be used to minimize radiation exposure to clinical personnel. Also, care should be taken to minimize radiation exposure to the patients consistent with proper patient management.

 $Contents \ of the kit before preparation are not radioactive. However, after the Sodium Pertechnetate Tc99m Injection is added, adequate shielding of the final preparation must be maintained.$

The components of the kit are sterile and non-pyrogenic. It is essential to follow directions carefully and to adhere to strict aseptic procedures during preparation.

Technetium Tc99m labeling reactions involved depend on maintaining the stannous ion in the reduced state. Hence, Sodium Pertechnetate Tc99m Injection containing oxidants should not be used. Technetium Tc99m Sestamibi should not be used more than six hours after preparation

Radiopharmaceuticals should be used only by physicians who are qualified by training and experi-ence in the safe use and handling of radionuclides and whose experience and training have been approved by the appropriate government agency authorized to license the use of radionuclides.

Stress testing should be performed only under the supervision of a qualified physician and in a laboratory equipped with appropriate resuscitation and support apparatus.

The most frequent exercise stress test endpoints, which resulted in termination of the test during controlled Tc99m Sestamibi studies (two-thirds were cardiac patients) were:

Fatigue	35%
Dyspnea	17%
Chest Pain	16%
ST-depression	7%
Arrhythmia	1%

Carcinogenesis, Mutagenesis, Impairment of Fertility

In comparison with most other diagnostic technetium labeled radiopharmaceuticals, the radiation dose to the ovaries (1.5rads/30mCi at rest, 1.2 rads/30mCi at exercise) is high. Minimal exposure (ALARA) is necessary in women of childbearing capability. (See Dosimetry subsection in DOSAGE AND ADMINISTRATION section.)

The active intermediate, $[Cu(MIBI)_4]BF_4$, was evaluated for genotoxic potential in a battery of five tests. No genotoxic activity was observed in the Ames, CHO/HPRT and sister chromatid exchange tests (all *in vitro*). At cytotoxic concentrations ($\geq 20\mu g/m$), an increase in cells with chromosome aberrations was observed in the *in vitro* numal hymphocyte assay. [Cu(MIBI)_4]BF_4 did not show genotoxic effects in the *in vitro* nouse micronucleus test at a dose which caused systemic and bone marrow toxicity (9mg/kg, > 600 × maximal human dose).

Pregnancy Category C

Animal reproduction and teratogenicity studies have not been conducted with Technetium Tc99m women. Technetium Tc99m Sestamibi should be given to a pregnant woman only if clearly needed

Nursing Mothers

Technetium Tc99m Pertechnetate is excreted in human milk during lactation. It is not known whether Technetium Tc99m Sestamibi is excreted in human milk. Therefore, formula feedings should be substituted for breast feedings.

Pediatric Use

Safety and effectiveness in children below the age of 18 have not been established.

Safety and effectiveness in children below the age of 18 have not been established. ADVERSE REACTIONS: During clinical trials, approximately 8% of patients experienced a tran-sient parosmia and/or taste perversion (metallic or bitter taste) immediately after the injection of Technetium Tc99m Sestamibi. A few cases of transient headache, flushing, edema, injection site inflammation, dyspepsia, nausea, vomiting, pruritus, rash, urticaria, dry mouth, fever, dizzines; fatigue, dyspnea, and hypotension also have been attributed to administration of the agent. Cases of angina, chest pain, and death have occurred (see WARNINGS and PRECAUTIONS). The following adverse reactions have been rarely reported: signs and symptoms consistent with seizure occurring shortly after administration of the agent; transient arthritis in a wrist join; and severe hypersensitivity, which was characterized by dyspnea, hypotension, bradycardia, asthenia and vomiting within two hours after a second injection of Technetium Tc99m Sestamibi.

DOSAGE AND ADMINISTRATION: The suggested dose range for I.V. administration in a single dose to be employed in the average patient (70kg) is:

370-1110MBq (10-30mCi)

The dose administered should be the lowest required to provide an adequate study consistent with ALARA principles (see also PRECAUTIONS).

When used in the diagnosis of myocardial infarction, imaging should be completed within four hours after administration (see also CLINICAL PHARMACOLOGY).

The patient dose should be measured by a suitable radioactivity calibration system immediately prior to patient administration. Radiochemical purity should be checked prior to patient administration. Parenteral drug products should be inspected visually for particulate matter and discoloration prior to administration whenever solution and container permit.

. Store at 15-25°C before and after reconstitution.

RADIATION DOSIMETRY: The radiation doses to organs and tissues of an average patient (70kg) per 1110MBq (30mCi) of Technetium Tc99m Sestamibi injected intravenously are shown in Table 4.

Table 4. Radiation Absorbed Doses from Tc99m Sestamibi Fetimated Padiation Absorbed Doce

_	Estimated Radiation Absorbed Dose					
_		RE	ST			
	2.0 h	our void	4.8 h	4.8 hour void		
Organ	rads/ 30mCi	mGy/ 1110MBq	rads/ 30mCi	mGy/ 1110MBq		
Breasts	0.2	2.0	0.2	1.9		
Gallbladder Wall	2.0	20.0	2.0	20.0		
Small Intestine	3.0	30.0	3.0	30.0		
Upper Large Intestine Wall	5.4	55.5	5.4	55.5		
Lower Large Intestine Wall	3.9	40.0	4.2	41.1		
Stomach Wall	0.6	6.1	0.6	5.8		
Heart Wall	0.5	5.1	0.5	4.9		
Kidneys	2.0	20.0	2.0	20.0		
Liver	0.6	5.8	0.6	5.7		
Lungs	0.3	2.8	0.3	2.7		
Bone Surfaces	0.7	6.8	0.7	6.4		
Thyroid	0.7	7.0	0.7	6.8		
Ovaries	1.5	15.5	1.6	15.5		
Testes	0.3	3.4	0.4	3.9		
Red Marrow	0.5	5.1	0.5	5.0		
Urinary Bladder Wall	2.0	20.0	4.2	41.1		
Total Body	0.5	4.8	0.5	4.8		

	STRESS				
_	2.0 hour void			4.8 hour void	
Orma	rads/	mGy/		rads/	mGy/
Organ	301101	TITOWDQ		Junei	mombq
Breasts	0.2	2.0		0.2	1.8
Gallbladder Wall	2.8	28.9		2.8	27.8
Small Intestine	2.4	24.4		2.4	24.4
Upper Large Intestine Wall	4.5	44.4		4.5	44.4
Lower Large Intestine Wall	3.3	32.2		3.3	32.2
Stomach Wall	0.5	5.3		0.5	5.2
Heart Wall	0.5	5.6		0.5	5.3
Kidneys	1.7	16.7		1.7	16.7
Liver	0.4	4.2		0.4	4.1
Lungs	0.3	2.6		0.2	2.4
Bone Surfaces	0.6	6.2		0.6	6.0
Thyroid	0.3	2.7		0.2	2.4
Ovaries	1.2	12.2		1.3	13.3
Testes	0.3	3.1		0.3	3.4
Red Marrow	0.5	4.6		0.5	4.4
Urinary Bladder Wall	1.5	15.5		3.0	30.0
Total Body	0.4	4.2		0.4	4.2

Radiopharmaceutical Internal Dose Information Center, July, 1990, Oak Ridge Associated Universities, P.O. Box 117, Oak Ridge, TN 37831, (615) 576-3449.

HOW SUPPLIED: Du Pont Radiopharmaceutical's CARDIOLITE[•]. Kit for the Preparation of Technetium Tc99m Sestamibi is supplied as a 5ml vial in kits of two (2), five (5) and thirty (30) vials, sterile and non-pyrogenic

Prior to tyophilization the pH is between 5.3-5.9. The contents of the vials are lyophilized and stored under nitrogen. Store at 15-25°C before and after reconstitution. Technetium Tc99m Sestamibi contains no preservatives. Included in each two (2) vial kit are one (1) package insert, six (6) vial shield labels and six (6) radiation warning labels. Included in each five (5) vial kit are one (1) package insert, six (6) vial shield labels and six (6) radiation warning labels. Included in each thirty (30) vial kit are one (1) package insert, thirty (30) vial shield labels and thirty (30) radi-cing warning labels. ation warning labels

The U.S. Nuclear Regulatory Commission has approved this reagent kit for distribution to per-sons licensed to use byproduct material pursuant to section 35.11 and section 35.200 of Title 10 CFR Part 35, to persons who hold an equivalent license issued by an Agreement State, and, outside the United States, to persons authorized by the appropriate authority.



Radiopharmaceuticals

Marketed by DuPont Radiopharmaceutical Division The DuPont Merck Pharmaceutical Co. 331 Treble Cove Road Billerica, Massachusetts, USA 01862 For ordering Tel. Toll Free: 800-225-1572 All other business: 800-362-2668 (For Massachusetts and International, call 508-667-9531)

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2/96

REFERENCES: 1. Nichols K, DePuey EG, Rozanski A. Automation of gated tomographic left ventricular ejection fraction. J Nucl Cardiol. 1996;3:475-482. 2. Chua T, Kiat H, Germano G, et al. Gated technetium-99m sestamibi for simultaneous assessment of stress myocardial perfusion, post-exercise regional ventricular function and myocardial viability. J Am Coll Cardiol. 1994;23:1107-1114. 3. Stratmann HG, Williams GA, Wittry MD, et al. Exercise technetium-99m sestamibi tomography for cardiac risk stratification of patients with stable chest pain. Circulation. 1994;89:615-622. 4. Berman DS, Hachamovitch R, Kit H, et al. Incremental value of prognostic testing in patients with known or suspected ischemic heart disease: a basis for optimal utilization of exercise technetium-99m sestamibi myocardial perfusion single-photon emission computed tomography. J Am Coll Cardiol. 1995;26:639-647. 5. Hachamovitch R, Berman DS, Kiat H, et al. Exercise myocardial perfusion SPECT in patients with out known coronary artery disease. Circulation. 1995;93:905-914.

See How Your Clinic Compares With Other Participants

Each subscriber will receive a phantom with instructions for imaging and a questionnaire. After the results have been submitted and evaluated by the Nuclear Medicine

Imaging Committee, the subscribers will receive a copy of their results compared with all other participants. A final critique will also be provided which will include a discussion of the exercise, the results of the subscribers, and recommendations for improved imaging based on the results of the exercise.

Spring '98 Phantom (IM-A)

EART

1998 IM-A Myocardial Perfusion



The Proficiency Testing Program offers the Society of Nuclear Medicine (SNM)-Technologist Section VOICE continuing education credits to those technologists who are members of the SNM. Continuing

education credits are also available for technologists who are not SNM members. The ACNP has accredited this program for Continuing Medical Education credits for physicians who participate and the ACNP received AMAP (American Medical Accreditation

Program) recognition for the Proficiency Testing Program in July of 1997.

Fall '98 Phantom (IM-B) BREAST

1998 IM-B Mammoscintigraphy and Oncologic Lesion Detection Exercise

The 1998 IM-B (fall) exercise will be a Transmission Phantom for a simulated mammoscintigraphy study and an oncologic lesion detection exercise with a receiver operating characteristic (ROC) analysis of warm lesions.

This mammoscintigraphy exercise will evaluate lesion size, contrast, and a location simulation of a two view planar study of the breast. Additionally, a matrix of lesions of varying contrast is included that will test the observer's ability to detect lesions as they are seen in nuclear oncology studies. An ROC curve will be produced for each observer. Pixel size evaluation will be included as a quality control exercise. The effect of camera distance on imaging quality will also be examined.

Shipping Date: September 15, 1998

Imaging Simulator The 1998 IM-A Myocardial Perfusion Study is designed to test the subscriber's ability to acquire, process, and interpret images, determining the presence of defect(s), to detect changes in sequential studies, and to quantitate

the defects. SPECT images are to be acquired and processed according to the participants own clinical protocols. Alternative processing options may be suggested for comparison.

A clinical history will be provided to assist in the interpretation of the findings.

A summary of all the participating facilities' results will accompany the report of each individual subscriber's results. The device may be retained for continued quality assurance testing.

Shipping Date: April 14, 1998



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SRS either unequivocally identified a primary tumor or clarified an equivocal lesion found on conventional imaging in 47% of patients with Zollinger-Ellison Syndrome undergoing initial evaluation. Of those with metastatic liver disease, SRS was the only localization method to determine the presence or extent of liver metastases in 12% of cases, or was the only method to establish additional metastases or metastases to the bone in 16% of cases.¹

Please see adjacent page for brief summary of prescribing information.



Kit for the Preparation of Indium In-III Pentetreotide

BRIEF SUMMARY OF PRESCRIBING INFORMATION

DESCRIPTION

OctreoScan* is a kit for the preparation of indium In-111 pentetreotide, a diagnostic radio-pharmaceutical. It is a kit consisting of two components:

1) A 10-mL OctreoScan Reaction Vial which contains a lyophilized mixture of 10 µg pentetreotide.

2) A 10-mL vial of Indium In-111 Chloride Sterile Solution. Indium In-111 pentetreotide is prepared by combining the two kit components.

INDICATIONS AND USAGE

Indium In-111 pentetreotide is an agent for the scintigraphic localization of primary and metastatic neuroendocrine tumors bearing somatostatin receptors.

CONTRAINDICATIONS

None known

WARNINGS

INCLUDED ADMINISTER IN TOTAL PARENTERAL NUTRITION (TPN) ADMIXTURES OR INJECT INTO TPN INTRAVENOUS ADMINISTRATION LINES; IN THESE SOLUTIONS, A COMPLEX GLYCOSYL OCTREOTIDE CONJUGATE MAY FORM

The sensitivity of scintigraphy with indium In-111 pentetreotide may be reduced in patients concurrently receiving therapeutic doses of octreotide acetate. Consideration should be given to temporarily suspending octreotide acetate therapy before the administration of indium In-111 pentetreotide and to monitoring the patient for any signs of withdrawa

PRECAUTIONS

General

 Therapy with octreotide acetate can produce severe hypoglycemia in patients with insulinomas. Since pentetreotide is an analog of octreotide, an intravenous line is recommended in any patient suspected of having an insulinoma. An intravenous solution containing glucose should be administered just before and during administration of indium In-111 pentetreotide.

The contents of the two vials supplied with the kit are intended only for use in the preparation of indium In-111 pentetreotide and are NOT to be administered separately to the patient.

3. Since indium In-111 pentetreotide is eliminated primarily by renal excretion, use in patients with impaired renal function should be carefully considered

4. To help reduce the radiation does to the thyroid, kidneys, bladder, and other target organs, patients should be well hydrated before the administration of indium in-111 pentetrectide. They should increase fluid intake and void frequently for one day after administration of this drug. In addition, it is recommended that patients be given a mile laxative (e.g., bisacody) or lactulose) before and after administration of indium In-111 pentetrectide (see Dosage ven a mild and Administration section).

Indium In-111 pentetreotide should be tested for labeling yield of radioactivity prior to administration. The product must be used within six hours of preparation.

6. Components of the kit are sterile and nonpyrogenic. To maintain sterility, it is essential that directions are followed carefully. Aseptic technique must be used during the preparation and administration of indium In-111 pentetreotide

7. Octreotide acetate and the natural somatostatin hormone may be associated with choleithiasis, presumably by attering fat absorption and possibly by decreasing motility of the gallbladder. A single dose of indium In-111 pentetreotide is not expected to cause cholelithiasis.

As with any other radioactive material, appropriate shielding should be used to avoid unnecessary radiation exposure to the patient, occupational workers, and other persons.

9. Radiopharmaceuticals should be used only by physicians who are qualified by specific training in the safe use and handling of radionuclides.

Carcinogenesis, Mutagenesis, Impairment of Fertility

Studies have not been performed with indium In-111 pentetreotide to evaluate carcinogenic potential or effects on fertility. Pentetreotide was evaluated for mutagenic potential in an in vitro mouse lymphoma forward mutation assay and an in vivo mouse micronucleus assay; evidence of mutagenicity was not found.

Pregnancy Category C

Animal reproduction studies have not been conducted with indium in-111 pentetreotide. It is not known whether indium In-111 pentetreotide can cause fetal harm when administered to a pregnant woman or can affect reproduction capacity. Therefore, indium in-111 pentetreotide should not be administered to a pregnant woman unless the potential benefit justifies the potential risk to the fetus.

Nursing Mothers

It is not known whether this drug is excreted in human milk. Because many drugs are excreted in human milk, caution should be exercised when indium In-111 pentetreotide is administered to a nursing woman.

Pediatric Use

Safety and effectiveness in children have not been established

ADVERSE REACTIONS

The following adverse effects were observed in clinical trials at a frequency of less than 1% of 538 patients: dizziness, fever, flush, headache, hypotension, changes in liver enzymes, joint pain, nausea, sweating, and weakness. These adverse effects were transient. Also in clinical trials, there was one reported case of bradycardia and one case of decreased hematocrit and hemoglobin.

Pentetreotide is derived from octreotide which is used as a therapeutic agent to control symptoms from certain tumors. The usual dose for indium In-111 pentetreotide is approximately 5 to 20 times less than for octreotide and is subtherapeutic. The following adverse reactions have been associated with octreotide in 3% to 10% of patients: nausea, injection site pain, diarrhea, abdominal pain/discomfort, loose stools, and vorniting. Hypertension and hyper- and hypoglycemia have also been reported with the use of octreotide.

DOSAGE AND ADMINISTRATION

Before administration, a patient should be well hydrated. After administration, the patient must be encouraged to drink fluids liberally. Elimination of extra fluid intake will help reduce the radiation dose by flushing out unbound, labelled penterbeoide by glomenular filtration. It is also recommended that a mild laxative (e.g., bisacodyl or lactulose) be given to the patient starting the evening before the radioactive drug is administered, and continuing

for 48 hours. Ample fluid uptake is necessary during this period as a support both to renal elimination and the bowel-cleansing process. In a patient with an insulinoma, bowel-cleansing should be undertaken only after consultation with an endocrinologist.

The recommended intravenous dose for <u>planar</u> imaging is 111 MBq (3.0 mCi) of indium In-111 pentetreotide prepared from an OctreoScan kit. The recommended intravenous dose for <u>SPECT</u> imaging is 222 MBq (6.0 mCi) of indium In-111 pentetreotide.

The dose should be confirmed by a suitably calibrated radioactivity ionization chamber immediately before administration

As with all intravenously administered products, OctreoScan should be inspected visually for particulate matter and discoloration prior to administration, whenever solution and container permit. Preparations containing particulate matter or discoloration should not be administered. They should be disposed of in a safe manner, in compliance with applicable regulations.

Aseptic techniques and effective shielding should be employed in withdrawing doses for administration to patients Waterproof gloves should be worn during the administration procedure.

Do not administer OctreoScan in TPN solutions or through the same intravenous line.

Radiation Dosimetry

The estimated radiation doses' to the average adult (70 kg) from intravenous administration of 111 MBq (3 mCi) and 222 MBq (6 mCi) are presented below. These estimates were calculated by Oak Ridge Associated Universities using the data published by Krenning, et al.²

Estimated Absorbed Radiation Doses after Intravenous Administration
of Indium In-111 Pentetreotide ³ to a 70 kg patient

	PLANAR		SPECT		
1. A.	and the second second				
Kidneys	54.16	5.42	108.32	10.83	
Liver	12.15	1.22	24.31	2.43	
Spleen	73.86	7.39	147.73	14.77	
Uterus	6.34	0.63	12.67	1.27	
Ovaries	4.89	0.49	9.79	0.98	
Testes	2.90	0.29	5.80	0.58	
Red Marrow	3.46	0.35	6.91	0.69	
Urinary Bladder Wall	30.42	3.04	60.48	6.05	
GI Tract		1			
Stomach Wall	5.67	0.57	11.34	1.13	
Small Intestine	4.78	0.48	9.56	0.96	
Upper Large Intestine	5.80	0.58	11.59	1.16	
Lower Large Intestine	7.73	0.77	15.46	1.55	
Adrenals	7.55	0.76	15.11	1.51	
Thyroid	7.43	0.74	14.86	1.49	
	an all an	a na sana badan sa sa sa			
Effective Dose* Equivalent	13.03	1.30	26.06	2.61	

1. Values listed include a correction for a maximum of 0.1% indium In-114m radiocontaminant at calibration.

2. E.P. Krenning, W.H. Bakker, P.P.M. Kooij, W.A.P. Breeman, H.Y.Oei, M. de Jong, J.C. Reubi, T.J. Visser, C. Bruns, D.J. Kwekkeboom, A.E.M. Reijs, P.M. van Hagen, J.W. Koper, and S.W.J. Lamberts, "Somatostatin Receptor Scintigraphy with Indium-111-DTPA-D-Phe-1-Octreoide in Man: Metabolism, Dosimetry and Comparison with Iodine-123-Tyr-3-Octreoide," The Journal of Nuclear Medicine, Vol. 33, No. 5, May 1992, pp. 652-658.

3. Assumes 4.8 hour voiding interval and International Commission on Radiological Protection (ICRP) 30 model for the gastrointestinal tract calculations.

4. Estimated according to ICRP Publication 53.

HOW SUPPLIED

The OctreoScan kit, NDC 0019-9050-40, is supplied with the following components:

- Bothoscain KI, MCC 0019-9000-40, is suppred with the following components:
 A 10-mL OctreoScan Reaction Vial which contains a hyophilized mixture of:
 (i) 10 µg pentetreotide [N-(diethy/enertramine-N,NN,N-Iertraacetic acid-N-acetyl)-D-phenylalanyl-L-hemicystyl-L-phenylalanyl-D-tryptophyl-L-hysyl-L-threonyl-L-hemicystyl-L-threon

- (v) 10.0 mg inositol.

Before hyphilization, sodium hydroxide or hydrochloric acid may have been added for pH adjustment. The vial contents are sterile and nonpyrogenic. No bacteriostatic preservative is present.

2. A 10-mL vial of Indium In-111 Chloride Sterile Solution, which contains 1.1 mL of 111 MBq/mL (3.0 mCi/mL) indium In-111 chloride in 0.02 N HCl at time of calibration. The vial also contains ferric chloride at a concentration of 3.5 µg/mL (ferric ion, 1.2 µg/mL). The vial contents are sterile and nonpyrogenic. No bacteriostatic preservative is present.

In addition, the kit also contains the following items: (1) a 25 G x 5/8" needle (B-D, Monoject) used to transfer Indium In-111 Chloride Sterile Solution to the OctreoScan Reaction Vial, (2) a pressure sensitive label, and (3) a package insert.



Mallinckrodt Inc. Mallinckrodt Nuclear Medicine Division P.O. Box 5840 St. Louis, MO 63134

1. Termanini B, Gibril F, Reynolds JC, et al. Value of Somatostatin Receptor Scintigraphy: A Prospective Study in Gastrinoma of its Effect on Clinical Management. Gastroenterology 1997;112:335-337.

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Mid-Eastern Chapter, Society of Nuclear Medicine 28th Annual Meeting

Updates of Current Topics in Nuclear Medicine and Nuclear Radiology

April 24, 25 & 26, 1998 Sheraton Fontainebleau Hotel, Ocean City, MD

Meeting topics will cover a Saturday half-day symposium on the issues and imaging of the breast. Friday and Saturday will cover mesenchymal stem cells in skeletal growth, nuclear cardiology, sports nuclear medicine, radioimmunoscintigraphy, gastrointestinal scintigraphy, SPECT imaging, pediatric nuclear medicine and a Second Annual Nuclear Medicine/Nuclear Radiology Quiz (with prizes).

Invited speakers are Drs. B. Barron, R. Brem, B. Croft, D. Eggli, S. Goldsmith, G. Johnston, E. Kotlyarov, J. McAfee, C. Nagle, J. Seabold, A. Serafini, R. Taillefer, J. Tatum, R. Tikofsky and H. Ziessman.

Ocean City should be very pleasant by late April, so plan to bring a friend or spouse. There are boat rides, golf (4 courses), fishing or just shopping to keep you busy. A Technologist program is in the plans.

Pre-registration fees will be \$50 for SNM Technologists members and \$100 for SNM Physician members. Non-members Technologists will be \$75 and non-member physicians will be \$120.

Rooms (single or double) will be \$117 (taxes included) and several meal functions are planned.

AND for your convenience, we now accept American Express, VISA and Mastercard for registration and meal payments!

Please call/fax R. Gramm at 410-465-8323 to receive a program after February 1st.



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MY JVIEW[®]

Kit for the Preparation of Technetium Tc99m Tetrofosmin for injection

Diagnostic radiopharmaceutical For intravenous use only

Code N166A

DESCRIPTION

The Medi-Physics Myoview™ kit is supplied as a pack of five vials for use in the preparation of a technetium Tc99m tetrofosmin intravenous injection to be used for the scintigraphic delineation of regions of reversible myocardial ischemia in the presence or absence of infarcted myocardium. Each vial contains a pre-dispensed, sterile, non-pyrogenic, tyophilized mixture of 0.23 mg tetrofosmin [6,9-bis(2-ethoxyethyl)-3,12-dioxa-6,9-diphospha-tetradecane], 30 µg stannous chloride dihydrate (minimum stannous tin 5.0 µg; maximum total stannous and stannic tin 15.8 µg), 0.32 mg disodium sulphosalicylate and 1.0 mg sodium D-gluconate, and 1.8 mg sodium hydrogen carbonate. The hyophilized powder is sealed under a nitrogen atmosphere with a rubber closure. The product contains no antimicrobial preservative.

Caution: Federal (USA) law prohibits dispensing without a prescription

CLINICAL PHARMACOLOGY

General

When technetium Tc99m pertechnetate is added to tetrofosmin in the presence of stannous reductant, a lipophilic, cationic technetium Tc99m complex is formed, Tc99m tetrofosmin. This complex is the active ingredient in the reconstituted drug product, on whose biodistribution and pharmacokinetic properties the indications for use depend.

Clinical Trials

A total of 252 patients with ischemic heart disease or atypical chest pain who had a reason for exercise stress imaging were studied in two open-label, multi center, clinical trials of Tc99m tetrofosmin (study a and study b). Of these 252 patients there were 212 (83%) males and 40 (17%) females with a mean age of 60.5 years (range 33.7 to 82.4 years). At peak exercise, maximum heart rate achieved and peak systolic blood pressure were comparable after Myoview and thallium-201 exercise studies

All patients had exercise and rest planar imaging with Myoview and thallium-201; 191 (76%) patients also had SPECT imaging. The Myoview and thallium-201 images were separated by a mean of 5.1 days (1-14 days before or 2-14 days after Myoview). For Myoview imaging, each patient received 185-296 MBq (5-8 mCi) Tc99m tetrofosmin at peak exercise and 555-888 MBq (15-24 mCi) Tc99m tetrofosmin at rest approximately 4 hours later. For thallium-201 imaging, patients received thallium-201 55.5-74 MBq (1.5-2.0 mCi) at peak exercise.

The images were evaluated for the quality of the image (excellent, good or poor) and the diagnosis (with scores of 0 = normal, 1 = ischemia, 2 = infarct, 3 = mixed infarct and ischemia). The primary outcome variable was the percentage of correct diagnoses in comparison to the final clinical diagnosis. All planar images were blindly read; SPECT images were evaluated by the unblinded investigator. A subset of 181/252 (71%) patients had coronary angiography comparisons to the planar images of Myoview or thallium-201.

INDICATIONS AND USAGE

Myoview is indicated for scintigraphic imaging of the myocardium following separate administrations under exercise and resting conditions. It is useful in the delineation of regions of reversible myocardial ischemia in the presence or absence of infarcted myocardium.

CONTRAINDICATIONS

None known.

WARNINGS

In studying patients with known or suspected coronary artery disease, care should be taken to ensure continuous cardiac monitoring and the availability of emergency cardiac treatment.

PRECAUTIONS

General

To minimize radiation dose to the bladder, the patient should be encouraged to void when the examination is completed and as often thereafter as possible. Adequate hydration should be encouraged to permit frequent voiding.

The contents of the Myoview vial are intended only for use in the preparation of technetium

Tc99m tetrofosmin injection and are NOT to be administered directly to the patient.

As with all injectable drug products, allergic reactions and anaphylaxis may occur.

Sometimes Tc99m labeled myocardial imaging agents may produce planar and SPECT images with different imaging information.

Technetium Tc99m tetrofosmin injection, like other radioactive drugs must be handled with care and appropriate safety measures should be used to minimize radiation exposure to clinical personnel. Care should also be taken to minimize radiation exposure to the patient consistent with proper patient management.

Radiopharmaceuticals should be used by or under the control of physicians who are qualified by specific training and experience in the safe use and handling of radionuclides, and whose experience and training have been approved by the appropriate governmental agency authorized to license the use of radionuclides.

Drug Interactions: Drug interactions were not noted and were not studied in clinical studies in which Myoview was administered to patients receiving concomitant medication. Drugs such as beta blockers, calcium blockers and nitrates may influence myocardial function and blood flow. The effects of such drugs on imaging results are not known.

Carcinogenesis, Mutagenesis, Impairment of Fertility Studies have not been conducted to evaluate carcinogenic potential or effects on fertility. Tetrofosmin sulphosalicylate was not mutagenic in vitro in the Ames test, mouse lymphoma, or human lymphocyte tests, nor was it clastogenic in vivo in the mouse micronucleus test.

Pregnancy Category C

Animal reproduction studies have not been conducted with Myoview. It is not known whether Myoview can cause fetal harm when administered to a pregnant woman or can affect reproductive capacity. Therefore, Myoview should not be administered to a pregnant woman unless the potential benefit justifies the potential risk to the fetus.

Nursing Mothers

Technetium Tc99m Pertechnetate can be excreted in human milk. Therefore, formula should be substituted for breast milk until the technetium has cleared from the body of the nursing woman.

Pediatric Use

Safety and effectiveness in pediatric patients have not been established.

ADVERSE REACTIONS

Adverse events were evaluated in clinical trials of 764 adults (511 men and 253 women) with a mean age of 58.7 years (range 26-94 years). The subjects received a mean dose of 7.67 mCi on the first injection and 22.4 mCi on the second injection of Myoview.

Deaths did not occur during the clinical study period of 2 days. Six cardiac deaths occurred 3 days to 6 months after injection and were thought to be related to the underlying disease or cardiac surgery. After Myoview injection, serious episodes of angina occurred in 3 patients. Overall cardiac adverse events occurred in 5/764 (less than 1 %) of patients after Myoview injection.

The following events were noted in less than 1 % of patients: Cardiovascular: angina, hypertension, Torsades de Pointes Gastrointestinal: vomiting, abdominal discomfort Hypersensitivity: cutaneous allergy, hypotension, dyspnea Special Senses: metallic taste, burning of the mouth, smelling something

There was a low incidence (less than 4%) of a transient and clinically insignificant rise in white blood cell counts following administration of the agent.

DOSAGE AND ADMINISTRATION

For exercise and rest imaging, Myoview is administered in two doses:

- The first dose of 5-8 mCi (185-296 MBq) is given at peak exercise. The second dose of 15-24 mCi (555-888 MBq) is given approximately 4 hours later, at rest.

Imaging may begin 15 minutes following administration of the agent.

Dose adjustment has not been established in renally or liver impaired, pediatric or geriatric patients. **RADIATION DOSIMETRY**

Based on human data, the absorbed radiation doses to an average human adult (70 kg) from intravenous injections of the agent under exercise and resting conditions are listed in Table 1. The values are listed in descending order as rad/mCi and µGy/MBq and assume urinary bladder emptying at 3.5 hours.

Table 1

Estimated Absorted Radiation Dose (Technetium Tc99m Tetrofosmin Injection)

	Absorbed radiation dose			
	Exe	rcise	R	est
Target Organ	rad/mCi	µGy/MBq	rad/mCi	µGy/MBq
Gall bladder wall	0.123	33.2	0.180	48.6
Upper large intestine	0.075	20.1	0.113	30.4
Bladder wall	0.058	15.6	0.071	19.3
Lower large intestine	0.057	15.3	0.082	22.2
Small intestine	0.045	12.1	0.063	17.0
Kidney	0.039	10.4	0.046	12.5
Salivary glands	0.030	8.04	0.043	11.6
Ovaries	0.029	7.88	0.035	9.55
Uterus	0.027	7.34	0.031	8.36
Bone surface	0.023	6.23	0.021	5.58
Pancreas	0.019	5.00	0.018	4.98
Stomach	0.017	4.60	0.017	4.63
Thyroid	0.016	4.34	0.022	5.83
Adrenals	0.016	4.32	0.015	4.11
Heart wall	0.015	4.14	0.015	3.93
Red marrow	0.015	4.14	0.015	3.97
Spleen	0.015	4.12	0.014	3.82
Muscle	0.013	3.52	0.012	3.32
Testes	0.013	3.41	0.011	3.05
Liver	0.012	3.22	0.015	4.15
Thymus	0.012	3.11	0.009	2.54
Brain	0.010	2.72	0.008	2.15
Lungs	0.008	2.27	0.008	2.08
Skin	0.008	2.22	0.007	1.91
Breasts	0.008	2.22	0.007	1.83

Dose calculations were performed using the standard MIRD method (MIRD Pamphlet No.1 (rev). Society of Nuclear Medicine, 1976. Effective dose equivalents (EDE) were calculated in accordance with ICRP 53 (Ann. ICRP 18 (1-4), 1988) and gave values of 8.61 x 103 mSv/MBq and 1.12 x 103 mSv/MBq after exercise and rest respectively.

Manufactured by Amersham International plc - Amersham, United Kingdom

Patent No. 5,045,302 (r)

Distributed by: Medi-Physics, Inc., Amersham Healthcare 2636 S. Clearbrook Dr., Arlington Heights, IL 60005

1-800- 633-4123 (Toll Free) February, 1996 Amersham and Myoview are trademarks of Amersham International plc

43-1011



CERTIFICATION COUNCIL OF NUCLEAR CARDIOLOGY

1998 CERTIFICATION EXAMINATION IN NUCLEAR CARDIOLOGY

DATE: October 25, 1998

TIME: 7:45 AM to 12:45 PM (Central Time)

LOCATION: Rosemont Convention Center, 5555 North River Road, Rosemont, Illinois

Deadline for Receipt of Applications: Early – May 22, 1998 Late – July 24, 1998

You are urged to write as soon as possible for the Candidate Bulletin and Application Form to:

Certification Council of Nuclear Cardiology

9111 Old Georgetown Road

Bethesda, MD 20814-1699

Sponsored by: Cardiovascular Council •Society of Nuclear Medicine PHYSICIANS, SCIENTISTS, AND TECHNOLOGISTS 1998 - CATEGORICAL COURSE • MYOCARDIAL PERFUSION IMAGING 45th SNM Annual Meeting • Sunday, June 7, 1998 Toronto Convention Centre • Toronto, Canada

Combined AM Session 8:30am-12:30pm Physicians PM Program 1:30pm-3:00pm Technologists PM Program 1:30pm-3:00pm

Course Organizers: Robert J. Burns, M.D., University of Toronto, Albert J. Sinusas, M.D., Yale University, Brenda McSherry, CNMT, Univ. of Mass. Med. Center, Donna Natale, CNMT, Yale University

Faculty: Stephen L. Bacharach, Ph.D., George A. Beller, M.D., Daniel S. Berman, M.D., Robert O. Bonow, M.D., James Cullum, Ph.D., E. Gordon DePuey, III, M.D., Andre Gagnon, CNMT, Ernest V. Garcia, Ph.D., Raymond J. Gibbons, M.D., Rory Hachamovitch, M.D., E. Lindsey Tauxe, CNMT, Jack A. Ziffer, M.D. Ph.D

Credits: CME: 5.0 CPE: 5.0 VOICE: 5.0

For registration and housing information: Call Convention Management Resources (CMR) SNM's official registration and housing company at 800-636-4SNM (4766) or 415-979-2265, fax 415-979-2250 For more information: Visit the SNM home page at www.snm.org

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Join 4,000 nuclear medicine professionals from around the world at the Society of Nuclear Medicine's 45th Annual Meeting June 7-11, 1998.

Seventh Conference on Radioimmunodetection And Radioimmunotherapy of Cancer

October 15-17, 1998

Princeton Marriott Forrestal Village Princeton, New Jersey

Conference Chairmen:

David M. Goldenberg, Sc.D., M.D. Garden State Cancer Center and Center for Molecular Medicine and Immunology

Gerald L. DeNardo, M.D. Molecular Cancer Institute University of California-Davis

ABSTRACT DEADLINE: May 1, 1998

Abstracts may be submitted on:

Radiochemistry of antibodies and peptides \bullet Radiation physics and dosimetry of radiolabeled antibodies and peptides \bullet Radiation biology

Experimental targeting studies • Clinical studies of radioimmunodetection • Experimental and clinical radioimmunotherapy • New approaches to improved antibodies and targeting

For abstract forms and further information contact: Lois Gillespie,Garden State Cancer Center, 520 Belleville Avenue, Belleville, NJ 07109 Telephone: (973) 844-7007; Fax: (973) 844-7020; e-mail: gscancer@worldnet.att.net

Registration: Before July 15, 1998, \$495; \$585 after July 15, 1998 (Fee includes all meals, amenities, and materials.)





Society of Nuclear Medicine MIRD Publications...

The Standards in Radionuclide Dose Calculations

The Society of Nuclear Medicine's Medical Internal Radiation Dose Committee serves as the international clearinghouse for data concerning the use of radionuclides in humans. Its two standard reference publications are of special interest to the Health Physics community—

<u>Mird Primer for Absorbed</u> <u>Dose Calculations,</u> Revised Edition

Prepared by Robert Loevinger, Center for Radiation Research, National Bureau of Statistics; Thomas F. Budinger, Donner Laboratory; Evelyn E. Watson, Radiopharmaceutical Internal Dose Center, Oak Ridge Associated Universities

Hardcover, 49.00 (plus shipping and handling), 128 pp.

The *MIRD Primer* is unquestionably the standard reference on absorbed dosage of radiopharmaceuticals in human beings, offering a thorough review of absorbed dose calculations used in the application of radiopharmaceuticals to medical studies. Included are detailed explanations of MIRD schema, examples of the application of the schema, dose estimates, and technical appendices.

MIRD Radionuclide Data and Decay Schemes

David A. Weber, University of California, Davis, Medical Center; Keith E. Eckerman, Oak Ridge National Laboratory; L. Thomas Dillman, Ohio Wesleyan University; Jeffrey C. Ryman, Oak Ridge National Laboratory

Hardcover, 63.00 (plus shipping and handling), 447 pp.

A thorough compilation of decay schemes and output tables for 242 radionuclides. Detailed information on radiation energy and intensity and on emissions in the decay of radionuclides. Supplies the basis for key commonly used computations, such as calculation of absorbed dose, assay of radioactivity, and evaluation of radionuclide purity. Allows assessment of radionuclide decay in

 \blacksquare Clinical imaging \blacksquare RIA \blacksquare Radiation therapy

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Did you know that ICD-9 diagnosis codes must be coded to the highest level of specificity or they will be rejected? Are you aware of the new, revised and deleted CPT codes for nuclear medicine in 1998?

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Ρ

Did you know that a new hospital outpatient prospective payment system called APCs is scheduled for implementation in January 1999?

S

С

How should you modify a CPT code to get paid for 2 procedures on the same day? — and — When is it appropriate?

You will discover the answers to these questions and more at the SNM Reimbursement Seminar for Nuclear Medicine Procedures. This course will include.....



Location and Dates:

Saturday, April 18, 1998 9:30 a.m. to 4:30 p.m. Renaissance Madison Hotel Seattle, Washington Saturday, April 25, 1998 9:30 a.m. to 4:30 p.m. Hotel Sofitel Chicago, Illinois (near Chicago's O'Hare airport) Saturday, May 9, 1998 9:30 a.m. to 4:30 p.m. Westin City Center Washington, D.C.

Speakers:

Becky Cacciatore, CNMT, FSNMTS Kenneth McKusick, MD, FACR, FACNP Michael A. Wilson, MD, FACNP, FRACP

Registration Fees:

Registration Fees are \$225.00 which includes the workbook, case studies, continental breakfast, lunch and an afternoon break. Contact Marie Davis at (703) 708-9000 x250 for additional information or a registration form.

Accreditation Statement:

The Society of Nuclear Medicine is accredited by the Accreditation Council for Continuing Medical Education and will offer a maximum of 6.0 hours in category 1 credits towards the AMA Physician Recognition Award. VOICE has approved 6.0 CEH for this session.

Coding Systems	
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Hospital Billing	
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Use of CPT	
Modifiers	
Special G Codes for PET Imaging	N E W
Medicare's Correct Coding Initiative	
Fraud and Abuse	
Remittance Advice (EOMBs)	
Claims Processing	
Medicare Appeals	
Practice Management	- - - -
Case Studies	

Presentation Summary:

This one day workshop will cover major procedural aspects of nuclear medicine services including proper code selection, claim submission and documentation. Nuclear medicine physicians and technologists, medical office managers, key billing and medical records personnel will learn to properly use the current CPT and ICD-9-CM manuals; use HCPCS II for effective coding and billing; understand third party payments; learn about the new G codes for PET imaging; be updated on the new editions of CPT and relevant Medicare changes; be fully cognizant and knowledgeable on the current Correct Coding Initiative and its implications of fraud and abuse; and review common procedures, fine tune coding skills and reimbursement algorithms.



ANNOUNCING The American Board of Science In Nuclear Medicine 1998 Certification Examination

The 1998 examination will be given Sunday, June 7,1998 in Toronto, Canada in conjunction with the 45th Annual Meeting of the Society of Nuclear Medicine.

The examination is written and consists of two parts —

Part One (3.5 hours) assesses knowledge of basic aspects of Nuclear Medicine Science.

Part Two (2.5 hours) examines in depth the knowledge of a predetermined subspecialty area of the candidate's choice including:

- Nuclear Medicine Physics and Instrumentation
- Nuclear Pharmaceutical Science and Radiochemistry
- Radiation Protection

Completed Applications must be postmarked by March 13, 1998. The examination fee is \$650 (\$550 refundable if you do not qualify).

For applications and more information, please contact: Jim Simpson, Associate Coordinator American Board of Science in Nuclear Medicine c/o The Society of Nuclear Medicine 1850 Samuel Morse Drive, Reston, Virginia 20190-5316 Tel: (703) 708-9000, ext. 227 • Fax: (703) 708-9013

DEADLINE EXTENDED TO APRIL 15, 1998

DUPONT PHARMA/SNM FELLOWSHIP PROGRAM FOR RESEARCH IN NUCLEAR ONCOLOGY

The Society of Nuclear Medicine (SNM) Awards Committee is pleased to announce that a fellowship for \$10,000 is available for July 1, 1998.

The objective of this fellowship is to (1) Encourage physicians to enter the field of Nuclear Oncology and (2) Support clinical research in the area of Technetium Tc 99m labeled compounds for breast imaging as a complement to mammography. Funds can be used to support the research and/or salary of the investigator. Preference will be given to those new to the field of Nuclear Oncology. The fellowship recipient will be announced at the next SNM Annual Meeting, June, 1998 in Toronto Canada. Application deadline: 4/15/1998.

> For more information and an application contact: Society of Nuclear Medicine, SNM Awards Committee, 1850 Samuel Morse Drive, Reston, VA 20190-5316 Phone: 703-708-9000 Fax: 703-708-9015

Positions Available

Clinical Nuclear Medicine/PET Physician

William Beaumont Hospital, Department of Nuclear Medicine is seeking an experienced, board certified Nuclear Physician to direct its clinical PET Facility as well as perform state-of-the-art non-PET nuclear procedures. Applicants should be committed to clinical care and resident education. Previous experience in PET and SPECT procedures required. The department is one of the largest in the country, performing more than 16,000 studies per year spanning the entire gamut of nuclear procedures including gated SPECT, neuroendocrine and antibody imaging. In addition to cardiac, neurologic and oncologic SPECT, the applicant will participate in interpreting non-PET procedures and will also assist in staffing the departments Thyroid Clinic. The department is well equipped with a PET Scanner, on-site cyclotron, 17 gamma cameras (10 SPECT), a nuclear pharmacy and a dedicated physicist. Interested parties should send a letter and CV to Howard Dworkin, MD, Director, Department of Nuclear Medicine, William Beaumont Hospital, 3601 W. 13 Mile Road, Royal Oak, MI 48073-6769 or e-mail: hdworkin@beaumont.edu.

Research Assistant Professor in Physics and Instrumentation

Applications are being accepted for a Research Assistant Professor in Physics and Instrumentation in the Department of Radiology, University of Pennsylvania. This position is in the research track and will not lead to tenure. The successful candidate will be expected to join a research program in developing receptor specific SPECT imaging agents, specifically on radiotracers for in vivo imaging of CNS receptors with emphasis on pharmacokinetic modeling and application in psychiatric patients. Require PhD degree in Physics and Bioengineering. Expertise in SPECT imaging and kineticmodeling is desirable. Duties will include multi-disciplinary research and development of extramural funding. Excellent facilities and collaborative opportunities exist. Interested candidates should send their resume, and the names and mailing and e-mail addresses of three references to: Hank F. Kung, PhD, Department of Radiology, University of Pennsylvania, 3700 Market Street, Room 305, Philadelphia, PA 19104. E-mail: kunghf@sunmac.spect.upenn.edu; http://sunmac.spect.upenn.edu. The University of Pennsylvania is an Equal Opportunity/Affirmative Action Institution.

Position Wanted

ABNM eligible physician, trained in Johns Hopkins with excellent CV and experience in all areas in NM seeking FT job. Dr. Lin (410) 764-7973.

KUWAIT UNIVERSITY • HEALTH SCIENCES CENTER FACULTY OF ALLIED HEALTH SCIENCES & NURSING

Teaching Appointments in Radiologic Sciences

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SALARIES: Professor KD 1670 - 1830, Associate Professor KD 1320 - 1480, Assistant Professor KD 1030 - 1190, Senior Lecturer KD 1260-1410, Lecturer KD 1020-1170 (1 KD + approx. \$3.30).

Other benefits include allowance KD 100 - 300 per month, free furnished accommodations or housing allowance (KD 350 - 450 for Assistant, Associate and Full Professors; or KD 250 or 350 per month for Lecturer/Senior Lectures, depending on martial status), furniture allowance, 60 days paid summer leave and 2 weeks mid-year break, end of service gratuity, round-trip air tickets and conference attendance. Assistant, Associate and Full Professors also receive baggage and freight allowances, children's education allowance and social allowances of KD 65 - 87 per month.

Applicants must be licensed to practice their profession.

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Applications including full curriculum vitae, personal details, qualifications, career history with dates, comprehensive publication list, telephone numbers (and fax if available) and the names and addresses of three references, should be sent to:

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KUWAIT UNIVERSITY • HEALTH SCIENCE CENTER FACULTY OF MEDICINE

Department of Nuclear Medicine

Qualified nuclear medicine physicians with American Board or equivalent high professional qualifications, and a proven research record in the respective specialty are invited to apply for positions at the ranks of Assistant, Associate or Full Professor. Duties include teaching, research and patient care.

Conditions of Appointment

Salaries: Total monthly salaries will be within the following scales according to qualifications and experience (1 KD = approx. US \$3.30). Professor: KD 2585 - 2745 Associate Professor: KD 2290 - 2450 Assistant Professor: KD 2010 - 2170

Other Allowances

Social allowance will be paid in addition to the monthly salary as per university regulations. Housing allowance of KD 350/single and KD 450/with family. Furniture allowance given once of KD 3500/single and KD 4500/with family.

Clinical allowances from the Ministry of Public Health for 10 months a year (i.e., the University academic year, from SEPTEMBER to the end of JUNE) for clinical service commitments as follows: Professor KD 400/-, Associate Professor KD 300/-, Assistant Professor KD 200/-.

Other Benefits

Conference attendance; gratuity; free medical treatment in Kuwait; free round-trip tickets to country of citizenship or permanent residence for self and up to three dependent children; baggage and freight allowance; education fees for a maximum of three children in Kuwait from elementary through high school; no taxation; currency is transferable without restriction; 60 days paid leave.

Please send CV mentioning your fax number, e-mail, addresses of 3 references and their fax numbers and copies of qualifications to:

> Abdelhamid H. Elgazzar, MD Professor and Chairman Department of Nuclear Medicine Faculty of Medicine Kuwait University P.O. Box 24923 13110 Safat KUWAIT Fax: (965) 533 8936

POSTDOCTORAL FELLOWSHIPS IN THE RADIATION SCIENCES Department of Environmental and Occupational Health Graduate School of Public Health University of Pittsburgh

The University of Pittsburgh has been designated as a unique academic "Center of Excellence" to provide Postdoctoral Fellowships for research and study in the Radiation Sciences. The goal of this training Program, supported by the U.S. Department of Energy, is to replenish the national pool of doctoral-level, multidisciplinary radiation scientists in governmental, academic and industrial research positions focused on the

health effects from ionizing radiation exposure.

The Program offers a two year sequence including course work, laboratory rotations, collequia and seminars, a radiation epidemiology workshop and one year of field experience at domestic or foreign sites of interest to the Department of Energy. Areas of concentration include: radiation epidemiology and biostatistics; health physics and radiobiology; biological dosimetry, biomarker development and application; and occupations medicine.

Applicants should have a recent doctoral degree (Ph.D., M.D., D.Sc., Dr.P.H.) in the natural or health-related sciences. M.D.s may integrate Program training with a departmental Occupational Medicine Residency.

A University-supported third year may be arranged if necessary. A stipend of \$33,500 for the first year, \$36,000 for the second year, research expenses, health insurance and annual travel allowances to and from the research sites are provided. Fellows must be U.S. citizens or permanent residents.

For additional information or application materials contact: Niel Wald, M.D., Program Director, A744 Crabtree Hall, Graduate School of Public Health, 130 Desoto Street, Pittsburgh, PA 15261; or telephone (412) 624-3155, fax (412) 624-3040, or e-mail wald@vms.cis.pitt.edu.

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In accordance with Canadian immigration requirements, preference will be given to Canadian citizens.

Please submit your CV and the names of three (3) references by March 21, 1998 to: Dr. Francois Raymond, Chief of Nuclear Medicine, M.D., FRCPC, Ottawa General Hospital, 501 Smyth Road, Ottawa, Ontario, K1H 8L6, Canada. Fax: (613) 737-8141.





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