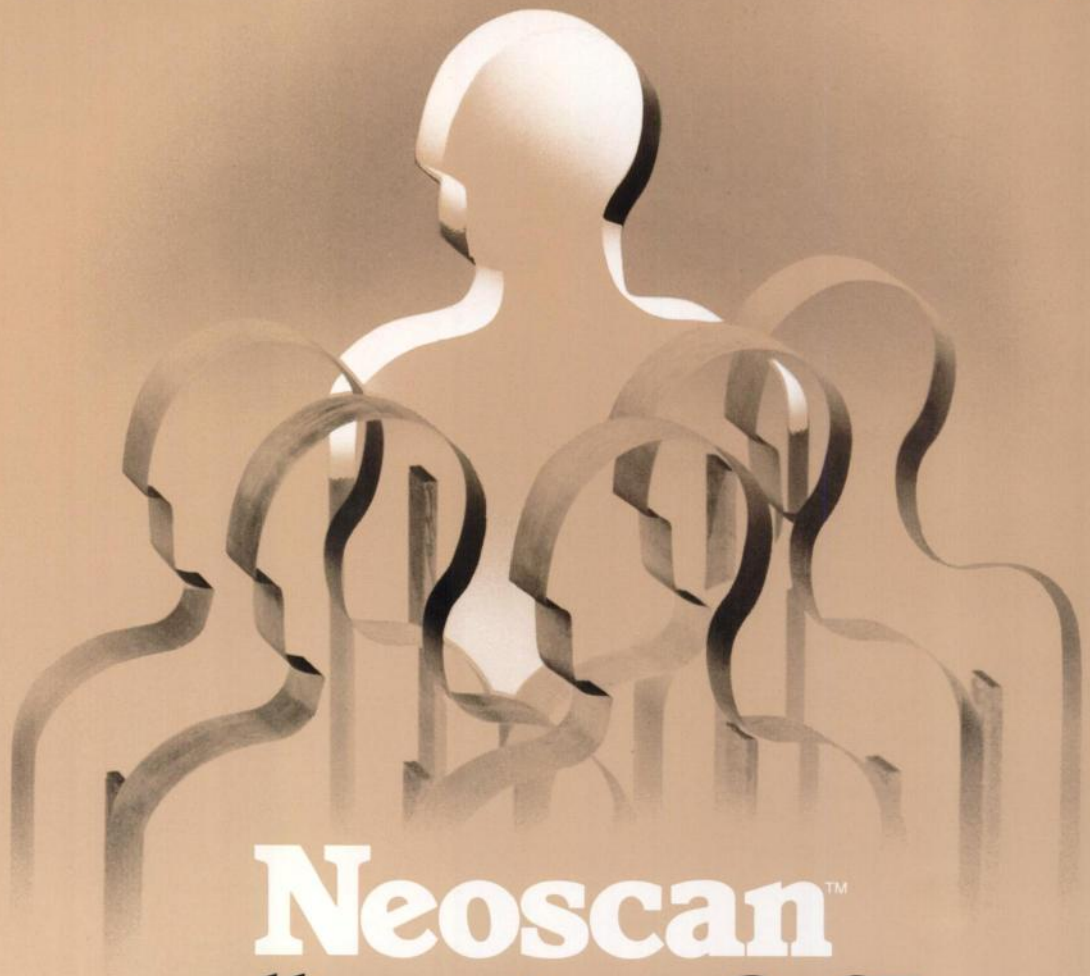
When nuclear medicine discusses gallium imaging, one name will keep coming up...



Neoscan™
gallium citrate Ga 67

from medi+physics™

NEOSCAN MEANS gallium citrate Ga 67 from Medi-Physics, Inc. Neoscan can aid in demonstrating the presence and extent of Hodgkin's disease, lymphoma *and* bronchogenic carcinoma. Positive uptake in the absence of prior symptoms warrants follow-up as an indication of a potential disease state.

NEOSCAN MEANS a gallium citrate Ga 67 that is produced by MPI on both the East and West Coasts and is available from 6 locations across the country for easy access when you need it. Neoscan is calibrated twice weekly in two convenient sizes: 3.0mCi and 13.2mCi.

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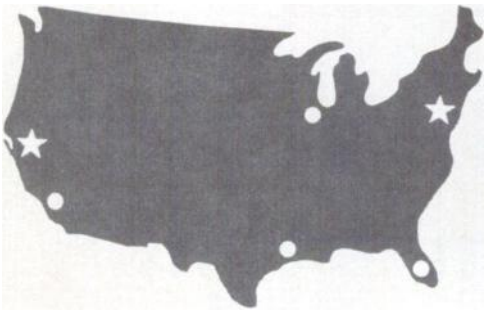

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Neoscan™

gallium citrate Ga 67

For complete product information, consult the package insert, a summary of which follows:

DESCRIPTION: Neoscan for diagnostic use is supplied as a sterile, apyrogenic aqueous solution for intravenous injection. Each milliliter of the solution contains 2 millicuries of gallium Ga 67 at calibration time, no-carrier-added, 2.5% sodium citrate, and 1% benzyl alcohol as a preservative. The pH is between 4.5-7.5. Gallium Ga 67, with a half-life of 78.1 hours, is cyclotron produced by the proton irradiation of zinc Zn 68-enriched zinc oxide. The radionuclidic composition, at calibration time, is not less than 98.9% of the total activity from gallium 67 with less than 1% of the total radioactivity due to gallium 66 and with zinc 65 and other radiocontaminants contributing less than 0.1% of the total activity.

INDICATIONS AND USAGE: Neoscan may be useful to demonstrate the presence and extent of Hodgkin's disease, lymphomas, and bronchogenic carcinoma. Positive gallium Ga 67 uptake in the absence of prior symptoms warrants follow-up as an indication of a potential disease state.

CONTRAINDICATIONS: None known.

WARNINGS: This radiopharmaceutical should not be administered to children or to patients who are pregnant or to nursing mothers unless the information to be gained outweighs the potential hazards. Ideally, examinations using radiopharmaceuticals, especially those elective in nature, in women of child-bearing capability should be performed during the first few (approximately 10) days following the onset of menses.

PRECAUTIONS: A thorough knowledge of the normal distribution of intravenously administered gallium citrate Ga 67 is essential in order to accurately interpret pathologic studies. The finding of an abnormal gallium concentration usually implies the existence of underlying pathology, but further diagnostic studies should be done to distinguish benign from malignant lesions. Neoscan is intended for use as an adjunct in the diagnosis of certain neoplasms. Negative results do not preclude the presence of disease.

Gallium citrate Ga 67 as well as other radioactive drugs, must be handled with care. Appropriate safety measures should be used to minimize radiation exposure to clinical personnel and to patients, consistent with proper patient management.

No long-term animal studies have been performed to evaluate carcinogenic potential.

Adequate reproduction studies have not been performed in animals to determine whether this drug affects fertility in males or females, has teratogenic potential, or has other adverse effects on the fetus. Gallium citrate Ga 67 should be used in pregnant women only when clearly needed.

Gallium citrate Ga 67 has been found to accumulate in breast milk and should not be used in nursing mothers.

Safety and effectiveness in children have not been established.

ADVERSE REACTIONS: No adverse reactions have been reported with the use of Neoscan at this time.

DOSAGE AND ADMINISTRATION: The recommended adult (70 kg) dose is 2-5 millicuries. Neoscan is intended for intravenous administration only. The patient dose should be measured by a suitable radioactivity calibration system immediately prior to administration.

Studies indicate the optimal tumor-to-background concentration ratios are often obtained about 48 hours after administration. However, considerable biological variability may occur in individuals, and acceptable images may be obtained as early as 6 hours and as late as 120 hours after injection.

Approximately 10% of the administered dose is excreted in the feces during the first week after injection. Daily laxatives and/or enemas are recommended from the first day of injection until the final images are obtained in order to cleanse the bowel of radioactive material and minimize the possibility of false positive studies.

Radiopharmaceuticals should be used only by persons who are qualified by training and experience 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.

HOW SUPPLIED: Neoscan is supplied as a no-carrier-added sterile apyrogenic aqueous solution for intravenous use. Each milliliter contains 2 mCi ± 10% gallium Ga 67 at the time of calibration with 2.5% sodium citrate. Benzyl alcohol 1% is present as a preservative. The pH is between 4.5-7.5.

The contents of the vial are radioactive and adequate shielding and handling precautions must be maintained.

When you think of gallium imaging, think of Neoscan™ from

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Technetium 99m

HSA Unit Dose

Technetium Tc 99m Human Serum Albumin Reagent Kit

Ten sterile unitdose reaction vials each containing 7 mg human serum albumin and 0.08 mg stannous tartrate, lyophilized. Hydrochloric acid was added prior to lyophilization for pH adjustment.

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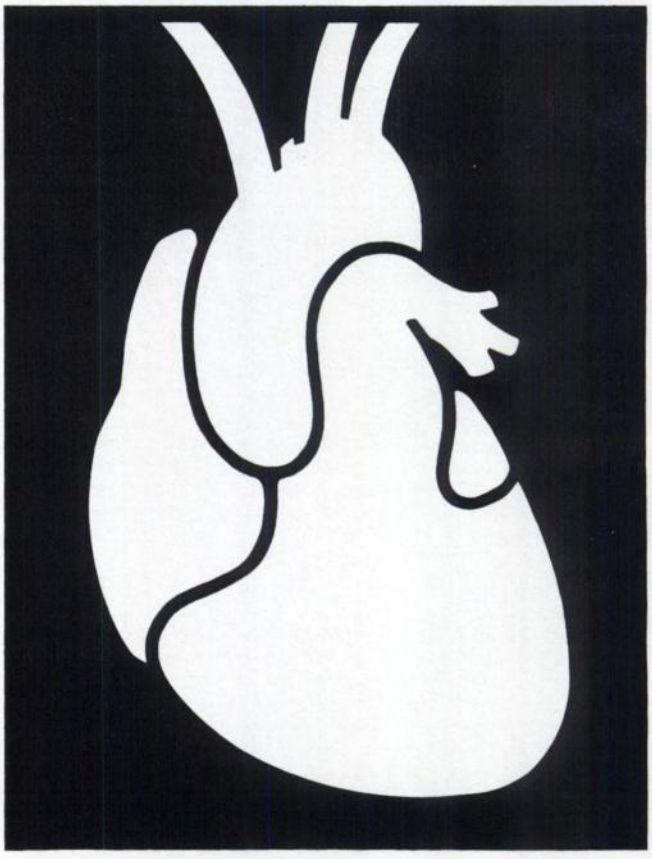
Stable formulation: Uses stannous tartrate, which is more stable to air oxidation than stannous chloride.

Free from extraneous constituents: Following aseptic preparation, final product contains HSA, water, stannous tartrate, and sodium chloride.

This kit is approved for use by persons licensed by the U.S. Nuclear Regulatory Commission pursuant to Sec. 35.14 and Sec. 35.100 Group III of 10 CFR Part 35 or under equivalent license of Agreement States.



For ordering, customer service, and technical information on HSA (Product Number UC-HA-81) call toll-free: (800) 431-1146. In New York State call: (914) 351-2131.

Union Carbide Corporation
Medical Products Division
Nuclear Products
Tuxedo, New York 10987

(OPPOSITE PAGE: PRODUCT INFORMATION)

CintiChem®

TECHNETIUM 99m

HSA Unit Dose Kit

TECHNETIUM Tc 99m HUMAN SERUM ALBUMIN UNIT DOSE REAGENT KIT

DIAGNOSTIC— FOR INTRAVENOUS USE

description

The kit consists of 10 unit dose reaction vials each containing a lyophilized mixture of 7 mg human serum albumin and 0.08 mg stannous tartrate. Hydrochloric acid was added prior to lyophilization for pH adjustment. All components are sterile and pyrogen-free. When a solution of sterile and pyrogen-free Sodium Pertechnetate Tc 99m in isotonic saline is mixed with these components, following the instructions provided with the kit, Technetium Tc 99m Human Serum Albumin is formed, with a labeling efficiency of 90% or greater. The product so derived has a pH of 2.5-3 and is intended for intravenous injection. The precise structure of Technetium Tc 99m Human Serum Albumin is not known at this time. The Normal Human Serum Albumin in this preparation was nonreactive when tested for hepatitis B surface antigen (HB_SAg) by radioimmunoassay.

physical characteristics

Technetium Tc 99m decays by isomeric transition with a physical half-life of 6.03 hours[1]. Photons that are useful for detection and imaging studies are listed in Table I.

table I. principal radiation emission data

radiation	mean % / disintegration	mean energy (keV)
Gamma-2	87.9	140.5

[1]Dillman, L.T. and Von der Lage, F.C., Radionuclide Decay Schemes and Nuclear Parameters for Use in Radiation-Dose Estimation. MIRD Pamphlet No. 10, p. 62, 1975.

external radiation

The specific gamma ray constant for Technetium Tc 99m is 0.8 R/millicurie-hour at 1 cm. The first half-value thickness of lead (Pb) for Technetium Tc 99m is 0.2 mm. A range of values for the relative attenuation of the radiation emitted by this radionuclide that results from interposition of various thicknesses of Pb is shown in Table II. For example, the use of 2.7 mm of Pb will decrease the external radiation exposure by a factor of 1,000.

table II. radiation attenuation by lead shielding

shield thickness (Pb) mm	coefficient of attenuation
0.2	0.5
0.95	10^{-1}
1.8	10^{-2}
2.7	10^{-3}
3.6	10^{-4}
4.5	10^{-5}

To correct for physical decay of this radionuclide, the fractions that remain at selected intervals relative to the time of calibration are shown in Table III.

table III. physical decay chart:
Tc 99m, half-life 6.03 hours

hours	fraction remaining	hours	fraction remaining
0*	1.000	7	.447
1	.891	8	.399
2	.795	9	.355
3	.708	10	.317
4	.631	11	.282
5	.563	12	.252
6	.502		

*Calibration Time. (Time of Preparation)

clinical pharmacology

Normal Human Serum Albumin, being a normal component of blood, leaves the vascular space at a rate slow enough to permit imaging procedures utilizing radioactive tags. Technetium Tc 99m Human Serum Albumin does not rapidly leak from the vascular space, nor is there significant accumulation in organs other than those of excretion, the kidney and bladder. Therefore, the vascular system may be imaged with a minimum of background and organ interference. In humans, a two-component blood clearance rate is observed, the T 1/2 slow component ranging from 10 to 16 hours. Twenty-four hour urine clearance averaged 39%.

indications and usage

Technetium Tc 99m Human Serum Albumin is used as an agent for imaging the heart blood pool and to assist in the detection of pericardial effusion and ventricular aneurysm.

contraindications

The use of Technetium Tc 99m Human Serum Albumin is contraindicated in persons with a history of hypersensitivity reactions to products containing human serum albumin.

warnings

The contents of the kit are not radioactive. However, after the Sodium Pertechnetate Tc 99m is added, adequate shielding of the final preparation must be maintained.

This radiopharmaceutical preparation should not be administered to children or to patients who are pregnant or to nursing mothers unless the expected benefits to be gained outweigh the potential hazards.

Ideally, examinations using radiopharmaceuticals, especially those elective in nature, of women of childbearing capability should be performed during the first few (approximately 10) days following the onset of menses.

precautions

The components of the kit are sterile and pyrogen-free. It is essential that the user follows the directions carefully and adheres to strict aseptic procedures during preparation of the radiodiagnostic.

Technetium Tc 99m Human Serum Albumin must not be used after three hours from the time of formulation.

Adequate reproduction studies have not been performed in animals to determine whether this drug affects fertility in males or females, has teratogenic potential, or has other adverse effects on the fetus. Technetium Tc 99m Human Serum Albumin should be used in pregnant women only when clearly needed.

It is not known whether this drug is excreted in human milk. As a general rule, nursing should not be undertaken while a patient is on a drug since many drugs are excreted in human milk.

Safety and effectiveness in children have not been established.

Technetium Tc 99m Human Serum Albumin, as well as other radioactive drugs, must be handled with care and appropriate safety measures should be used to minimize external radiation exposure to clinical personnel. Also, care should be taken to minimize radiation exposure to patients, consistent with proper patient management.

The labeling reactions involved in preparing the agent depend on maintaining the tin in the reduced state. Any oxidant present in the Sodium Pertechnetate Tc 99m supply may thus adversely affect the quality of the prepared agent. Hence, Sodium Pertechnetate Tc 99m containing oxidants, or other additives, should not be employed without first demonstrating that it is without adverse effect on the properties of the resulting agent.

adverse reactions

Hypersensitivity reactions are possible whenever protein-containing materials such as Technetium Tc 99m labeled human serum albumin are used in man. Epinephrine, antihistamines and corticosteroid agents should be available for use.

dosage and administration

The suggested intravenous dose used in the average patient (70 kg) is 3-5 millicuries of Technetium Tc 99m Human Serum Albumin.

Each dose should be measured by a suitable radioactivity calibration system immediately prior to administration.

Radiopharmaceuticals should be used only by physicians who are qualified by training and experience 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.

radiation dosimetry

The estimated absorbed radiation doses[2] to an average patient (70 kg) from an intravenous injection of a maximum dose of 5 millicuries of Technetium Tc 99m Human Serum Albumin are shown in Table IV.

table IV. estimated absorbed dose

tissue	absorbed radiation dose (rads/5 mCi)
Brain	0.047
Marrow	0.076
Kidneys	0.063
Bladder	0.166
Ovaries	0.082
Testes	0.079
Total Body	0.073

[2]Method of Calculation: A Schema for Absorbed-Dose Calculations for Biologically Distributed Radionuclides. Supplement No. 1, MIRD Pamphlet No. 1, *J. Nucl. Med.*, p. 7, 1968.

how supplied

kit contents

10 STERILE UNIT DOSE REACTION VIALS (5 cc, gold aluminum overseal), each containing 7 mg human serum albumin and 0.08 mg stannous tartrate, lyophilized. Hydrochloric acid was added prior to lyophilization for pH adjustment.

20 PRESSURE-SENSITIVE LABELS for final Technetium Tc 99m Human Serum Albumin preparation.

1 PACKAGE INSERT.

storage

Store kit contents in refrigerator (2-8°C). Do not freeze.

disposal

The residual materials may be discarded in ordinary trash provided the vials and syringes read background with an appropriate low range survey meter. It is suggested that all identifying labels be destroyed before discarding.

directions

The following directions must be carefully followed for optimum preparation of the Technetium Tc 99m Human Serum Albumin.

1. Aseptically swab rubber septum of sterile vial containing the sterile, lyophilized human serum albumin.
2. Aseptically inject 0.5 ml of Sterile Water for Injection; withdraw an equal volume of air.
3. Mix contents by swirling.
4. Place vial in appropriate lead shield.*

*Use Unit Dose vial shield, Catalog No. 17500501.

5. Aseptically swab rubber septum of shielded vial.
6. Aseptically inject 1.3 ml of Sodium Pertechnetate Tc 99m having a maximum activity of 30 millicurie/ml into the vial; withdraw equal volume of air.
7. Mix contents of vial by gentle shaking for 10 seconds.
8. Affix pressure-sensitive label to shielded vial.
9. Allow to stand for 20 minutes after mixing to allow maximum tagging.
10. The TECHNETIUM 99m HSA is ready for use.
11. Mix contents of vial (step 7) prior to withdrawing patient dose.
12. Mix contents of syringe by repeated inversion immediately prior to injection.
13. Maintain adequate shielding of the radioactive preparation.
14. Do not use the preparation after 3 hours from the time of formulation.

The radioactivity concentration of the final Technetium Tc 99m Human Serum Albumin preparation may be calculated by using the following formula:

C = A/V where C equals radioactivity concentration of the preparation (millicuries/ml).

A = Tc 99m activity added to the reaction mixture vessel (millicuries).

V = Total volume in the final mixture (ml).

This kit is approved for use by persons licensed by the U. S. Nuclear Regulatory Commission pursuant to Sec. 35.14 and Sec. 35.100 Group III of 10 CFR Part 35 or under equivalent license of Agreement States.

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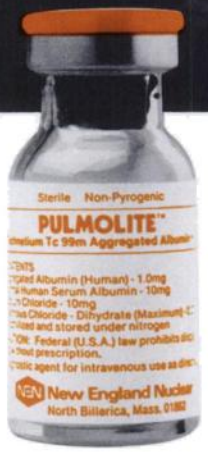

Indications and Usage: Technetium Tc 99m aggregated albumin is indicated as a lung imaging agent to be used as an adjunct in the evaluation of pulmonary perfusion.

Contraindications: Technetium Tc 99m aggregated albumin should not be administered to patients with severe pulmonary hypertension.

The use of Tc 99m aggregated albumin is contraindicated in persons with a history of hypersensitivity reactions to products containing human serum albumin.

Warnings: The possibility of allergic reactions should be considered in patients who receive multiple doses.

Theoretically, the intravenous administration of particulate material such as aggregated albumin imposes a temporary small mechanical impediment to blood flow. While this effect is probably physiologically insignificant in most patients the administration of aggregated albumin is possibly hazardous in acute cor pulmonale and other states of severely impaired pulmonary blood flow.

This radiopharmaceutical preparation should not be administered to children or to pregnant or lactating women unless the expected benefits to be gained outweigh the potential risks.

Ideally, examinations using radiopharmaceuticals, especially those elective in nature, of a woman of childbearing capability should be performed during the first few (approximately 10) days following the onset of menses.

Precautions: In cases of right-to-left cardiac shunt, additional risk may exist due to the rapid entry of aggregated albumin into the systemic circulation.

The contents of the kit are not radioactive. However, after the sodium pertechnetate Tc 99m is added, adequate shielding of the final preparation must be maintained.

The labeling reactions involved in preparing the agent depend on maintaining tin in the reduced state. Any oxidant present in the sodium pertechnetate Tc 99m supply may thus adversely affect the quality of the prepared agent. Hence, sodium pertechnetate Tc 99m containing oxidants, or other additives, should not be employed without first demonstrating that it is without adverse effect on the properties of the resulting agent.

The contents of the vial are sterile and non-pyrogenic. It is essential that the user follow the directions carefully and adhere to strict aseptic procedures during preparation of the radiodiagnostic.

Technetium Tc 99m aggregated albumin is physically unstable and as such the particles will settle with time. Failure to mix the vial contents adequately before use may result in non-uniform distribution of radioactivity.

It is also recommended that, because of the increasing probability of agglomeration with aging, a batch of Technetium Tc 99m aggregated albumin not be used after eight hours from the time of reconstitution. Refrigerate at 2° to 8°C after reconstitution. If blood is withdrawn into the syringe, unnecessary delay prior to injection may result in clot formation in situ.

The contents of the vial are under a nitrogen atmosphere and should be protected from air. Do not use if clumping or foaming of the contents is observed.

Adequate reproduction studies have not been performed in animals to determine whether this drug affects fertility in males or females, has teratogenic potential, or has other adverse effects on the fetus. Technetium Tc 99m aggregated albumin should be used in pregnant women only when clearly needed.

It is not known whether this drug is excreted in human milk. As a general rule, nursing should not be undertaken while a patient is on a drug since many drugs are excreted in human milk.

Safety and effectiveness in children have not been established.

As in the use of any radioactive material, care should be taken to minimize radiation exposure to the patient, consistent with proper management, and to insure minimum radiation exposure to the occupational worker.

Radiopharmaceuticals should be used only by physicians who are qualified by 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.

Adverse Reactions: The literature contains reports of deaths occurring after the administration of aggregated albumin to patients with pre-existing severe pulmonary hypertension. Instances of hemodynamic or idiosyncratic reactions to preparations of Tc 99m-labeled aggregated albumin have been reported.

Hypersensitivity reactions are possible whenever protein-containing materials such as Tc 99m-labeled aggregated albumin are used in man. Epinephrine, antihistamines and corticosteroid agents should be available for use.

Dosage and Administration: The recommended intravenous dose range for the average patient (70kg) is 1 to 4 millicuries. The volume of the dose may vary from 0.2 to 1.3ml.

The recommended number of aggregated albumin particles to be administered per dose is 200,000-700,000 with the suggested number being approximately 350,000.

For ease and accuracy in dispensing the prepared agent, it is recommended that prior to reconstitution, concentrated sodium pertechnetate Tc 99m be further diluted to a volume of 8ml with fresh, preservative-free sodium chloride injection (U.S.P.).

How Supplied: PULMOLITE™ Technetium Tc 99m Aggregated Albumin Kit is supplied in kits of five (5) or thirty (30) vials, sterile and non-pyrogenic, each vial containing in lyophilized form:

Aggregated albumin (human)-1.0mg
Normal human serum albumin-10mg
Sodium chloride-10mg
Stannous chloride dihydrate, maximum-0.07mg

Each vial contains 3.6-6.5 x 10^6 aggregated albumin particles.

PULMOLITE contains no preservative; after reconstitution the shielded vial should be stored at 2° to 8°C.

Included in each five (5) vial kit is one (1) package insert and six (6) radiation labels. Included in each thirty (30) vial kit is one (1) package insert and thirty-six (36) radiation labels.

Cat. No. NRP-415

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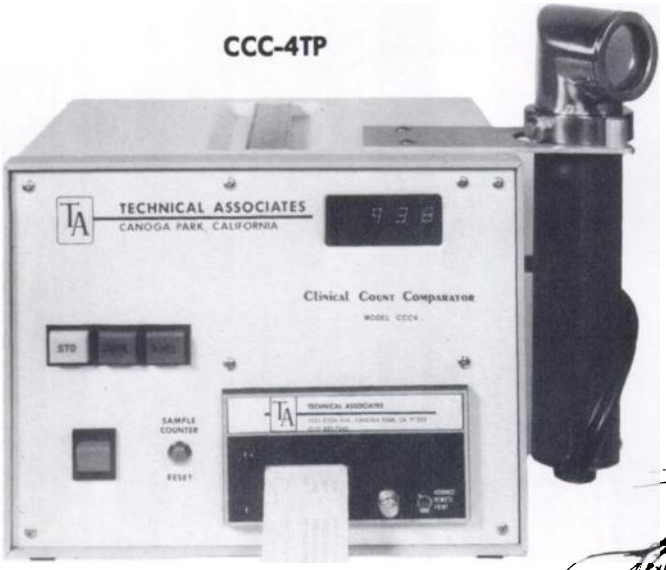

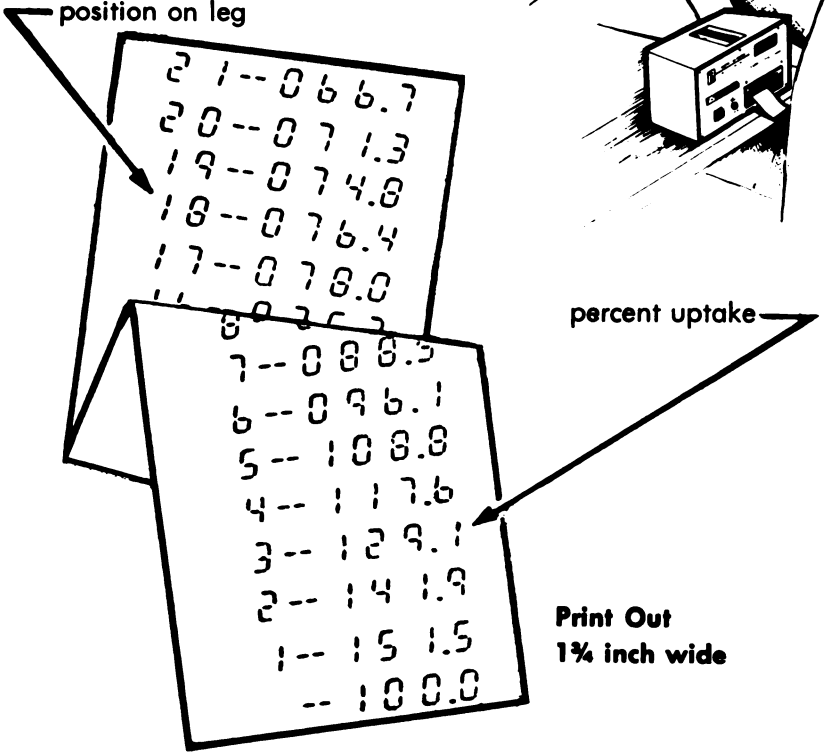

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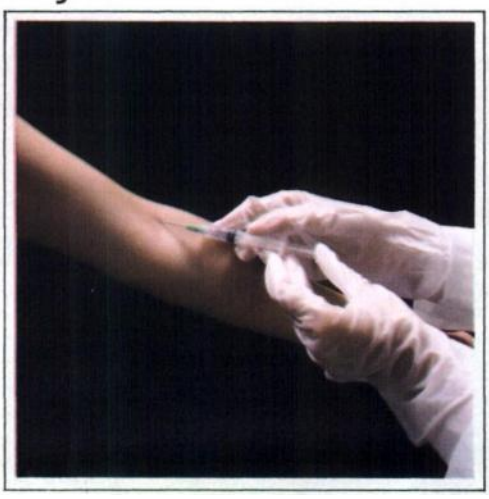
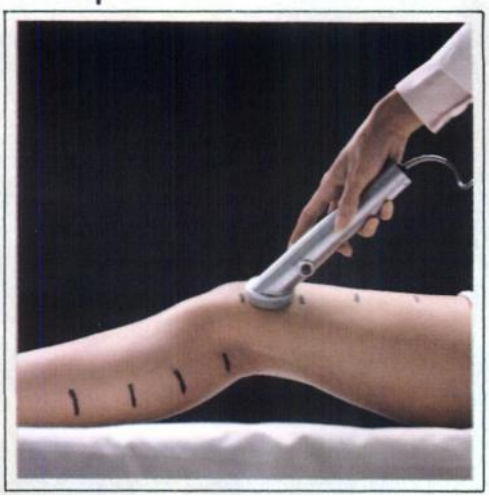
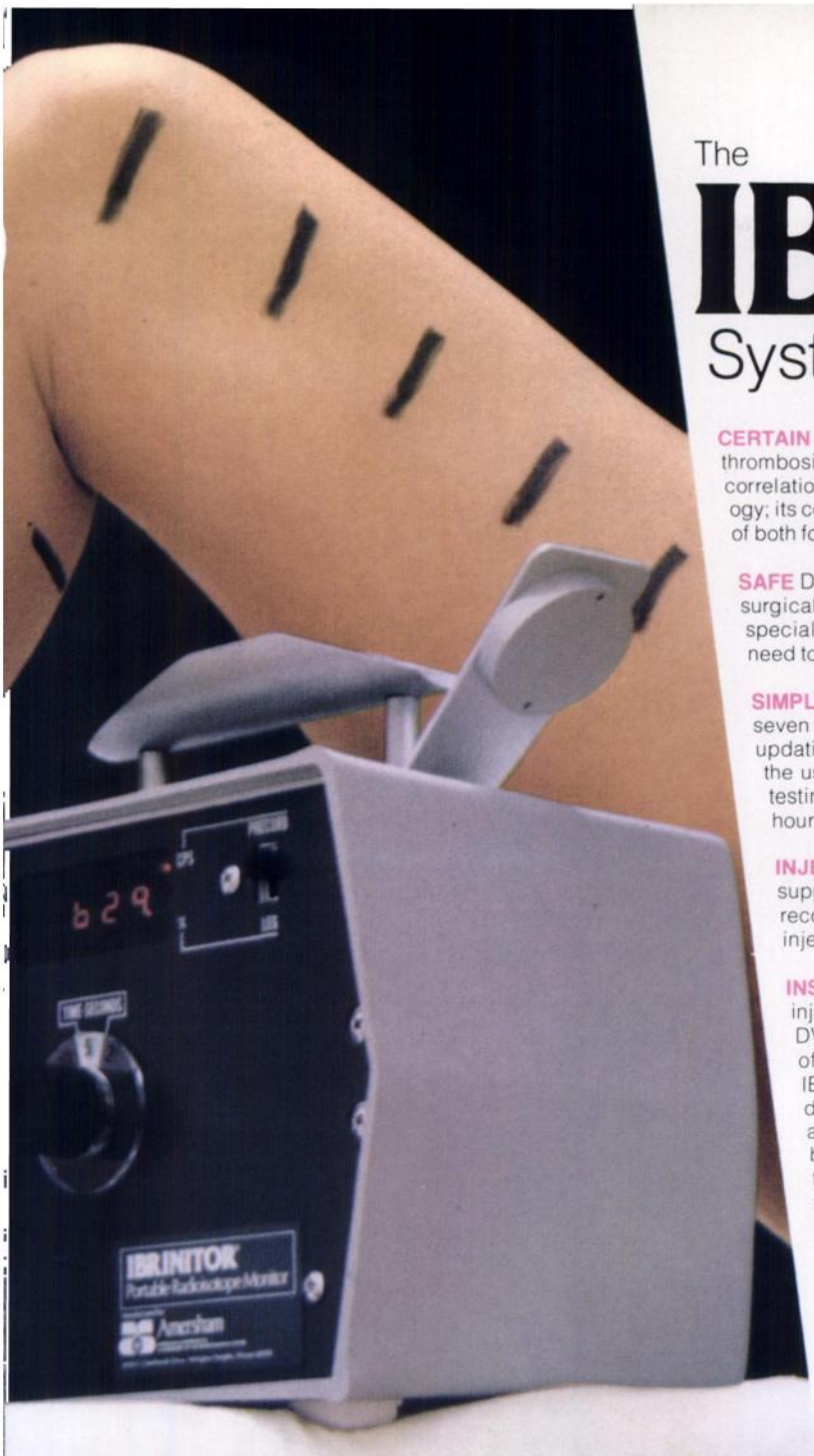


Inspect





The

IBRIN System

IBRIN®
Radionuclide-Labeled
(^{125}I) Fibrinogen (Human)
IBRINITOR™
Portable Radioisotope Monitor

CERTAIN The diagnostic accuracy of IBRIN for the detection of deep-vein thrombosis (DVT) has been confirmed in over 100 studies which show a 92% correlation with venography. IBRIN actively participates in thrombus physiology; its consistent clottability insures bioactivity and allows accurate detection of both forming and established thrombi.

SAFE DVT monitoring with the IBRIN System can be performed on medical, surgical and orthopedic patients. There is no need to move the patient to a special procedure area. The IBRIN System of DVT detection reduces the need to subject the patient to radiopaque venography.

SIMPLE IBRIN has a long *in-vivo* half-life, permitting monitoring for up to seven days without additional injections. Serial monitoring allows constant updating of the patient's status. IBRIN emits low energy radiation enabling the use of a lightweight isotope monitor such as the IBRINITOR for rapid testing of a large number of patients. Monitoring can begin within three hours after injection and results can be confirmed within twenty-four hours.

INJECT IBRIN, a Radionuclide-Labeled (^{125}I) Fibrinogen (Human), is supplied freeze-dried for convenient storage and extended stability. It is reconstituted immediately prior to injection. The patient is intravenously injected with 100μCi of IBRIN prior to testing.

INSPECT Initial monitoring can be performed three hours after the IBRIN injection. The IBRINITOR is specifically designed and built for detecting DVT. Sophisticated electronic design assures reliable accumulation of statistically valid data and eliminates most operator error. The IBRINITOR has a continuous stage design that requires all the correct data in the correct order before giving results. A digital data display and built-in printout insure ease and accuracy of data collection. Push button controls on the detector probe are provided for quick, accurate testing. The probe design includes an angled detector head to facilitate positioning for maximum operator convenience and patient comfort. The IBRINITOR is powered by rechargable Ni-Cd batteries. A source is provided for calibration convenience and the complete unit weighs less than eight pounds.

DETECT The IBRIN System includes a patient data sheet which provides a convenient display of printout tape and graphical representation of data for the physician's interpretation and diagnosis.

We will be glad to help you explain the benefits of the IBRIN System to your surgical staff. Write or phone Amersham for complete details.

See following page for brief summary of package insert.

Detect

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In Canada
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416/842-2720 or 800/261-5061 (Toll free)

C777112

The

IBRIN System

IBRIN®
Radionuclide-Labeled
(^{125}I) Fibrinogen (Human)
IBRINITOR®
Portable Radioisotope Monitor

INDICATIONS
IBRIN is indicated for use in prospective studies for the early detection and subsequent monitoring of developing deep-vein thrombosis and in diagnostic studies for the detection of established thrombosis in the legs.

A. The IBRIN [Radionuclide-Labeled (^{125}I) Fibrinogen (Human)] test is indicated in patients with signs and/or symptoms suggestive of deep-vein thrombosis with or without associated pulmonary embolism or in patients with pulmonary embolism, with or without evidence of peripheral deep-vein thrombosis. In patients with established, old or "inactive" thrombi, the test will be positive only if radionuclide-labeled fibrin deposition occurs in a sufficient quantity to allow detection. Its use is not contraindicated in patients on anticoagulants.

B. The IBRIN [Radionuclide-Labeled (^{125}I) Fibrinogen (Human)] test is indicated for the detection of thrombus formation in patients undergoing major orthopedic or other surgical procedures, myocardial infarction, pulmonary disease, malignant disease and other medical conditions known to predispose to thromboembolism.

CONTRAINDICATIONS
There are no known contraindications to the use of IBRIN. However, it should be noted that the iodides given to block the uptake of ^{125}I by the thyroid gland are contraindicated in patients with a known sensitivity to the iodides.

WARNINGS
This radiopharmaceutical should not be administered to patients under 18 years of age, to patients who are pregnant, or to patients who are lactating, unless the information to be gained outweighs the potential risk.

Ideally, examinations using radiopharmaceuticals, especially those elective in nature, of a woman of child bearing capability should be performed during the first few (approximately 10) days following the onset of menses. Nursing mothers should substitute formula feeding after the administration of Fibrinogen ^{125}I.

Extraordinary precautions have been taken in the preparation of IBRIN [Radionuclide-Labeled (^{125}I) Fibrinogen (Human)] to eliminate the possible transmission of hepatitis. Nevertheless, the remote risk of hepatitis associated with the administration of Radionuclide-Labeled (^{125}I) Fibrinogen (Human) cannot be entirely eliminated. The finding of viral hepatitis in any patient up to six months after the administration of IBRIN should be reported to Amersham for further evaluation, since there are numerous possible sources of hepatitis infection.

PRECAUTIONS
Care should be taken to insure minimum radiation exposure to the patient, consistent with proper patient management, and to insure minimum radiation exposure to occupational workers.

This drug contains radioactive materials which must be handled only by qualified personnel in conformity with Nuclear Regulatory Commission, agreement state, or other appropriate government regulations. Care must be taken to avoid excessive exposure to its radiation. Shielding or equivalent radiation protective measures must be used.

This product is prepared from units of human plasma which have been tested using RIA methods and found non-reactive for Hepatitis B surface antigen. Approved detection methods are not sensitive enough to detect all infectious units of blood or all possible cases of hepatitis. However, IBRIN has been prepared from single donor plasma and has been injected into recipients without incidence of fibrinogen related Hepatitis B as evidenced by periodic physical examination and laboratory testing (liver profile, CBC, and Hepatitis B surface antigen and antibody by radioimmunoassay) of the recipients.

There are a number of clinical circumstances requiring consideration in the interpretation of the test results. (See complete Package Insert.)

Fibrinogen ^{125}I scanning should preferably be performed prior to venography if both procedures are contemplated, since venography may cause increases in count rate making interpretation of post-venography monitoring data difficult.

Adequate reproduction studies on animals have not been performed to determine whether this drug affects fertility in males or females, has teratogenic potential, or has other adverse effects on the fetus. Radionuclide-Labeled (^{125}I) Fibrinogen (Human) should be used in pregnant women only when clearly needed.

ADVERSE REACTIONS
There has been no reported incidence of allergic or anaphylactic reactions following the intravenous administration of IBRIN.

Amersham
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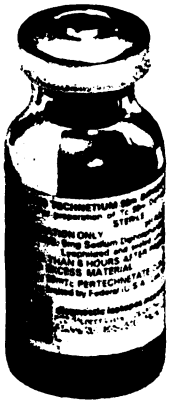
- 10 vials per kit



The implications are obvious to the expert. You get consistently better imaging and in vivo stability, combined with ease of handling and the ability to store products for long periods without refrigeration.

Of course the proof is in the using. We invite you to try our product at no obligation. Just write to us at the address below, and we'll send you a sample of any of our diagnostic kits for your use and evaluation.

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See adjacent page for brief summary of package insert.

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Where existing computer facilities are available, a basic TASC-5 can be interfaced with any RS-232C compatible input. In the event a computer terminal is not available, a tape recorder provides for data storage.

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The Helmet is Harshaw's unique new probe holder for the advanced TASC-5 Computerized rCBF Analysis System. The clear acrylic helmet provides good visibility when adjusting the probes and eliminates the problem of probe placement duplication for serial studies.

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HARSHAW

*Walter D. Obrist, et al. STROKE, Vol. 6, May-June, 1975, pp. 245-256.

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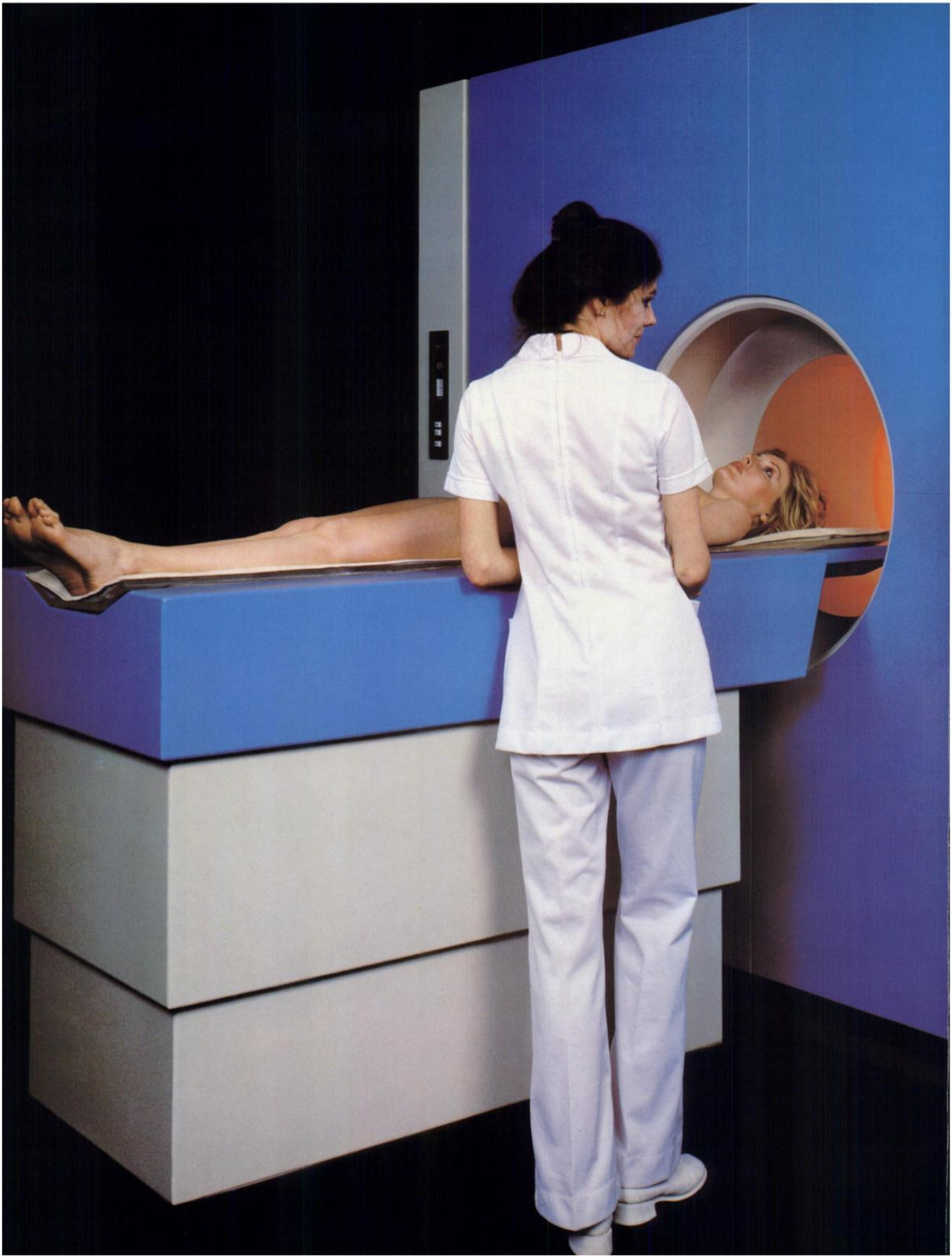
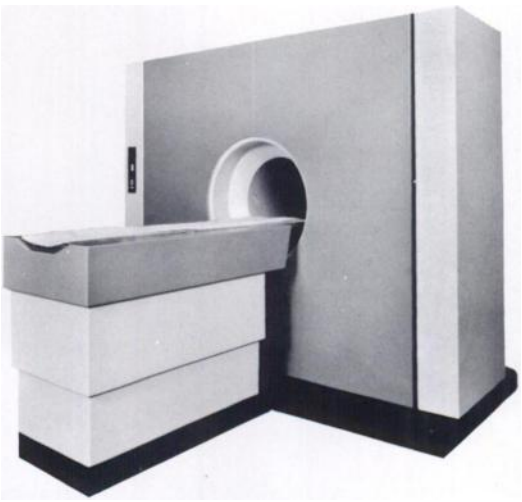
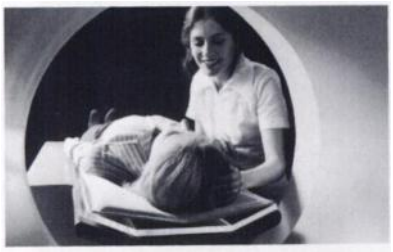


The UNION CARBIDE Radionuclide Body Function Imager:

A Powerful New Way to Look Into Life.



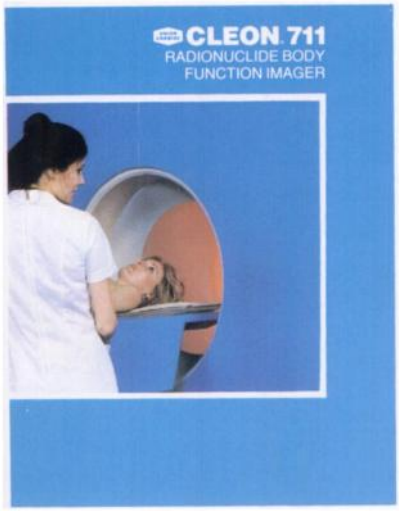
The CLEON 711 Radionuclide Body Function Imager utilizes accepted levels of conventional radiopharmaceuticals to produce computer-reconstructed, transaxial images of radioisotope concentrations in body sections. The system has been designed to provide clinical diagnostic information for early detection of organ function abnormalities and pathological changes, before anatomical changes are present.



The system can operate in a single or dual isotope mode. In the dual isotope mode there is independent data acquisition, reconstruction, and display for each isotope. There is also capability, using software options, to do array manipulations with the images from each isotope. Parameters are set for each slice – including slice thickness, scan time, radionuclide, and photon energy.

Both the Polaroid camera and sheet film can be exposed simultaneously, or the Polaroid camera can be inhibited. Up to four images can be recorded on each sheet film format.

Each slice is automatically recorded on diskette at the end of each scan and can be played back at the operator's console. Once a slice is reconstructed, it can be further manipulated using various degrees of background subtraction, upper and lower cutoff, and contrast enhancement, and recorded on film. Meanwhile, the system continues to gather data from subsequent slices. Image data stored on diskette can be played back and further manipulated at the requesting physician's convenience.



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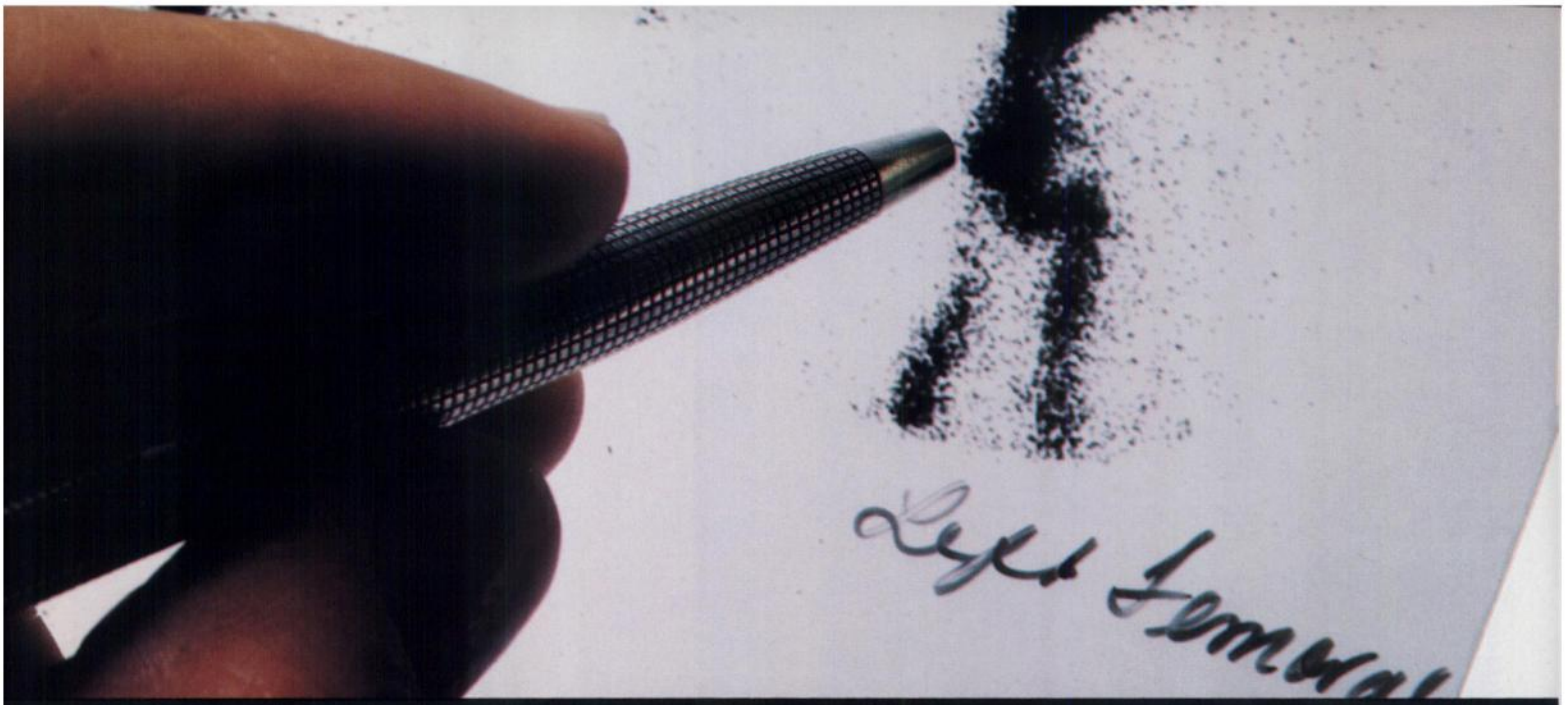


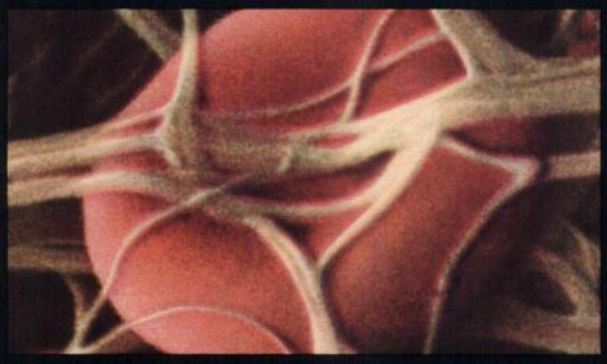
Pulmonary emboli kill 140,000 people every year.[1]

Most are postsurgical hospital patients or patients suffering from an extended illness.

A simple test might have saved them.

At autopsy, most had undetected thrombi in the deep venous system in the legs.[2] No lung scan would have detected those thrombi. Until recently, the only way to detect deep venous thrombi was painful and risky contrast venography.

But now there is a single nuclear medicine procedure that can detect thrombi in the deep venous system and emboli in the lungs with minimal patient discomfort.



Scanning electron micrograph of an erythrocyte enmeshed in fibrin. (Emil Bernstein and Eila Kairinen, Gillette Company Research Institute, Rockville, Maryland.) SCIENCE

The technique is Radionuclide Thrombo-EmboloGraphy (combined radionuclide venography and lung scanning). Or simply, TEG.

TEG uses 3M's radiopharmaceutical Technetium Tc 99m Albumin Microspheres Injection.

Microspheres injected into the dorsal veins of each foot flow upward through the deep venous system, depicting blood flow and the development of collateral circulation.

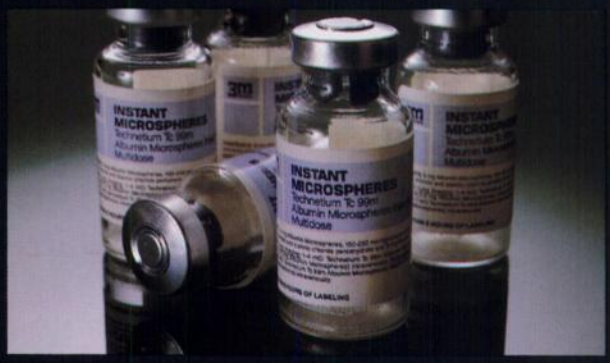
Static images from the procedure show "hot spots"—retained Microspheres suggesting the presence of thrombi. The procedure includes a conventional lung scan for pulmonary emboli.

Radionuclide TEG depicts the patient's thrombo-embolic condition in the iliac, femoral, popliteal, and tibial veins, as well as the lungs.

Clinical tests prove radionuclide venography highly accurate when compared to contrast venography.[3] And there are the added advantages of minimal risk and discomfort to the patient.

For more information on TEG, write: Nuclear Products, 3M Medical Products Division, 3M Center, St. Paul, MN 55101. Or call 800-328-1671.

TEG. It leads you to the problem.



3M COMPANY

PRODUCT INFORMATION

3M Brand Instant Microspheres

TECHNETIUM Tc 99m
ALBUMIN MICROSPHERES KIT
DIAGNOSTIC—FOR INTRAVENOUS USE
MULTIDOSE

Indications and Usage

Technetium Tc 99m Albumin Microspheres Injection is indicated as a lung imaging agent to be used as an adjunct in the evaluation of pulmonary perfusion.

Combined radionuclide venography and imaging of the lungs (thrombo-embolography, TEG) with Technetium Tc 99m Albumin Microspheres Injection is indicated as an adjunct to other diagnostic procedures where deep venous thrombosis in the lower extremities is suspected.

Contraindications

Technetium Tc 99m Albumin Microspheres Injection should not be administered to patients with severe pulmonary hypertension. The use of Technetium Tc 99m Albumin Microspheres Injection is contraindicated in persons with a history of hypersensitivity reactions to products containing human serum albumin.

Warnings

The possibility of allergic reactions should be considered in patients who receive multiple doses.

Theoretically, the intravenous administration of particulate material such as Albumin Microspheres imposes a temporary small mechanical impediment to blood flow. While this effect is probably physiologically insignificant in most patients, the administration of Albumin Microspheres is possibly hazardous in acute cor pulmonale and other states of severely impaired pulmonary blood flow.

This radiopharmaceutical preparation should not be administered to children or to pregnant or lactating women unless the expected benefits to be gained outweigh the potential risks.

Ideally, examinations using radiopharmaceuticals, especially those elective in nature, of a woman of childbearing capability should be performed during the first few (approximately 10) days following the onset of menses.

Precautions

In cases of right-to-left cardiac shunt, additional risk may exist due to the rapid entry of Albumin Microspheres into the systemic circulation.

The contents of the kit are not radioactive. However, after the sodium pertechnetate Tc 99m is added, adequate shielding of the final preparation must be maintained.

The labeling reactions involved in preparing the agent depend on maintaining tin in the reduced state. Any oxidant present in the sodium pertechnetate Tc 99m supply may thus adversely affect the quality of the prepared agent. Hence, sodium pertechnetate Tc 99m containing oxidants or other additives should not be employed without first demonstrating that it is without adverse effect on the properties of the resulting agent.

The contents of the vial are sterile and non-pyrogenic. It is essential that the user follows the directions carefully and adheres to strict aseptic procedures during preparation of the radiodiagnostic.

The suspended Albumin Microspheres will settle with time. Failure to mix the vial contents adequately before use may result in nonuniform distribution of radioactivity.

It is also recommended that Technetium Tc 99m Albumin Microspheres Injection not be used after eight hours from the time of reconstitution. Refrigerate at 2° to 8°C after reconstitution. If blood is withdrawn into the syringe, unnecessary delay prior to injection may result in clot formation *in situ*.

If aggregation of the Albumin Microspheres is observed, the vial should be sonicated or shaken vigorously.

Adequate reproduction studies have not been performed in animals to determine whether this drug effects fertility in males or females, has teratogenic potential, or has other adverse effects on the fetus. Technetium Tc 99m Albumin Microspheres Injection should be used in pregnant women only when clearly needed.

It is not known whether this drug is excreted in human milk. As a general rule, nursing should not be undertaken while a patient is on a drug since many drugs are excreted in human milk.

Safety and effectiveness in children have not been established.

As in the use of any radioactive material, care should be taken to minimize radiation exposure to the patient, consistent with proper management, and to insure minimum radiation exposure to the occupational worker.

Radiopharmaceuticals should be used only by physicians who are qualified by 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.

Adverse Reactions

The most frequently reported adverse reactions associated with the use of Technetium Tc 99m Albumin Microspheres Injection are transient facial flushing and dyspnea. Less frequent adverse reactions are transient nausea, perspiration and cyanosis. An adverse reaction, which occurs rarely, is severe respiratory distress.

The literature contains reports of deaths occurring after the administration of aggregated albumin to patients with pre-existing severe pulmonary hypertension. Instances of hemodynamic or idiosyncratic reactions to preparations of Tc 99m labeled aggregated albumin have been reported.

1. Hume M, Sevitt S, Thomas DP: Venous thrombosis and pulmonary embolism. Cambridge, Harvard University Press, p. 4, 1970.
2. Sevitt S, Gallagher N, Venous thrombosis and pulmonary embolism, a clinico-pathological study in injured and burned patients. *Brit J Surg* 48:475, 1961.
3. Henkin RE, Yao JST, Quinn JL et al: Radionuclide venography (RNV) in lower extremity venous disease. *J Nucl Med* 15:171, 1974.

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FB-65

When Toshiba gave nuclear medicine the world's first jumbo gammacamera in 1973, the medical community was very impressed. But we were dedicated to giving you more, so we introduced the world's first jumbo gammacamera with high resolution, fine diagnostic detail over a large area. That was important, but we knew it still wasn't enough.

Now, we are introducing the latest in the state-of-the-art, the GCA-402. The world's first Super High Resolution, Large Field Gammacamera combining stability and exceptional workload capability in one instrument. Frankly, we're pleased.

Toshiba's system approach allows for no compromise where clinical diagnostic values are concerned. The GCA-402 is a prime example. High resolution is the basis for obtaining useful diagnostic images. The intrinsic resolution and linearity of the GCA-402, combined with its range of ten collimators provides unsurpassed images of exceptional diagnostic value. The GCA-402 incorporates 61 photo-multiplier tubes to electronically smooth the image and eliminate the high-energy collimator hole patterns unavoidable in conventional systems. Its 35cm field of view combined with 17 preselected isotope ranges allows unobstructed views of large organs, or groups of organs, as well as whole body scanning.

Toshiba's patented* delay line system and modern IC-technology provide long term stability, trouble free performance, and ease of operation.

Of course, the GCA-402 has a wide range of accessories including special collimators, whole body scanning bed, video tape and film recorders, plus, the GCA-402 may be interfaced to any computer.

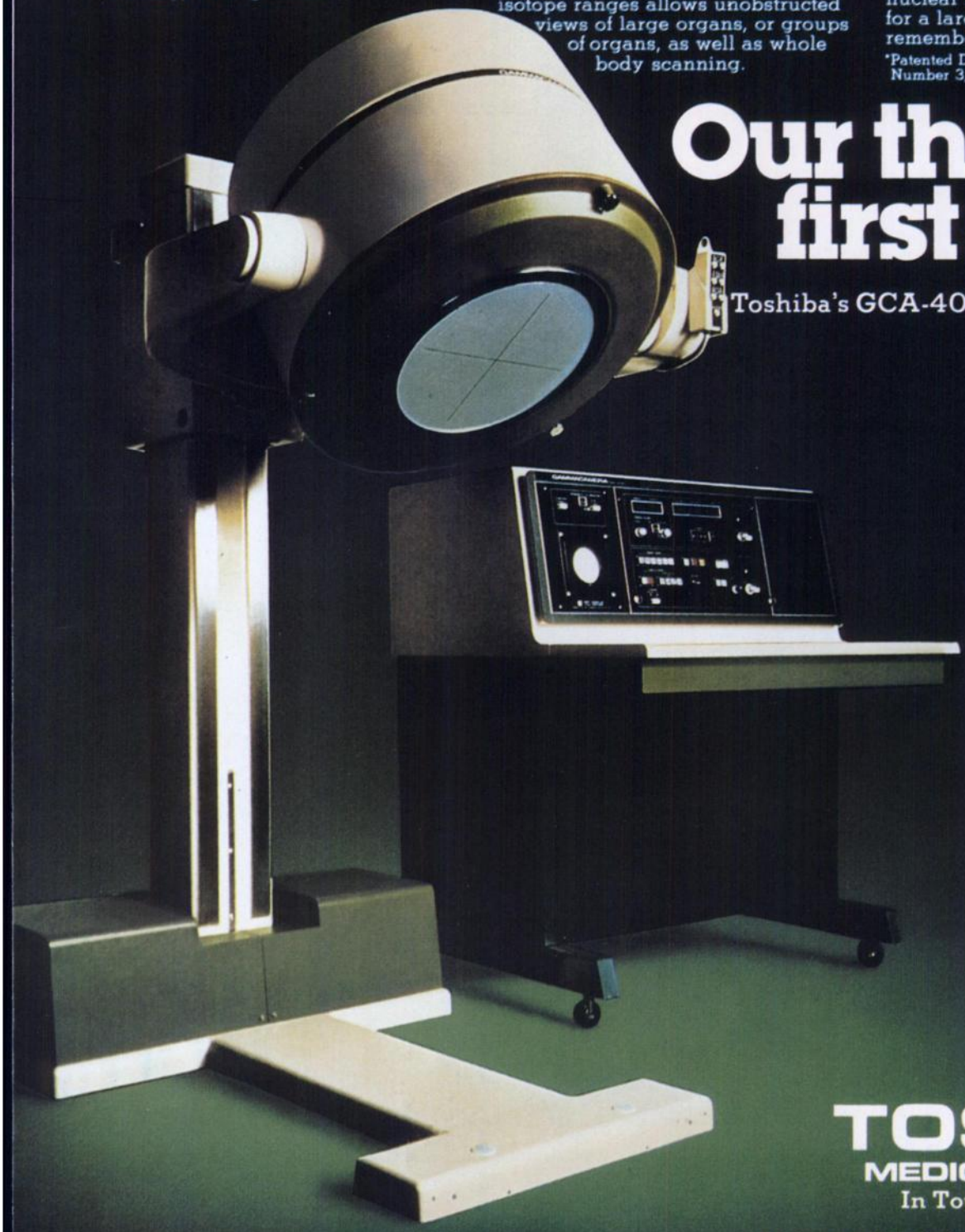
This combination of human engineering, fail-proof auto exposure and easy collimator changeover provides the highest efficiency while minimizing patient discomforture.

When you're ready to fill your nuclear medicine department's need for a large field gammacamera, remember Toshiba. We're the first.

*Patented Delay Line, U.S. Patent Number 3,717,763

Our third is first again

Toshiba's GCA-402 Jumbo Gammacamera



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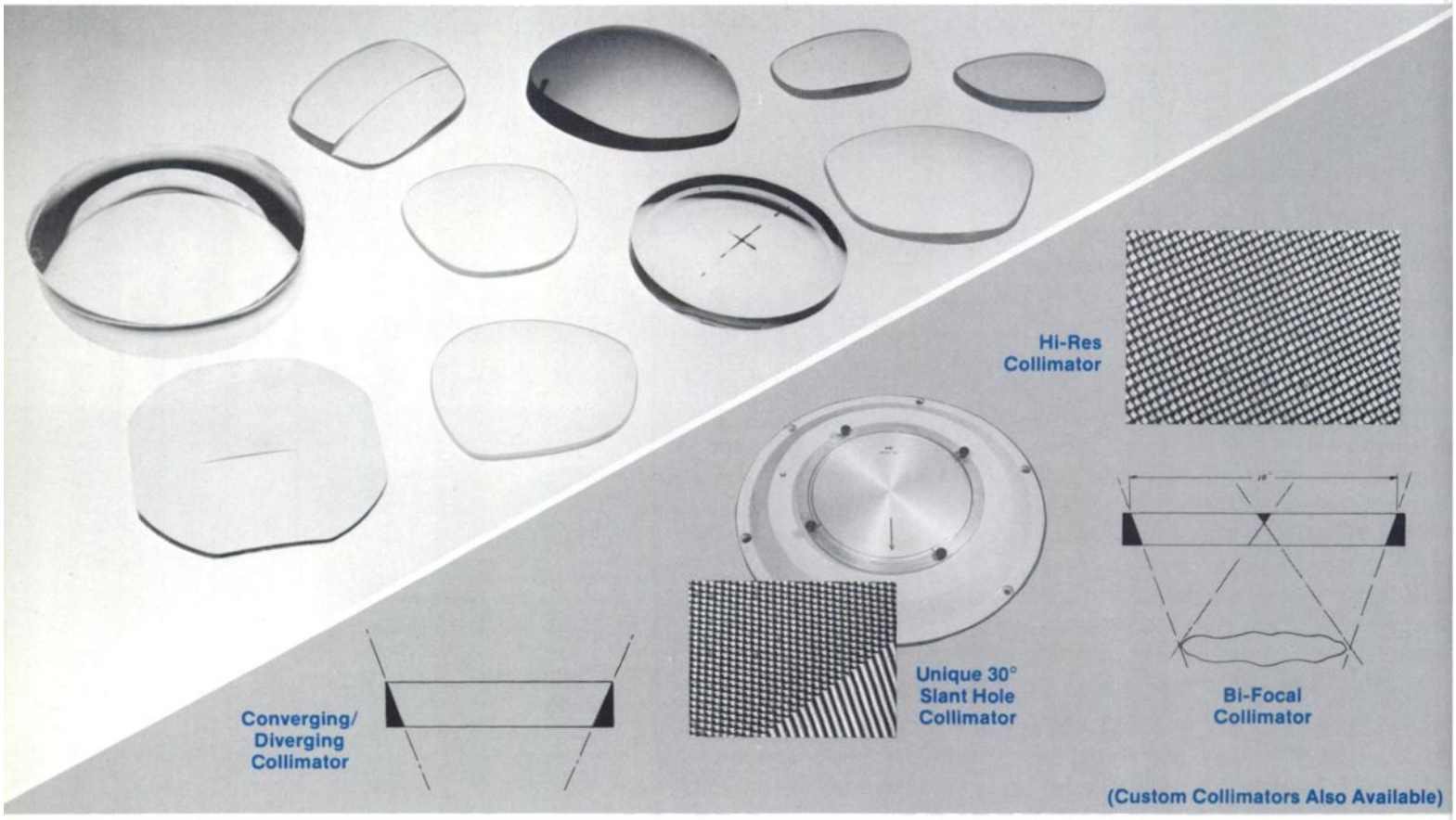
Nuclear Imaging and Opthalmology have a lot in common.



Both require the appropriate lens.

- Square holes maximize sensitivity without sacrificing resolution.
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CIS offers two new tests: Diagnosis of heart attacks and possible relapses, **MYOK** (kit for myoglobin radioimmunoassay).

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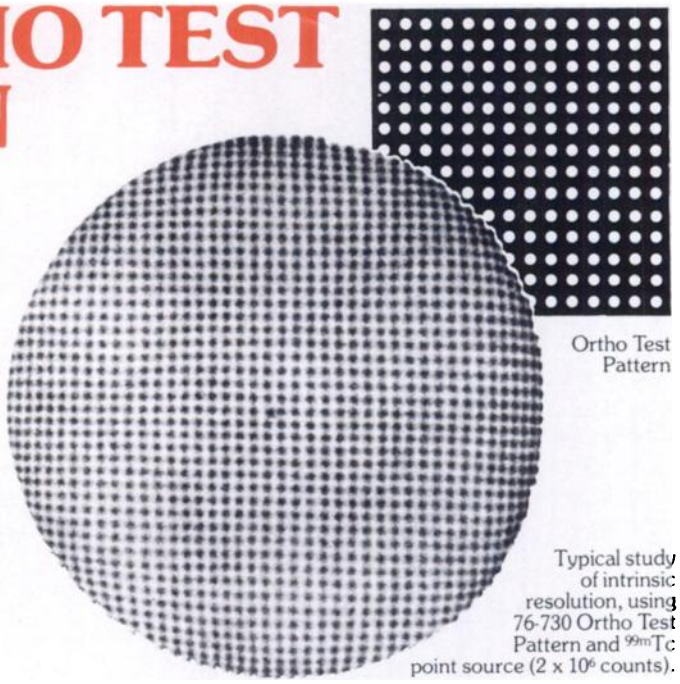

Ortho Test Pattern

Typical study of intrinsic resolution, using 76-730 Ortho Test Pattern and ^{99m}Tc point source (2 x 10^6 counts).

ONE scintiphoto permits precise determination of

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Ortho Test Patterns are recommended by the Quality Control Committee of the Society of Nuclear Medicine. They are fully described in "An Ortho Test Pattern For Quality Assurance of Gamma Cameras," a protocol by Dr. Gerald Hine, recognized authority on nuclear medicine instrumentation. Copies are available on request.

SNM Education Fund Contribution

For every Ortho Test Pattern purchase order resulting from this ad and received by us on or before December 31, 1978, Nuclear Associates will donate $10.00 to the Education Fund of the Society of Nuclear Medicine.

For complete details, ask for Bulletin 265-BB

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- **The use of positron-emitting radiopharmaceuticals.**
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- **Rapid, flexible scan capabilities, automatic bed indexing, high-resolution display, and adaptable data processing.**

The ECAT (Emission Computerized Axial Tomographic) whole-body scanner uses positron-emitting radiopharmaceuticals for patient imaging.

Developed and manufactured by the Life Sciences Division of Ortec Inc., the ECAT represents an accumulation of the extensive line of research instruments which Ortec supplies. Data acquisition is achieved with standard NIM and CAMAC modules identical to those proven reliable throughout the world in research, industrial, and clinical laboratories. It is this modular approach that not only helps prevent obsolescence but also provides for ease of service should the need ever arise.

The ECAT measures and locates the concentration of a positron-emitting radiopharmaceutical compound, such as ^{68}Ga-EDTA, ^{11}CO, or $^{13}NH_3$, administered to the patient. When a positron annihilates, two gamma rays are emitted in opposite directions. By detecting these gamma rays with electronically collimated opposing detector banks, the ray projection in which the annihilation occurred is determined. This method of detection provides for high resolution, high contrast, and high sensitivity in a format uniquely suited to reconstruction tomography. Compiling, sorting, and processing these data with a reconstruction algorithm results in a cross-sectional image similar to the images generated by transmission CAT (TCAT) scanners. The difference is that Ortec ECAT images are a measure of the physiology, or function, rather than the morphology, or density, of the structure.

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Our ^{125}I Doxorubicin (Adriamycin) Radioimmunoassay Kit features a rapid, simple procedure with 100 picogram sensitivity in serum, plasma or urine. Six precalibrated standards as well as a control serum are supplied. The stable ^{125}I tracer and one hour incubation time makes this kit a unique tool in cancer management.

1. Bonadonna, G. et al: Phase I and preliminary Phase II evaluation of adriamycin (NSC 123127), Cancer Res. *30*, 2572, 1970
2. Middleman, E. et al: Clinical trials with adriamycin. Cancer, *28*, 844, 1971
3. Wang, J. et al: Therapeutic effect and toxicity of adriamycin in patients with neoplastic diseases. Cancer, *28*, 837, 1971

*Tradename Adria Labs.

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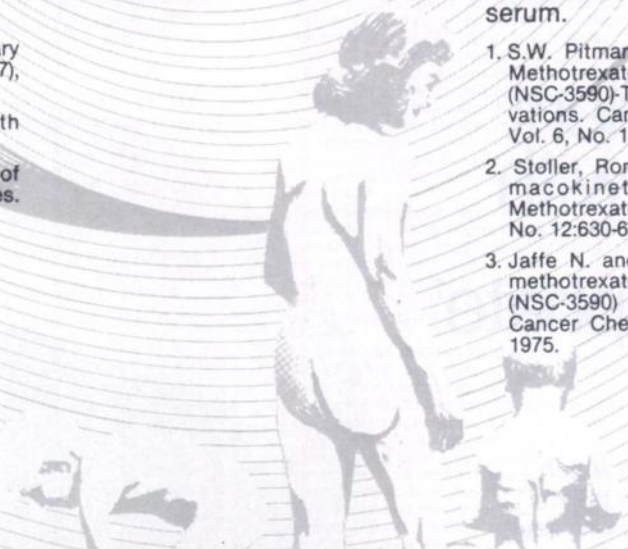
High dose Methotrexate therapy in combination with leucovorin "rescue" treatment creates a vital need for close monitoring of circulating Methotrexate plasma levels. Methotrexate overdose has been shown to be associated with severe myelosuppression, renal damage[1,2] and hepatotoxicity.[3]

Our ^{125}I Methotrexate Radioimmunoassay Kit provides a rapid simple method, with sensitivity of 10 picograms in serum, plasma, cerebrospinal fluid or urine. Results can be reported in less than 1½ hours. Precalibrated human serum standards and control serum are provided as well as a stable ^{125}I tracer and antiserum.

1. S.W. Pitman et al: Clinical Trial of High-Dose Methotrexate (NSC-740). With Citrovorum Factor (NSC-3590)-Toxicologic and Therapeutic Observations. Cancer Chemotherapy Reports Part 3 Vol. 6, No. 1, July 1975.
2. Stoller, Ronald G. et al: Use of Plasma Pharmacokinetics to Predict and Prevent Methotrexate Toxicity. N.E. Jr. of Med. Vol. 297 No. 12:630-634, Sept. 22, 1977.
3. Jaffe N. and Traggis D. Toxicity of high-dose methotrexate (NSC- 740) and citrovorum factor (NSC-3590) rescue in osteogenic sarcoma. Cancer Chemother. Rep. Part 3, Vol.6(1):31-36, 1975.



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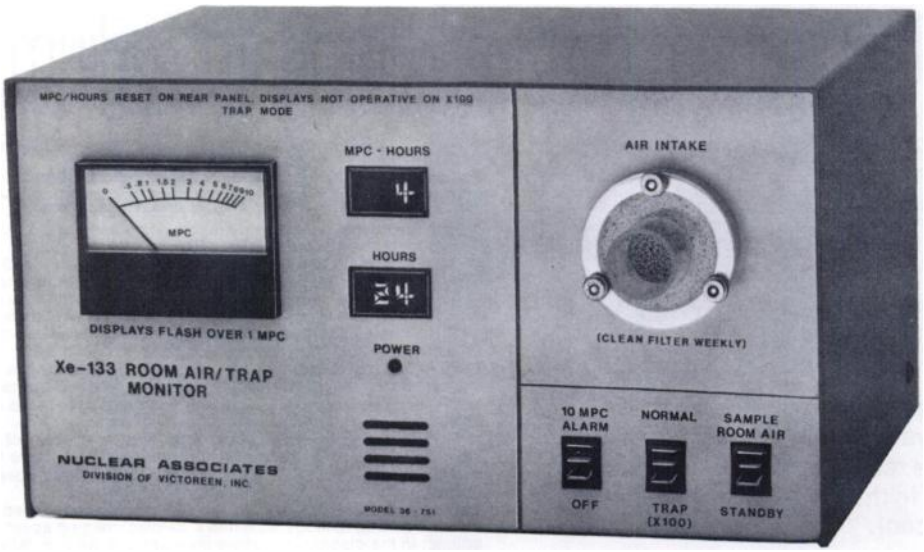

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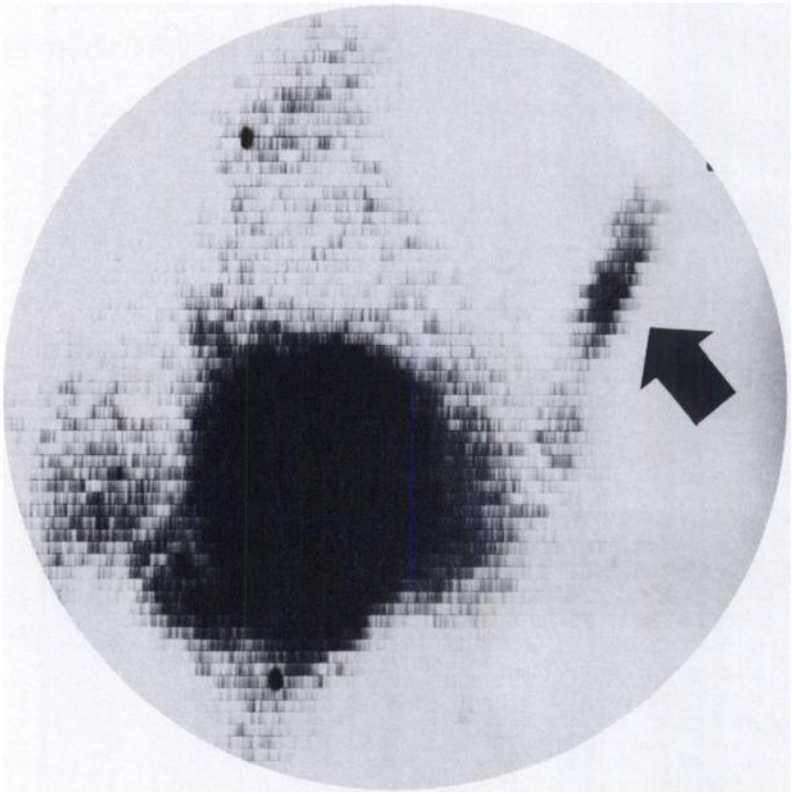
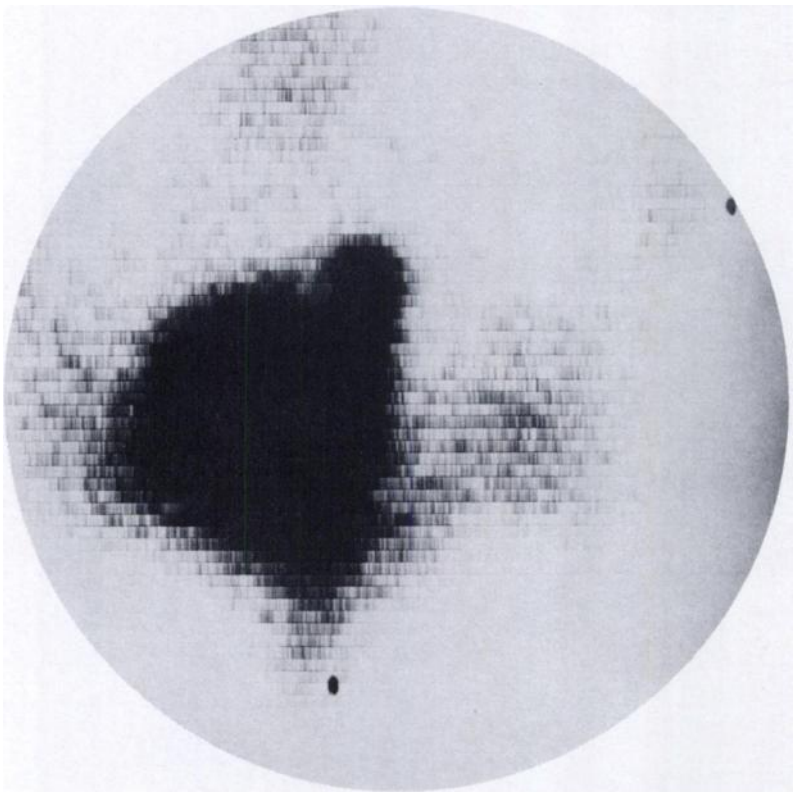
NOW AVAILABLE FOR ROUTINE USE AS AN ADJUNCT IN THE DIAGNOSIS OF ACUTE MYOCARDIAL INFARCTION.

Solitary lesion seen with OSTEOSCAN®[1]

Technetium Tc99m etidronate sodium kit

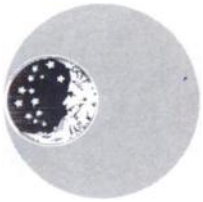


Same patient scanned with Tc 99m pyrophosphate[1]



In whole body scans from which these skeletal views were taken, a solitary ileal metastasis was seen with Osteoscan, but not with the pyrophosphate imaging agent.

superiority to pyrophosphates for bone lesion detection



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OSTEOSCAN®

Technetium Tc99m etidronate sodium kit

Clinical evidence produced by two groups of investigators[1,2] demonstrates that Osteoscan outperforms pyrophosphates in detecting bone lesions.

"In ten of the 30 scans (33%) one or more metastases not detected on the Tc-PPi [pyrophosphate] image were noted by at least two of the three readers with Tc-HEDP [Osteoscan]."[1]

"...in three of 30 patients the Tc-PPi [pyrophosphate] scan was falsely read as normal by at least two of three readers, whereas metastatic disease was found in these patients with Tc-HEDP [Osteoscan]."[1]

The superior lesion detection demonstrated by Osteoscan may be explained by the higher tumor to normal bone ratios obtained.[2] In fact, it was concluded that Osteoscan "...is at present the agent of choice for routine clinical practice..."[2]

With Osteoscan, you can also expect excellent in vitro stability (greater than 98% tag 8 hours after preparation)...a very low tin level (.16 mg stannous chloride per vial) to minimize the potential for liver visualization or interference with subsequent brain scans...rapid blood clearance...plus excellent in vivo stability due to Osteoscan's P-C-P bond.

For additional information, call or write Procter & Gamble, Professional Services, P.O. Box 85507, Cincinnati, Ohio 45201, (513) 977-5547.

In Europe, contact: Philips-Duphar B.V., Cyclotron and Isotope Laboratories, Petten, Holland.

References:

1. Silberstein, E. B. et al.: Clinical comparison of technetium-99m diphosphonate and pyrophosphate in bone scintigraphy: Concise communication, J. Nucl. Med. 19:161, 1978.
2. Fogelman, I. et al.: A clinical comparison of ^{99m}Tc-hydroxyethylidene diphosphonate (H.E.D.P.) and ^{99m}Tc-pyrophosphate in the detection of bone metastases, Clin. Nucl. Med. 2:364, 1977.

Brief summary of Package Insert. Before using, please consult the full Package Insert included in each kit.

Description: Each vial of OSTEOSCAN contains 5.9 mg etidronate disodium, 0.16 mg stannous chloride and 0.56 mg sodium ascorbate as active ingredients. Upon addition of ADDITIVE-FREE sodium pertechnetate Tc99m the etidronate disodium and stannous chloride combine with Tc99m to form a stable soluble complex.

Clinical pharmacology: When injected intravenously, Tc99m-labeled OSTEOSCAN has a specific affinity for areas of altered osteogenesis. Areas of bone which are undergoing neoplastic invasion often have an unusually high turnover rate which may be imaged with Tc99m-labeled OSTEOSCAN.

Three hours after intravenous injection of Tc99m-labeled OSTEOSCAN, an estimated 40-50% of the injected dose has been taken up by the skeleton. At this time approximately 50% has been excreted in the urine and 6% remains in the blood. A small amount is retained by the soft tissue. The level of Tc99m-labeled OSTEOSCAN excreted in the feces is below the level detectable by routine laboratory techniques.

Tc99m-labeled OSTEOSCAN is also taken up in areas of necrosis and severely injured myocardial cells. Approximately 1.5 hours following intravenous injection 0.01-0.02 percent of the administered dose per gram of tissue is taken up by an acutely infarcted myocardium.

Indications: OSTEOSCAN is a skeletal imaging agent used to demonstrate areas of altered osteogenesis and a cardiac imaging agent used as an adjunct in the diagnosis of acute myocardial infarction. When used as an adjunct in the diagnosis of myocardial infarction the incidence of false negatives has been found to be approximately 14% and false positives about 16%. False negatives may result from failure to observe temporal requirements for good myocardial imaging; false positives may be related to coronary heart disease, left ventricular aneurysms, trauma, repeated cardioversion following coronary by-pass surgery or old myocardial infarcts.

Contraindications: None known.

Warnings: This radiopharmaceutical should not be administered to patients who are pregnant or lactating unless the information to be gained outweighs the potential hazards.

Ideally, examinations using radiopharmaceuticals, especially those elective in nature, of a woman of childbearing capability should be performed during the first few (approximately 10) days following the onset of menses.

The technetium used to tag the product should be routinely tested for molybdenum and aluminum; if an unacceptable level of either is found, the technetium should not be used.

Radiopharmaceuticals should be used only by physicians who are qualified by specific training in the safe use and handling of radionuclides produced by nuclear reactor or particle accelerator and whose experience and training have been approved by the appropriate government agency authorized to license the use of radionuclides.

Precautions: As in the use of any other radioactive material, care should be taken to insure minimum radiation exposure to the patient, consistent with proper patient management, and to insure minimum radiation exposure to occupational workers.

Bone Imaging:

Both prior to and following Tc99m-labeled OSTEOSCAN administration, patients should be encouraged to drink fluids. Patients should void as often as possible after the Tc99m-labeled OSTEOSCAN injection to minimize background interference from accumulation in the bladder and unnecessary exposure to radiation.

Cardiac Imaging:

Patient's cardiac condition should be stable before beginning the cardiac imaging procedure. If not contraindicated by the cardiac status, patients should be encouraged to ingest fluids and to void frequently in order to reduce unnecessary radiation exposure.

Interference from chest wall lesions such as breast tumors and healing rib fractures can be minimized by employing the three recommended projections.

Adverse reactions: None known.

Dosage and administration: The recommended adult dose of Tc99m-labeled OSTEOSCAN is 10-15 mCi. The activity of each dose should be measured by a suitable radiation calibration system just prior to administration. The dose should be given intravenously by slow injection. For optimal results bone imaging should be done 2-4 hours post injection and cardiac imaging 1-1½ hours post injection. The acute myocardial infarct can be visualized from 1-9 days following onset of symptoms with maximum uptake at 2-3 days. It is recommended that three projections of the heart be made (anterior, left anterior oblique and left lateral).

Your Scintigraphy Kit

Your kit starts with any of our three simple one-step preparations which combined with our new Sterile Technetium-99m Generator offers a complete package for liver, lung, bone and brain scintigraphy. Later we will be adding more kits to our range.

All our kits are tested extensively in clinical trials which include the use of other technetium-99m generators as well as our own. All are terminally sterilized and every batch is animal tested.

Agent for Bone Scintigraphy

Our Technetium (MDP) Agent gives you the best skeletal visualization available today. The high bone uptake and rapid clearance from blood and soft tissue makes this superior to other bone agents giving better definition and improved discrimination.

New Agent for Lung Scintigraphy

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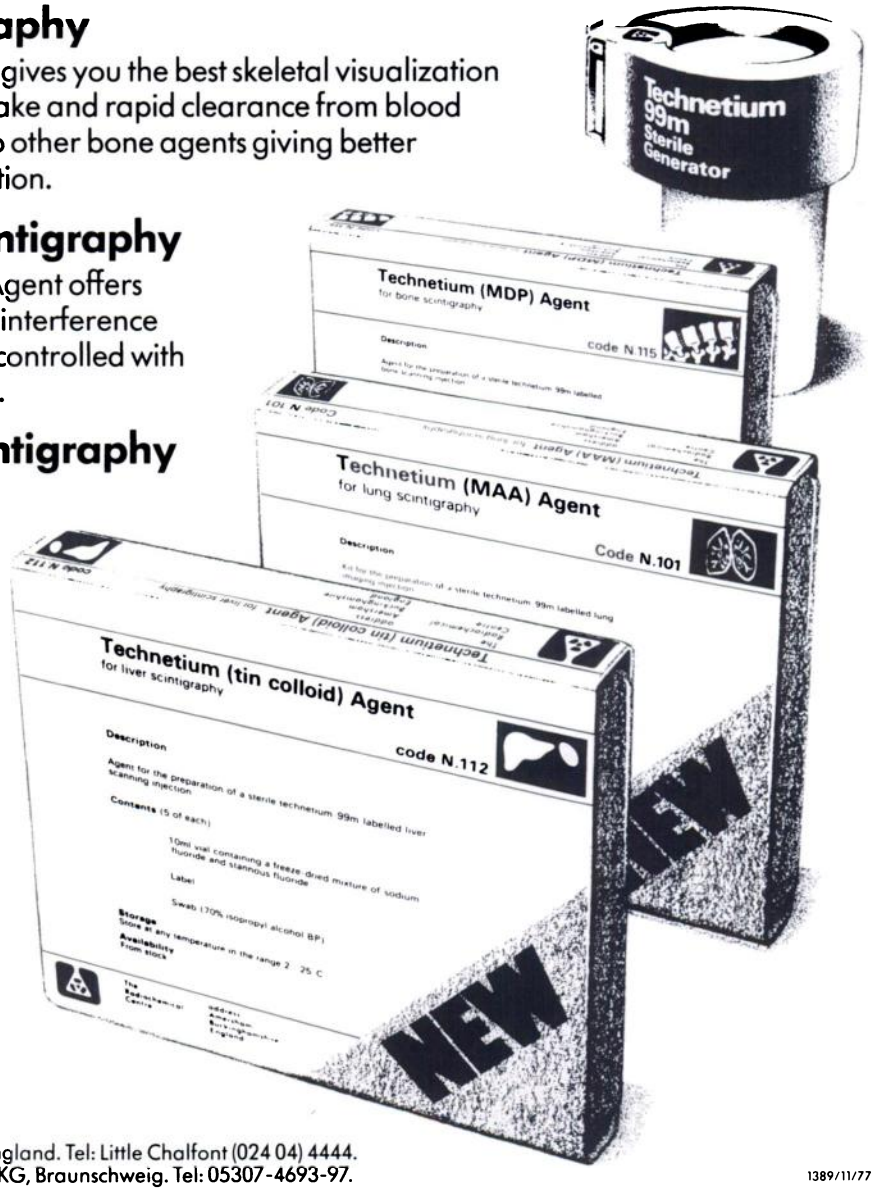
New Agent for Liver Scintigraphy

The latest addition to our range is the unique Technetium (tin colloid) Agent. Its preparation is much simpler than sulphur colloid agents and requires no heating stage. It will visualize liver and spleen and unlike agents based on phytate, the colloid is formed in the vial, allowing quality control checks prior to injection.



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Real time diagnostics at a realistic price. Computing cardiac ejection fraction is a vital job. But, it's also an expensive and complicated one. Most hospitals cannot afford the luxury of a nuclear medicine system and the computer-trained personnel required to accomplish this time-consuming technical task. But, they can afford the efficiency of a Picker Nuclear Cardiology Module, which can quickly determine ejection fraction at a fraction of the cost of a computer.

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produce the ejection fraction value six times faster than the first pass probe method at a third the cost.

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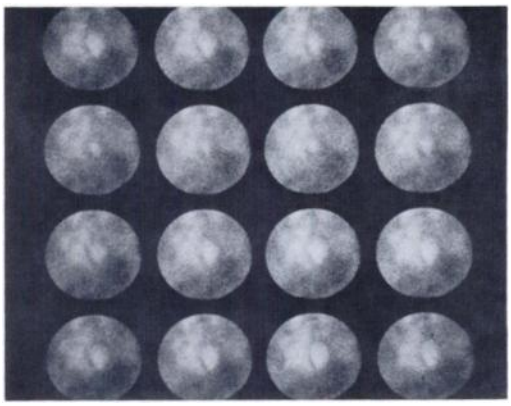

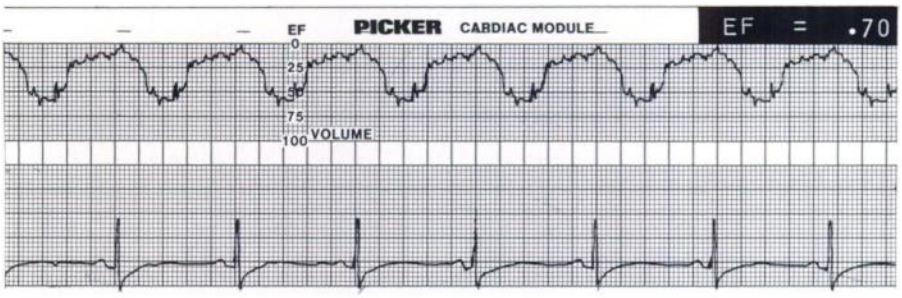

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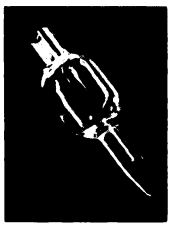

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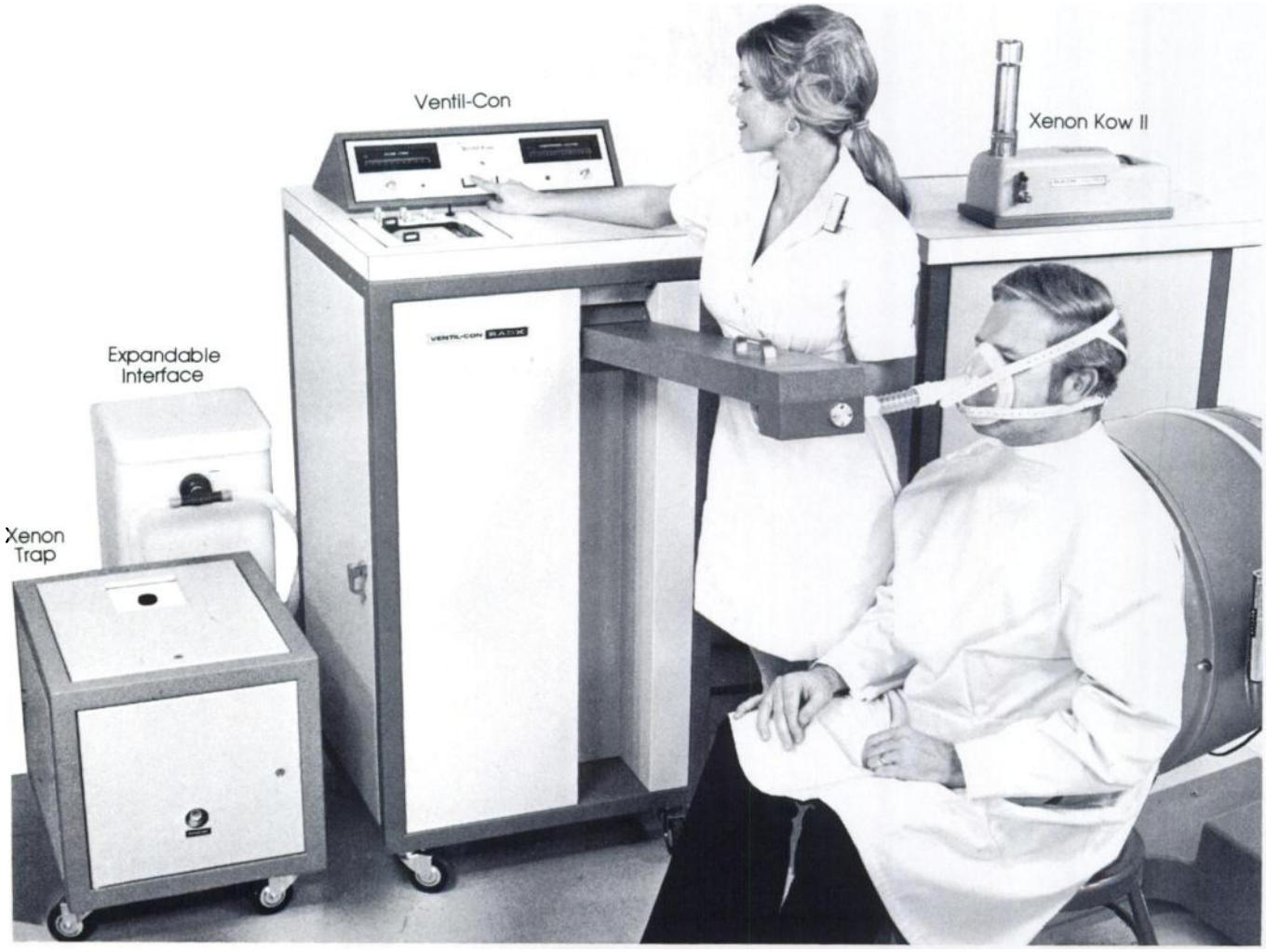

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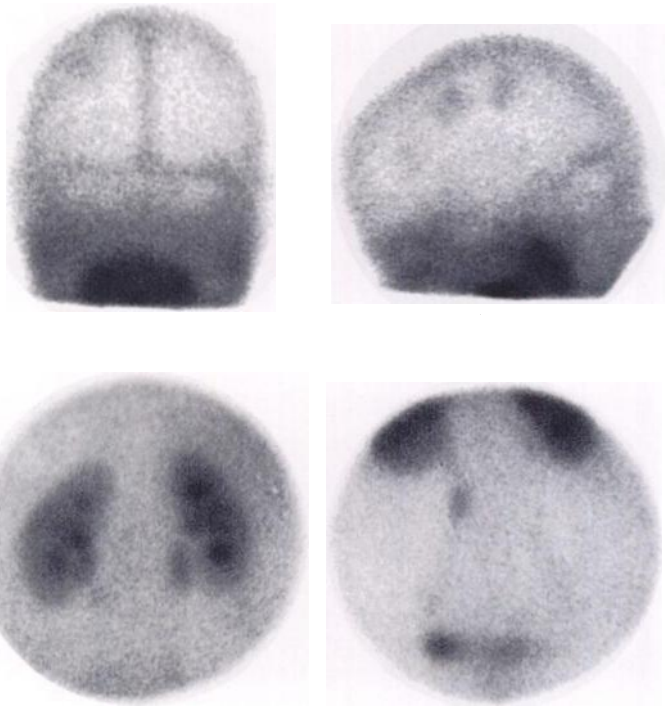
For efficiency in brain and renal imaging



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for brain imaging:

Considered superior to technetium pertechnetate or DTPA[1,2,3]

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Gluceptate (2 hrs)

Vert Post R Lat

Pertechnetate (3 hrs)

Higher target to background ratios

"The results of the computer background study for ^{99m}Tc GH *versus* $^{99m}TcO_4$ show an average calvaria/brain ratio of 2.1 and 1.6 for ^{99m}Tc GH and $^{99m}TcO_4$, respectively, at 90 min. after injection." Rollo et al[2]

May detect lesions not seen with other agents

"...^{99m}Tc glucoheptonate concentrates in all lesions which accumulate $^{99m}TcO_4$ or ^{99m}Tc DTPA, and in certain cases, appears to localize lesions which do not concentrate other agents." Rollo et al[2]

When compared to pertechnetate ... "Glucoheptonate offers a significant improvement in lesion detection (for both infarcts and tumors)." Waxman et al[3]

Optimal imaging at 90 minutes postinjection, without $KClO_4$

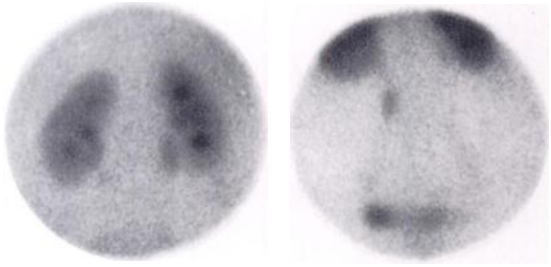
"^{99m}Tc glucoheptonate combines the absence of oral activity with the convenience of obtaining highly diagnostically accurate images at 90 minutes." Rollo et al[2]

Excellent pharmacokinetics for busy nuclear medicine department

"Kinetic studies have shown that while some of the activity is rapidly cleared through the urine, the remainder is retained in the renal cortex. In humans, about 25% of the injected dose is excreted in the urine during the first hour post-injection. Within the same interval, blood activity rapidly clears to less than 2% of the injected dose."[4]

for dynamic and static renal imaging:

Single radionuclide study detects masses; assesses renal size, shape, position



10 min 32 min

A multifunctional agent

. . .whose appearance in the renal parenchyma and collecting system reflects cortical blood flow, tubular function and collecting system patency.

Less limited by poor renal function than IVP

"Several patients with BUNs of 90 mg/dl or greater have been imaged, and information concerning renal size, contour and relative function obtained." Leonard et al[5]

Safe method to assess renal function and morphology in patients allergic to iodinated contrast agents[5]

Diagnostic results comparable to that of IVP for detection of mass lesions

"Glucoheptonate renal studies were performed on 275 patients, 55 of whom had angiography and/or surgery as well as IVP. All studies were interpreted prospectively by a board certified staff physician utilizing pertinent clinical information. In this study, the glucoheptonate images provided greater accuracy in the detection of renal mass lesions than the IVP (85% versus 67% respectively). This improved accuracy resulted from the greater sensitivity and specificity of the glucoheptonate images." Leonard et al[6]

1. Léveillé J et al: Technetium-99m glucoheptonate in brain-tumor detection: An important advance in radiotracer techniques. J Nucl Med 18 (10):957-961, 1977.

2. Rollo FD et al: Comparative evaluation of ^{99m}TC GH; $^{99m}TcO_4$; and ^{99m}Tc DTPA as brain imaging agents. Radiology 123:379-383, 1977.

3. Waxman AD et al: Technetium 99m glucoheptonate as a brain scanning agent: A critical comparison with pertechnetate. J Nucl Med 17 (5):345-8,1975.

4. Glucoscan (Technetium Tc 99m Gluceptate Sodium Kit), Full Prescribing Information, New England Nuclear, May 1978.

5. Leonard JC et al: Glucoheptonate renal imaging. Given at Radiological Society of North America, Annual Meeting, Nov 29, 1977.

6. Leonard JC et al: Glucoheptonate renal imaging and the IVP: A surgical and angiographic correlative study. Given at Society of Nuclear Medicine, Southwest Chapter, April 27, 1978.

NEN New England Nuclear

See following page for full prescribing information.

GLUCOSCAN

May 1978

Technetium Tc 99m Gluceptate Sodium Kit

FOR DIAGNOSTIC USE

DESCRIPTION: New England Nuclear's GLUCOSCAN™ Technetium Tc 99m Gluceptate Sodium Kit is supplied sterile and non-pyrogenic in lyophilized kit form suitable for reconstitution with sodium pertechnetate Tc 99m to form a diagnostic imaging agent for intravenous administration. Each vial contains 200mg gluceptate sodium, 0.07mg maximum tin and 0.06mg (min.) stannous chloride. Prior to lyophilization, hydrochloric acid and / or sodium hydroxide solution may be added to adjust the pH.

PHYSICAL CHARACTERISTICS

Technetium Tc 99m decays by isomeric transition with a physical half-life of 6.02 hours (SOURCE: Martin, M.J., Nuclear Data Project, ORNL, March, 1976). Photons that are useful for imaging studies are listed in Table 1.

Table 1. Principal Radiation Emission Data

Radiation	Mean % / Disintegration	Mean Energy (keV)
Gamma-2	88.96	140.5

To facilitate correction for physical decay of Technetium Tc 99m, the fractions of initial activity that remain at selected intervals after the time of calibration are shown in Table 2.

Table 2. Technetium Tc 99m Physical Decay Chart; Half-Life 6.02 Hours

Hours	Fraction Remaining	Hours	Fraction Remaining
0*	1.000	5	.562
1	.891	6	.501
2	.794	7	.447
3	.708	8	.398
4	.631		

*Calibration Time

EXTERNAL RADIATION

The specific gamma ray constant for Technetium Tc 99m is 0.8R/mCi-hr at 1 cm. The first half-value thickness of lead (Pb) is 0.2mm. A range of values for the relative attenuation of the radiation emitted by this radionuclide that results from interposition of various thicknesses of lead is shown in Table 3. For example, the use of a 6.3mm thickness of lead will attenuate the radiation by a factor greater than 10^{-6}.

Table 3. Radiation Attenuation by Lead Shielding

Shield Thickness Lead (Pb) mm	Coefficient of Attenuation
0.2	0.5
0.95	10^{-1}
1.8	10^{-2}
2.7	10^{-3}
3.6	10^{-4}
4.5	10^{-5}
5.4	10^{-6}
6.3	10^{-7}

CLINICAL PHARMACOLOGY: Technetium Tc 99m Gluceptate Sodium has been shown by comparative renograms to concentrate in the kidney by both glomerular filtration and tubular secretion. Kinetic studies have shown that while some of the activity is rapidly cleared through the urine, the remainder is retained in the renal cortex. In humans, about 25% of the injected dose is excreted in the urine during the first hour post-injection. Within the same interval, blood activity rapidly clears to less than 2% of the injected dose.

Technetium Tc 99m Gluceptate Sodium has also been shown to localize in areas of intracranial pathology characterized by a disturbance in the blood brain barrier. The mechanism is probably non-specific since neoplasms, cerebrovascular accidents and extracerebral hematomas have all shown pronounced radionuclide uptake. Used in conjunction with dynamic flow studies, Technetium Tc 99m Gluceptate Sodium may detect vascular stenoses and arteriovenous malformations. There is no concentration of the agent by the salivary glands or the choroid plexus.

INDICATIONS AND USAGE: Technetium Tc 99m Gluceptate Sodium is used for brain imaging.

Technetium Tc 99m Gluceptate Sodium is indicated for renal perfusion imaging as an adjunct in the diagnosis, localization and evaluation of kidney disease. It may provide useful information about renal size, shape, and position and may delineate lesions affecting renal blood flow.

CONTRAINDICATIONS: None known.

WARNINGS: The contents of the GLUCOSCAN vial are intended only for use in the preparation of Technetium Tc 99m Gluceptate Sodium and are NOT to be directly administered to the patient.

Ideally examinations using radiopharmaceuticals—especially those elective in nature—of a woman of childbearing capability should be performed during the first ten days following the onset of the menses.

Dehydration and / or patient positioning may result in failure to visualize urinary excretory structures in the presence of normal function. Adequate patient fluid intake and repositioning may reduce the incidence of such false positive studies.

PRECAUTIONS: Technetium Tc 99m Gluceptate Sodium, as well as any radioactive agent, must be handled with care. Once sodium pertechnetate Tc 99m is added to the kit, appropriate safety measures should be used to minimize external radiation exposure to clinical personnel.

Care should also be taken to minimize radiation exposure to patients in a manner consistent with proper patient management.

The Technetium Tc 99m labeling reaction involved in preparing Technetium Tc 99m Gluceptate Sodium depends on the maintenance of tin in the divalent state. Any oxidant present in the sodium pertechnetate Tc 99m employed may adversely affect the quality of the prepared agent. Thus, sodium pertechnetate Tc 99m containing oxidants should not be used without first demonstrating that it is without adverse effect on the properties of the resulting agent.

The use of bacteriostatic sodium chloride as a diluent for sodium pertechnetate Tc 99m may adversely affect the biologic distribution of the prepared agent, and its use is not recommended.

No long term animal studies have been performed to evaluate carcinogenic potential.

Adequate reproduction studies have not been performed in animals to determine whether this drug affects fertility in males or females, has teratogenic potential, or has other adverse effects on the fetus. Technetium Tc 99m Gluceptate Sodium should be used in pregnant women only when clearly needed.

It is not known whether this drug is excreted in human milk. As a general rule, nursing should not be undertaken when a patient is administered radioactive material.

Safety and effectiveness in children have not been established.

ADVERSE REACTIONS: Although infrequent, erythema has been reported in association with the use of Technetium Tc 99m Gluceptate Sodium.

DOSAGE AND ADMINISTRATION: The recommended dose for the average (70kg) adult patient is 10-20 millicuries for both renal and brain imaging. Technetium Tc 99m Gluceptate Sodium is intended for intravenous administration only.

Technetium Tc 99m Gluceptate Sodium should be used within eight hours after aseptic reconstitution with sodium pertechnetate Tc 99m. For optimal results, this time should be minimized. The reaction vial contains no bacteriostat.

Optimal results for both renal and brain imaging are obtained one hour after administration. Studies have shown that although optimal target-to-background ratios for brain lesions are obtained at two hours post-injection, there is no improvement in diagnostic efficacy after one hour.

Radiopharmaceuticals should be used by persons with specific training in the safe use and handling of radionuclides produced by nuclear reactor or particle accelerator and whose experience and training have been approved by the appropriate governmental agencies authorized to license the use of radionuclides.

The components of the New England Nuclear GLUCOSCAN Kit are supplied sterile and non-pyrogenic. Aseptic procedures normally employed in making additions and withdrawals from sterile, non-pyrogenic containers should be used during addition of pertechnetate solution and the withdrawal of doses for patient administration.

RADIATION DOSIMETRY

The estimated radiation absorbed doses to an average adult patient (70kg) from an intravenous injection of a maximum dose of 20 millicuries of Technetium Tc 99m Gluceptate Sodium are shown in Table 4.

Table 4. Radiation Absorbed Doses

Tissue	Absorbed Dose Rads/20 millicuries
Kidneys	3.40
Liver	0.20
Bladder Wall	5.60
Ovaries	0.32
Testes	0.20
Whole Body	0.15

HOW SUPPLIED: NEN's GLUCOSCAN Technetium Tc 99m Gluceptate Sodium Kit is supplied as a set of five or thirty vials, sterile and non-pyrogenic. Each vial contains in lyophilized form:

Gluceptate Sodium—200mg
Maximum Tin—0.07mg
Stannous Chloride (min.)—0.06mg

Prior to lyophilization the pH is adjusted with hydrochloric acid and / or sodium hydroxide solution. Store at room temperature (15°-30°C). Included in each five vial kit is one package insert and six radiation labels. Included in each thirty vial kit is one package insert and thirty-six radiation labels.

INSTRUCTIONS FOR PREPARATION OF TECHNETIUM Tc 99m GLUCEPTATE SODIUM KIT: Aseptically inject 3 to 7ml of sodium pertechnetate Tc 99m into the supplied vial of GLUCOSCAN after placing vial in a radiation shield. Swirl for several seconds to dissolve completely. Label shield appropriately. Use within eight hours of reconstitution.

Using proper shielding, the vial containing the reconstituted solution should be visually inspected to insure that it is clear and free of particulate matter.

The contents of the kit vials are not radioactive: however, after reconstitution with sodium pertechnetate Tc 99m the contents are radioactive and adequate shielding and handling precautions must be maintained.

This reagent kit is approved for use by persons licensed by the U.S. Nuclear Regulatory Commission pursuant to Section 35.14 and 35.100 Group III of 10 CFR or under equivalent licenses of Agreement States.

Catalog Number NRP-180 (5 vial kit)
Catalog Number NRP-180C (30 vial kit)

New England Nuclear
Medical Diagnostics Division
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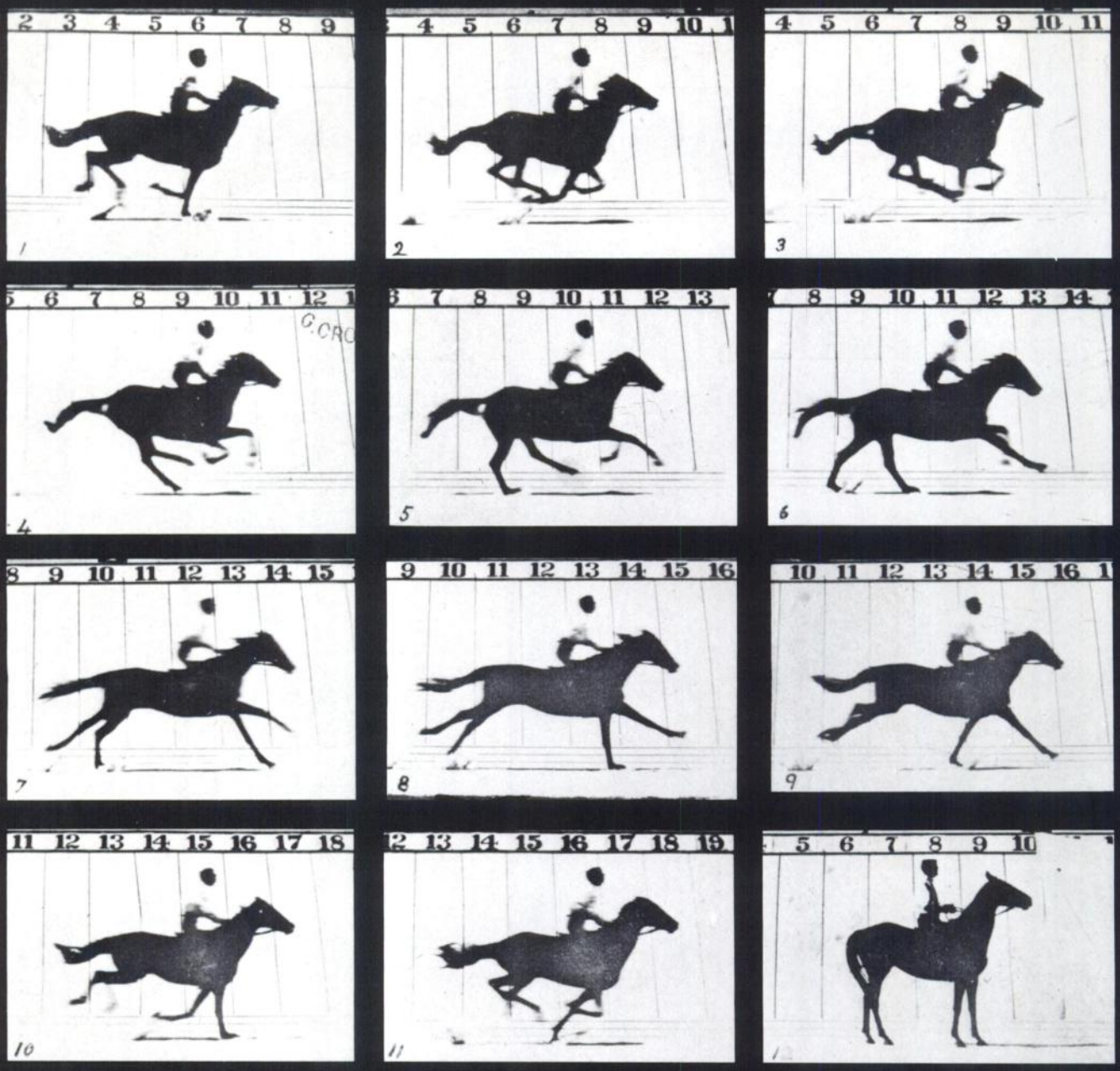

Eadweard Muybridge: *Galloping Horse*, 1878.
International Museum of Photography, Rochester, NY

SI-7-8343R1 1007CMO1772

One hundred years ago our concept of how a horse ran was limited to what we thought we saw—the two front legs touching the ground in unison to propel the horse forward, followed by the two hind legs hitting the ground as the front legs recovered. But in 1878, Eadweard Muybridge altered our awareness of reality with 12 great pictures of a galloping horse—stopping the action with a very fast shutter speed. He not only successfully demonstrated that for an instant (panels 2 & 3) all four legs actually lose touch with the ground altogether, but also that horses only place one leg down at a time. Thus, he extended our vision and enabled men to see things that are not normally visible to the human eye.

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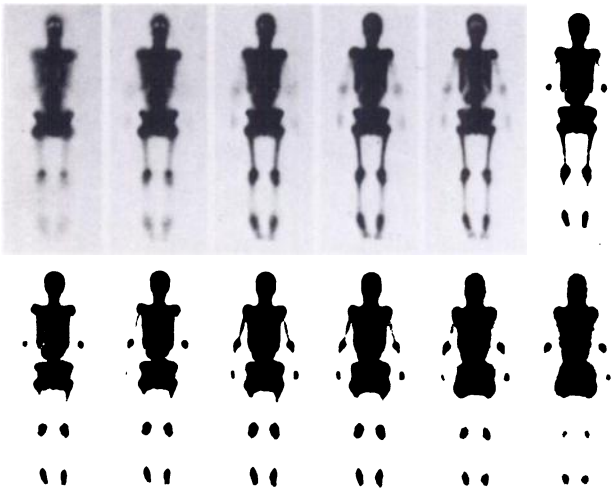

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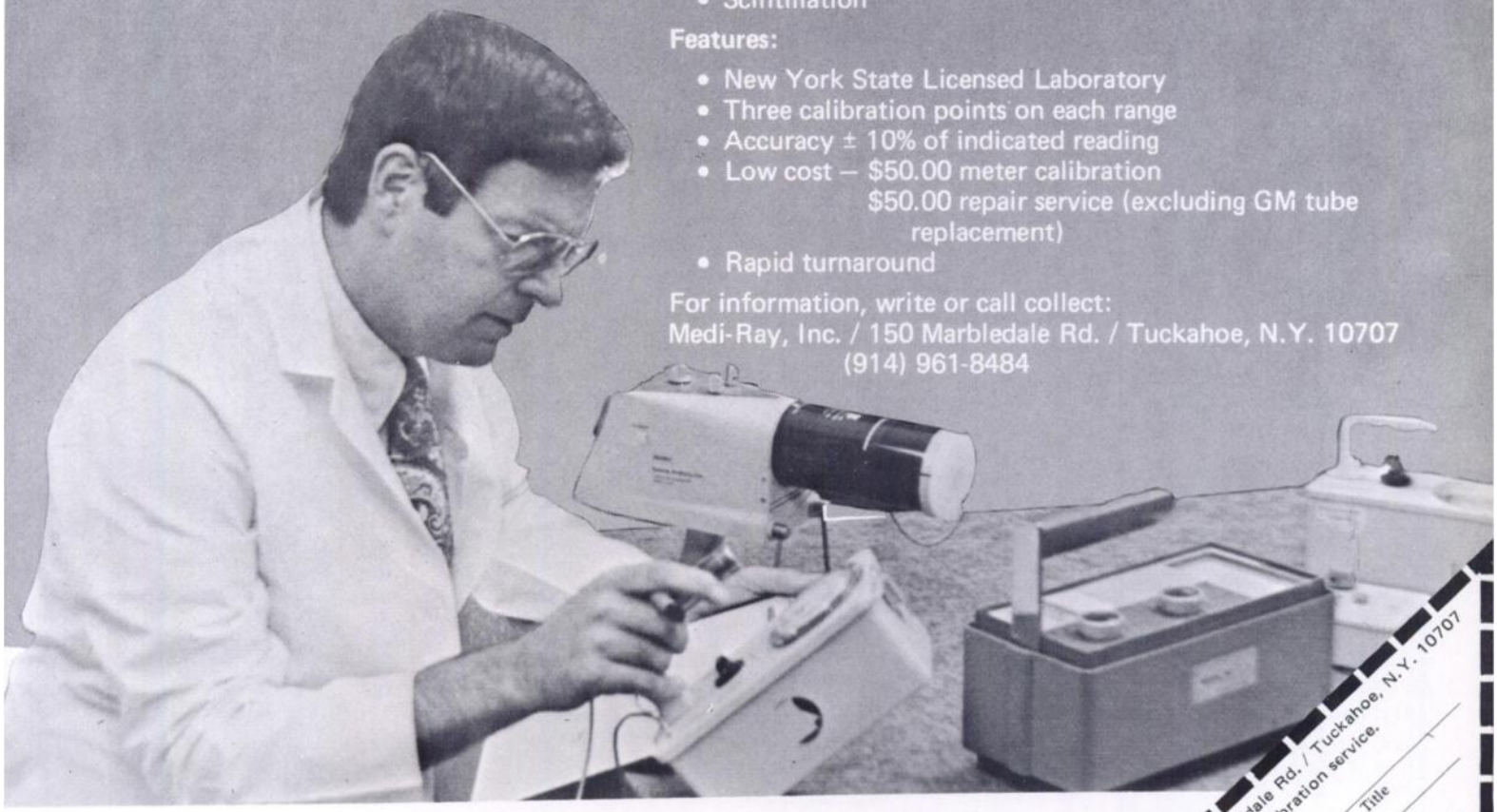

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Textbook of Nuclear Medicine: Basic Science

(32 Contributors)

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Director, Centro de Medicina Nuclear da Guanabara
Advisor, Comissão Nacional de Energia Nuclear
Rio de Janeiro

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Basic science—a comprehensive treatment of nuclear medicine—is presented in this general textbook which covers every aspect from basic atomic structure and measurement of radioactivity to activation analysis and the newest developments in computerized tomography and ultrasound. This volume reflects the recent technologic advances from many contributing fields such as physics, chemistry, engineering and energy, while retaining all of the important elements which form the basic science of nuclear medicine. It is an international collaboration which brings together contributions from recognized authorities throughout the world.

Representing completely new treatment not found in most standard texts are chapters that the reader will find especially interesting, including labeled carbon breath analysis, *in vitro* neutron activation analysis, ultrasound and computerized tomography. Also included are extensive sections on radiochemistry, radionuclide production and instrumentation. Initially discussing the physical basis of matter and energy, radioactivity, decay processes, and interaction of radiation with matter, the text provides excellent coverage of radiation detector systems, radioactivity and statistical counting, compartmental analysis, biologic effects of radiation, radiation dosimetry and safety, production of radionuclides, radionuclide generator systems, radiopharmaceutical chemistry of technetium and iodine, radiopharmaceutical quality control, and discussion of rectilinear scanners, scintillation cameras, and computer systems.

This highly functional and concise text is intended for use by practicing physicians, students, and residents in nuclear medicine, and as a useful reference for the laboratory scientist with nuclear counting and radioassay problems.

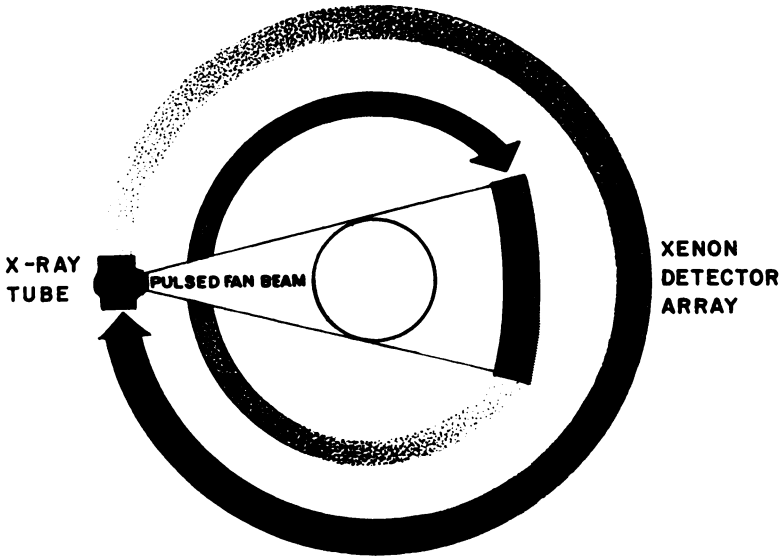

FIG. 17-9. *Third generation pure rotational fan-beam scanning.*

TEXTBOOK OF NUCLEAR MEDICINE: Basic Science is designed as one of two volumes which together provide a composite picture and solid grounding of both fundamentals and clinical application of nuclear medicine. The companion volume, edited by Doctors Rocha and Harbert, is entitled **TEXTBOOK OF NUCLEAR MEDICINE: Clinical Applications**, and is available from Lea & Febiger.

412 pages (7 x 10), illustrated, $27.50
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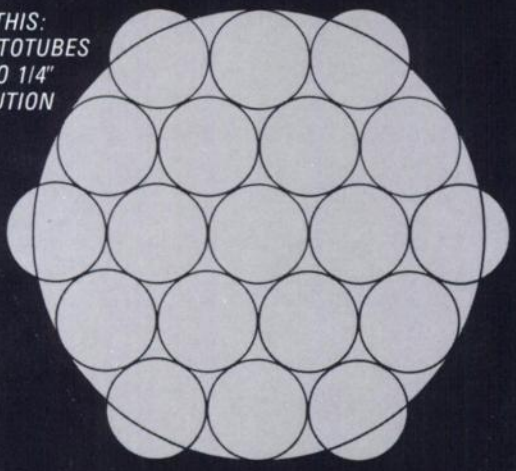

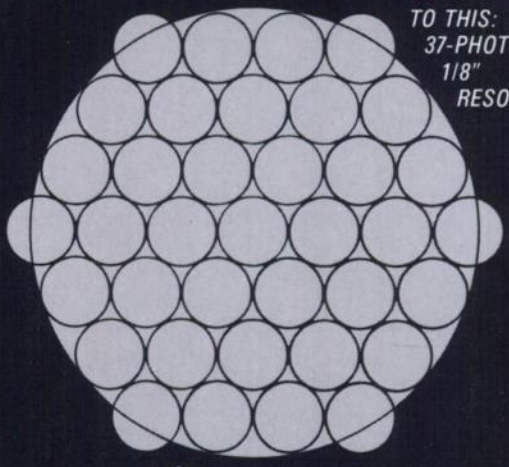

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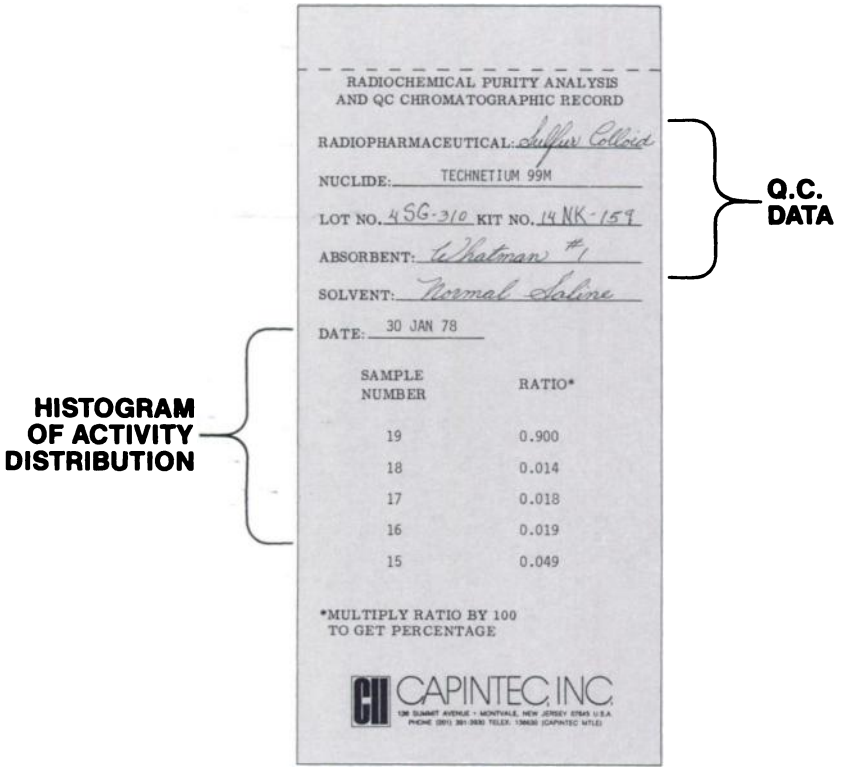

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NUCLIDE: TECHNETIUM 99M
LOT NO. 4SG-310 KIT NO. 14NK-159
ABSORBENT: Whatman #1
SOLVENT: Normal Saline
DATE: 30 JAN 78

SAMPLE NUMBER	RATIO*
19	0.900
18	0.014
17	0.018
16	0.019
15	0.049

*MULTIPLY RATIO BY 100
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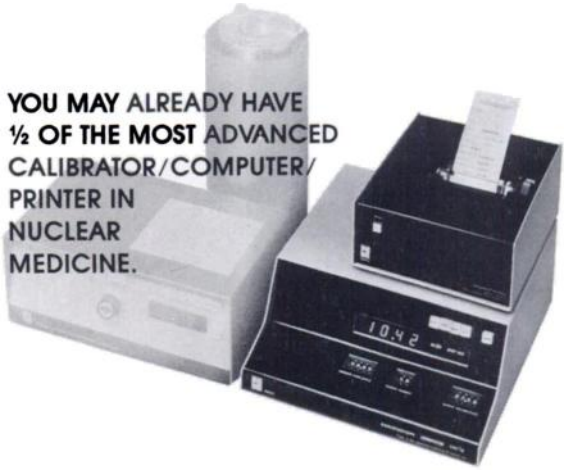

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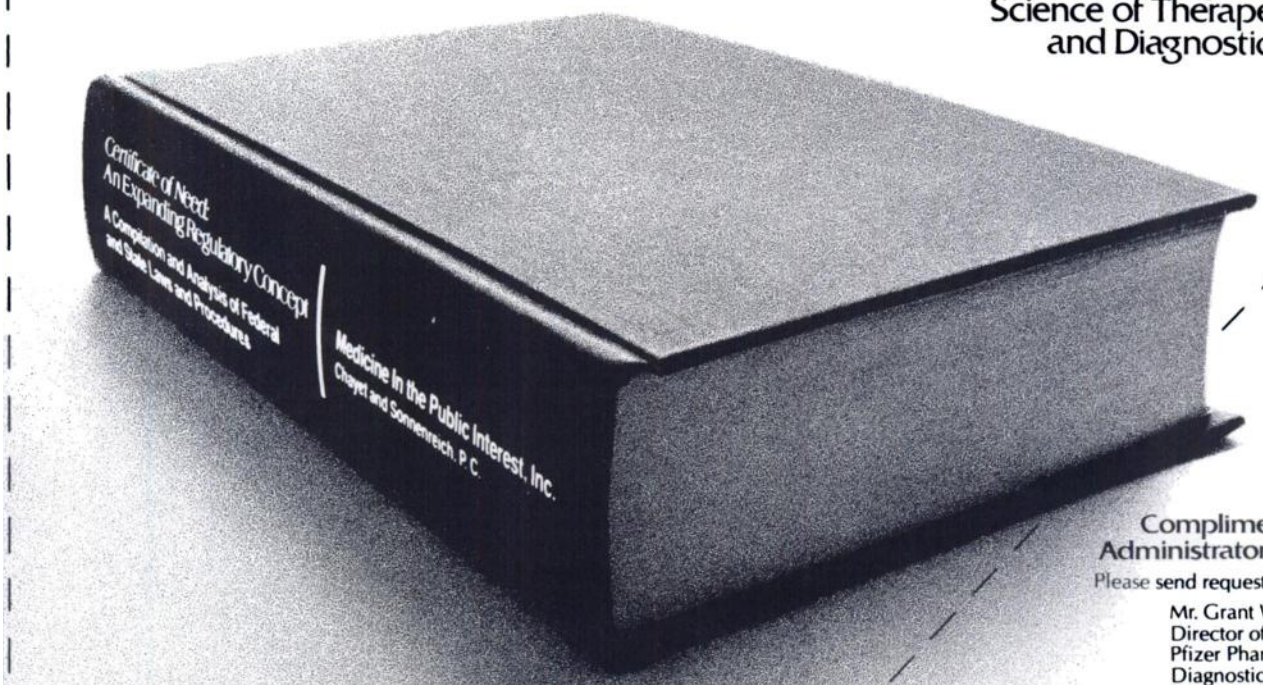

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NUCLEAR MEDICINE RESIDENCY Medical College of Wisconsin. Two year integrated program including 710 bed VA General Hospital, 600 bed County Medical Complex and two large community hospitals. Several cameras each interfaced to computer. Ultrasound training included. Positions available to July 1979. Nondiscrimination in employment. Contact Robert C. Meade, M.D. Chief, Nuclear Medicine Service VA Center, Milwaukee, WI 53193 414-384-2000, EXT 2138

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FACULTY POSITION IN NUCLEAR Medicine (Medical Imaging): Associate or Assistant Professor in Department of Radiology of university based academic program. Position involves work in Nuclear Medicine, Ultrasound, and Body CT. 15,000 imaging procedures performed annually in two hospitals. Particular interest in training in Cardiac Nuclear Medicine is desired. Salary open. Equal Opportunity Employer. Contact: C. M. Boyd, M.D., University of Arkansas for Medical Sciences, 4301 W. Markham, Little Rock, Arkansas 72201.

IMAGING FELLOWSHIP: FIRST OR Second Year Imaging Fellowship (includes Nuclear Medicine, Ultrasound, and CT Imaging) available in university based AMA approved program in mid-south. Approximately 850 beds for clinical activities, and 15,000 Nuclear Medicine imaging procedures annually. Prefer applicants with 2-3 years radiology training. Contact: C. M. Boyd, M.D., University of Arkansas for Medical Sciences, 4301 W. Markham, Little Rock, Arkansas 72201.

NUCLEAR RADIOLOGIC TECHNOLOgist. We are now accepting applications for a Registered Nuclear Radiologic Technologist to work in our Nuclear Imaging Department. Salary Range $917 to $1,170 per month. Salary negotiable within range. Registry eligible applicant may apply. This is a modern and progressive radiology facility serving a 50 member physician clinic and a 185 bed general hospital located in Bismarck, North Dakota. Inquire by calling (701)-222-5412 or write Personnel Director, Box 1818, Bismarck, North Dakota 58501. We are an equal opportunity employer.

REGISTERED NUCLEAR MEDICINE technologist needed for 200-bed acute general hospital. Desire experience in cardiac imaging and computations. Competitive salary, excellent fringe benefits. Personal interview required. Send resume to: Dr. Jerry D. Wolf, Dept. of Radiology, Billings Deaconess Hospital, P.O. Box 2547, Billings, Montana 59103. Phone (406) 657-4013. An Equal Opportunity Employer.

NUCLEAR MEDICINE RESIDENCY: University of Oregon Health Sciences Center and Veterans Administration Hospital, two years, integrated, AMA approved program invites applications for July 1979 opening. A well rounded program includes rotation through ultrasound, C.T. Scanning and extensive in-vivo and in-vitro Nuclear Medicine procedures at both the University and VA Hospital. New Nuclear Medicine Technology Training Program will complement residency training from October 1978. Excellent facilities for research are provided during the second year of training. UOHSC and VA are both equal opportunity and affirmative action employers. For further information contact: G. T. Krishnamurthy, M.D., Director, UOHSC/VA Nuclear Medicine Residency Program, V. A. Hospital (115), 3710 S. W. US Veterans Hospital Road, Portland, Oregon 97201.

CONSULTANTS IN NUCLEAR MEDIcine with corporation offering health physics on a consulting basis to a large number of hospitals in North Central United States. Expense paid travel, not to exceed 25%. B.S. degree minimum. Fringe benefit program. Profit-sharing. Nuclear medicine experience required. Contact: Nuclear Medicine Associates, Inc., 9726 Park Heights Ave., Cleveland, Ohio 44125.

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NUCLEAR PHYSICIAN. THE NEW York Hospital and Cornell University Medical College are seeking a Board certified or Board eligible Nuclear Physician with at least two years training in Nuclear Medicine. The successful candidate will fill a staff position in the Division of Nuclear Medicine at The New York Hospital and receive an academic appointment at Cornell University Medical College. Background in Radiology, Internal Medicine, or Pathology is acceptable. Candidates must be prepared to assume major clinical and teaching responsibilities; outstanding research opportunities also available. Appointment for July 1, 1979 or sooner. Contact David V. Becker, M.D., Chief, Division of Nuclear Medicine, The New York Hospital-Cornell Medical Center, 525 East 68th Street, New York, New York 10021.

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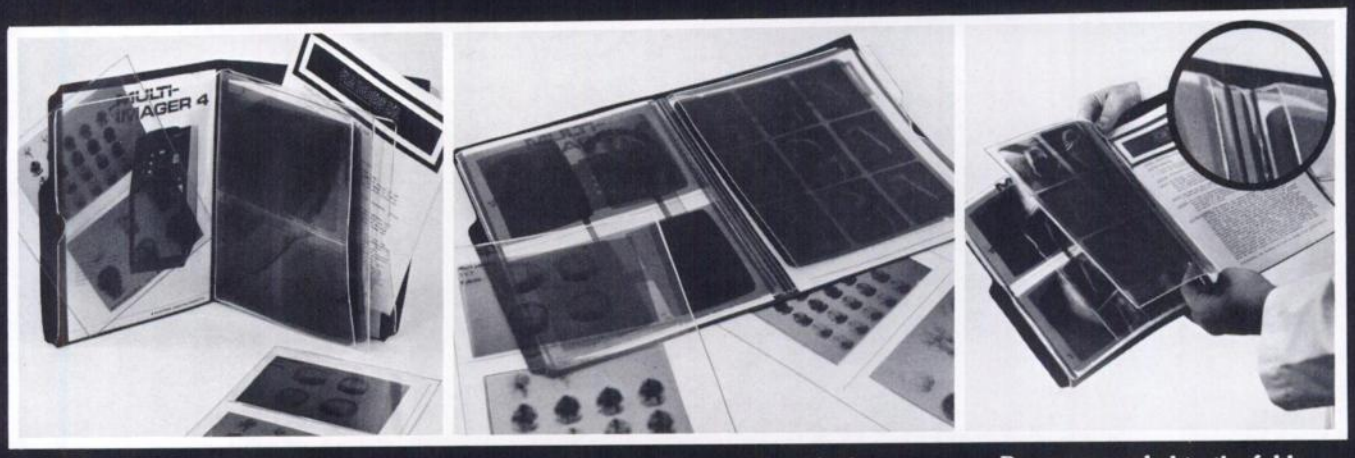

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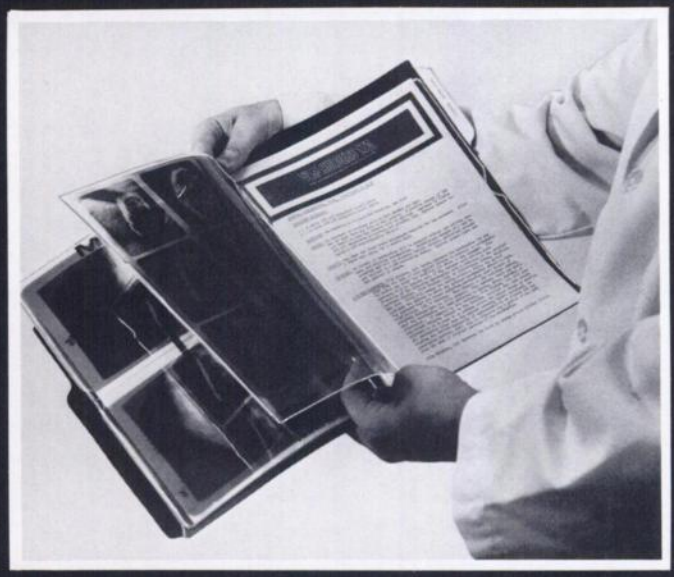

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Merrill A. Bender, M.D., Program Director, Dept. of Nuclear Medicine, 666 Elm St., Buffalo, NY 14263.

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Fellowships (2) with emphasis on cardiac and pulmonary disease are available in association with the Texas Heart Institute. With the mobile capabilities and a large population of critically ill patients (total hospital beds, 1000; intensive care beds, 100), participation in one of the most rapidly growing areas of clinical nuclear medicine is possible with potential for participation in several research projects related to cardiovascular, pulmonary, and critical care nuclear medicine.

Requests for further information should be directed to John A. Burdine, M.D., Chief, Nuclear Medicine Section, or Paul H. Murphy, Ph.D., Residency and Fellowship Coordinator, Department of Radiology, Baylor College of Medicine, Houston, Texas 77030.

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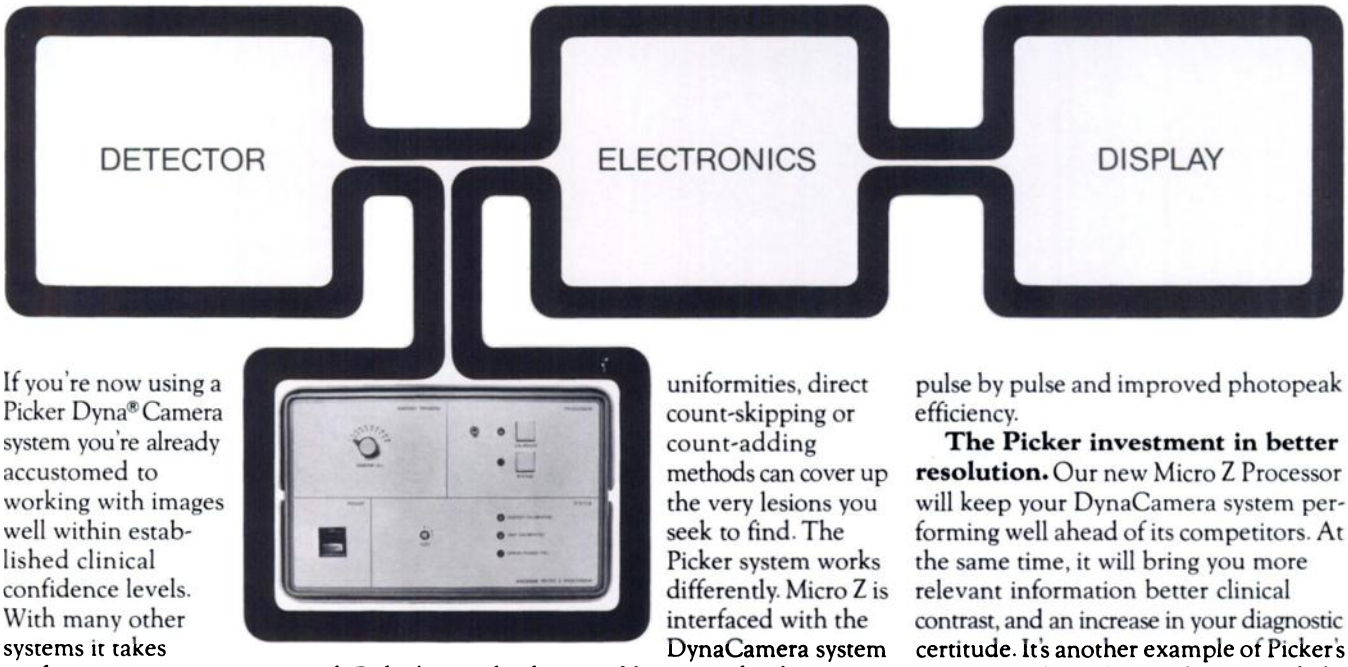

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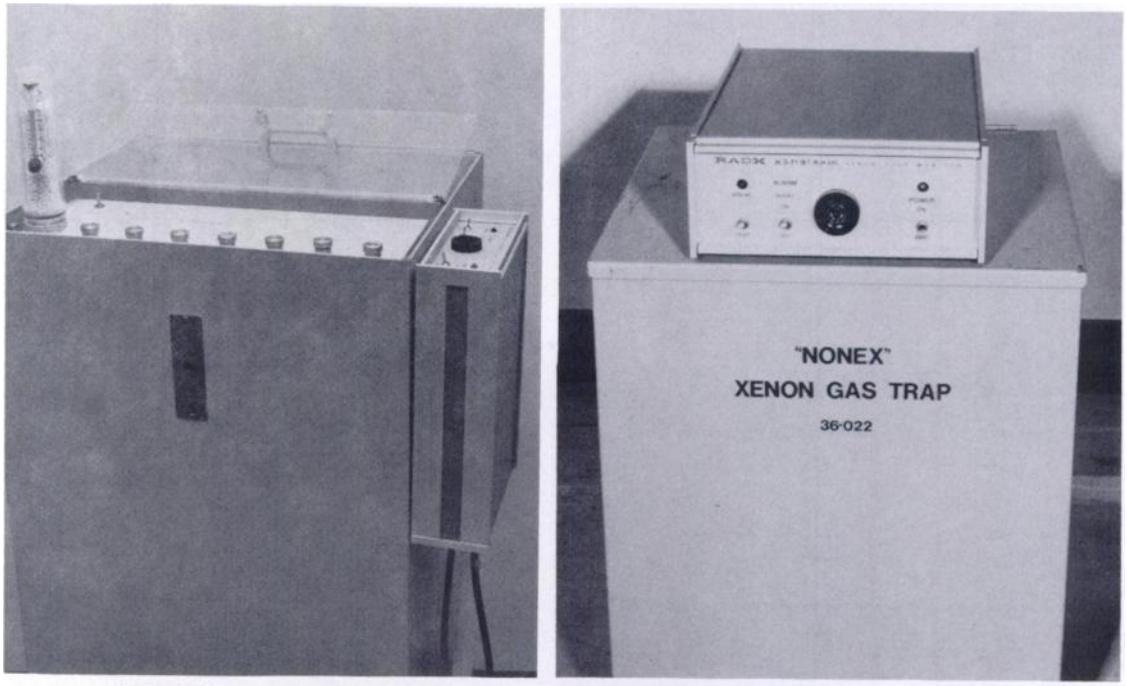

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[1] *Timpe, G.M. Precautions for Avoiding ^{133}Xe Release From Charcoal Xenon Traps. Journal of Nuclear Medicine Technology Volume 4, Number 4, Pages 208-209.*

JNM CLASSIFIED PLACEMENT SERVICE SECTION

This section in the Journal of Nuclear Medicine contains "Positions Open", "Positions Wanted", and "For Sale" listings. Nondisplay "Positions Wanted" ads by members of the Society are billed at 50¢ per word for each insertion with no minimum rate. Nondisplay "Positions Wanted" ads by nonmembers and all nondisplay "Positions Open" and "For Sale" ads by members and nonmembers are charged at 75¢ per word. Display advertisements are accepted at $100 for ⅛ page, $145 for ¼ page, $245 for ½ page, and $425 for a full page. Closing date for each issue is the 1st of the month preceding publication. Agency commissions and cash discounts are allowed on display ads only. Box numbers are available for those who wish them.

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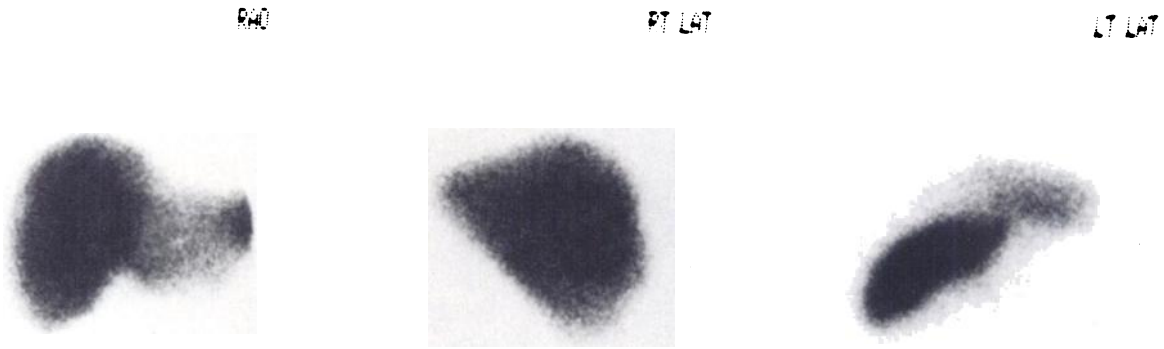

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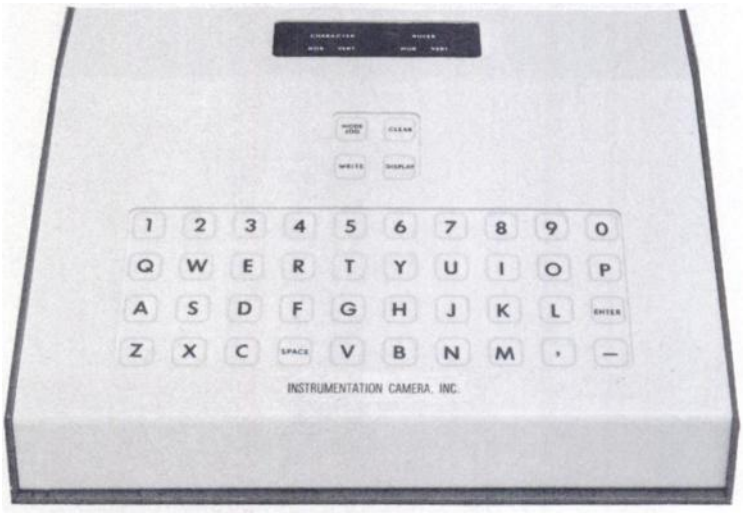

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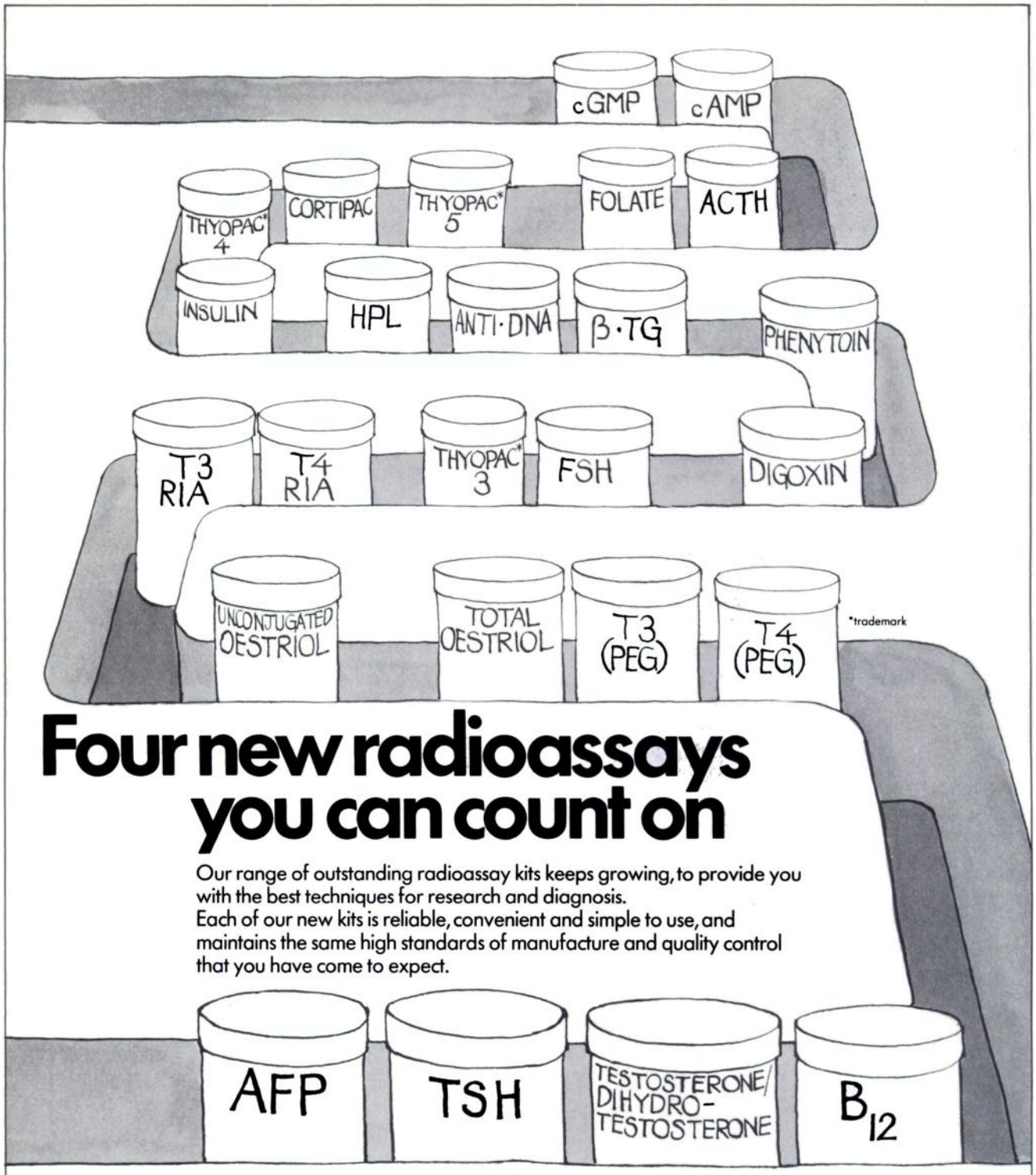

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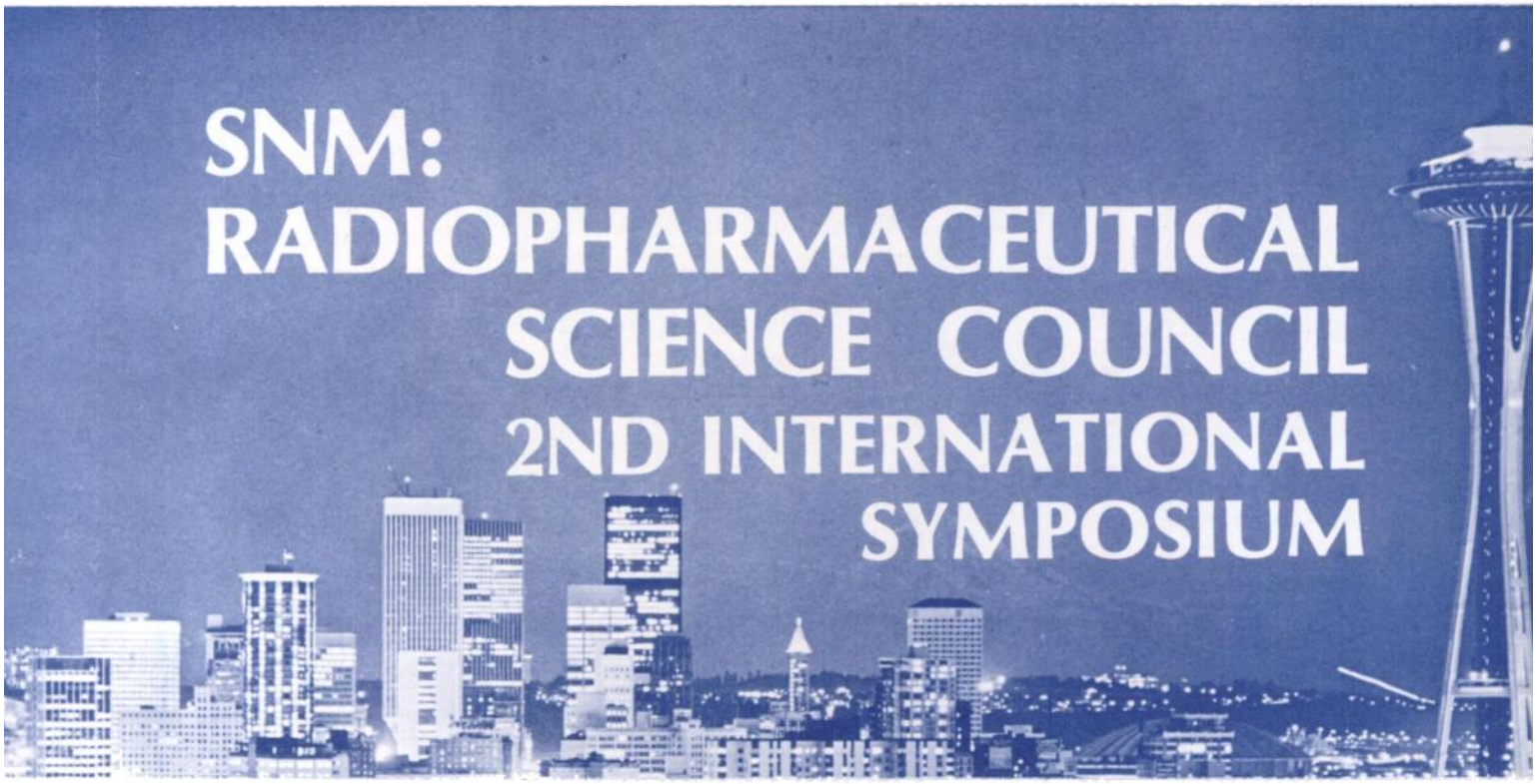

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PRELIMINARY PROGRAM

SECOND INTERNATIONAL SYMPOSIUM ON RADIOPHARMACEUTICALS

Sponsored by the Radiopharmaceutical Science Council of the Society of Nuclear Medicine to be held March 19-22, 1979 at the Olympic Hotel. Seattle, Washington

Monday - March 19	Tuesday - March 20	Wednesday - March 21	Thursday - March 22
KEYNOTE SPEAKER: Gov. Dixie Lee Ray	**FUNCTIONAL IMAGING:** H. Atkins (Brookhaven Nat'l Lab.)	**RES/BILIARY:** M. Loberg (Univ. of Maryland)	**PANCREAS, PROSTATE AND ADRENALS:** M. Blau (SUNY, Buffalo)
PANEL ON REGULATORY AFFAIRS: Leaders from Gov't., Industry & Users	**INORGANIC RADIOPHARMACEUTICALS** E. Deutsch (Univ. of Cincinnati)	**RENAL:** S. Winchell (Medi+Physics)	**THYROID:** H. Nishyama (FDA)
RADIONUCLIDE PRODUCTION P. Silvester (U. K.)	**ORGANIC RADIOPHARMACEUTICALS** A. Wolf (Brookhaven Nat'l Lab.)	**CENTRAL NERVOUS SYSTEM:** M. J. Welch Mallinckrodt Inst. of Rad.	**SKELETAL:** M. Francis (Procter & Gamble Co.)
QUALITY CONTROL: K. Kristiansen (Denmark)	**IMMUNOLOGY** R. Ekins (U.K.)		**CARDIOPULMONARY** J. Pohost (Mass. Gen . Hosp.) G. Hamilton (Univ. of Wash.)
ICE BREAKER COCKTAIL PARTY	**ONCOLOGY/ HEMATOLOGY:** J. Adelstein (Peter Bent Brigham Hospital) G. Ege (Canada)	**SALMON BARBEQUE**	

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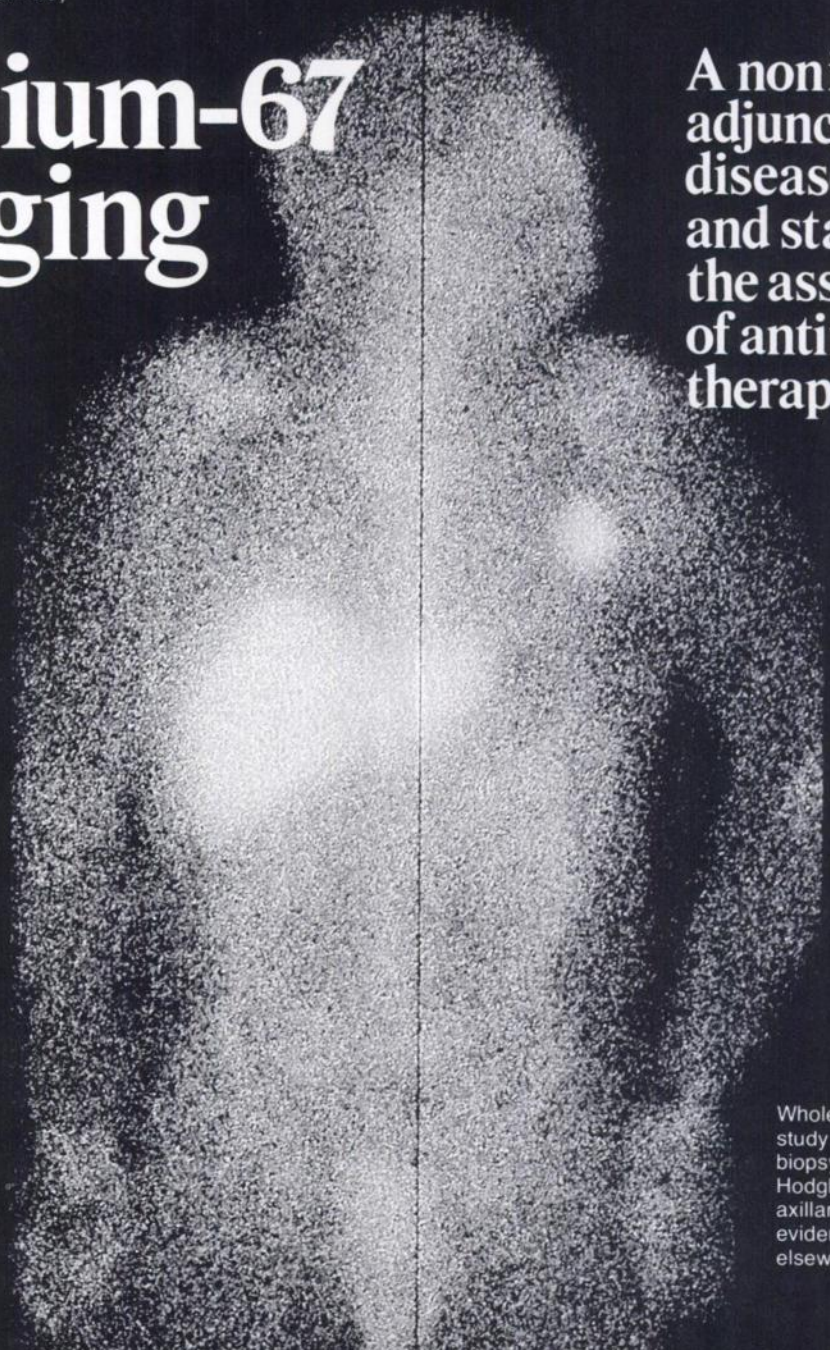
In suspected or known bronchogenic carcinoma, Hodgkin's disease and certain lymphomas, consider

Gallium-67 imaging

A noninvasive adjunct to disease diagnosis and staging, and the assessment of antineoplastic therapy



Whole-body gallium-67 study of patient with biopsy-confirmed Hodgkin's disease in axillary nodes; no evidence of disease elsewhere.

Gallium Citrate Ga 67

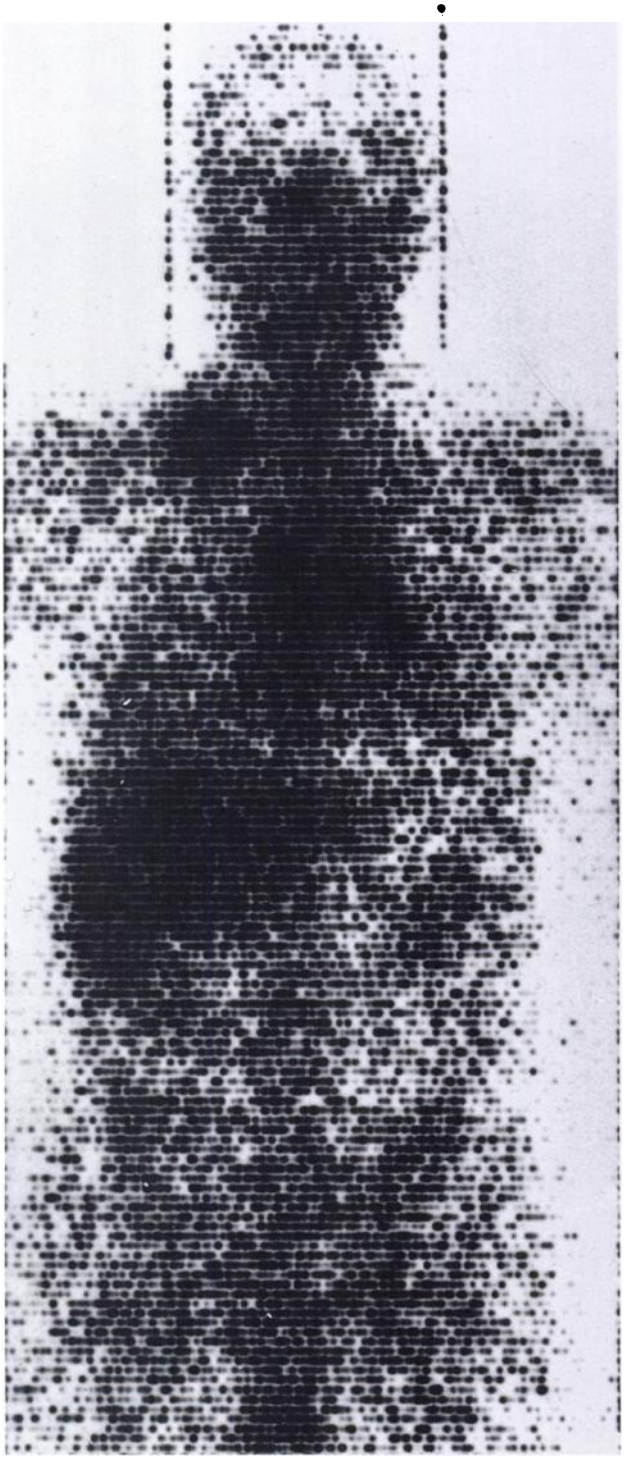
NEN New England Nuclear

Gallium-67 imaging: assessment of therapy

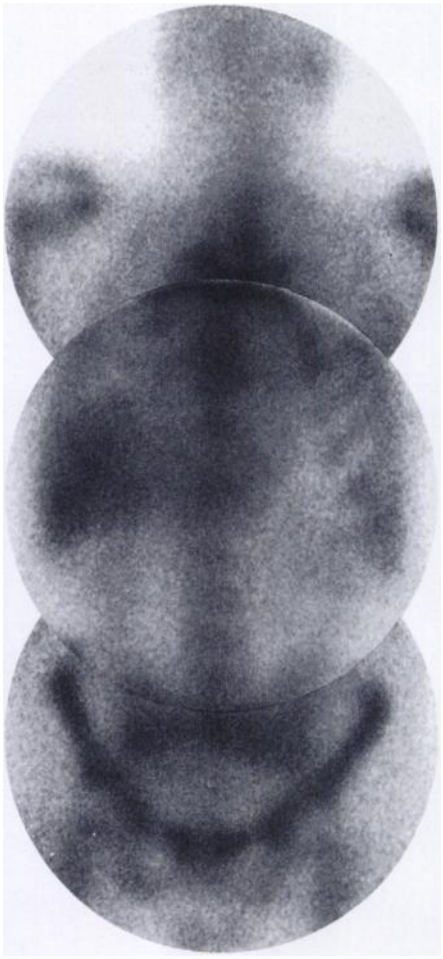
Bronchogenic Ca

72-year-old male with neck mass; biopsy revealed anaplastic carcinoma from an uncertain primary site. Chest X-ray considered to demonstrate only mediastinal widening and neck mass. Pulmonary tomography, barium studies of bowel and IVP all negative.

Gallium-67 scan displayed neck tumor and abnormally intense uptake in mediastinum and left lung, confirmed by cytologic studies as primary lesion. Gallium-67 study helped suggest site of primary lesion, aided in disease staging and planning of radiation therapy to limited field.



Hodgkin's disease

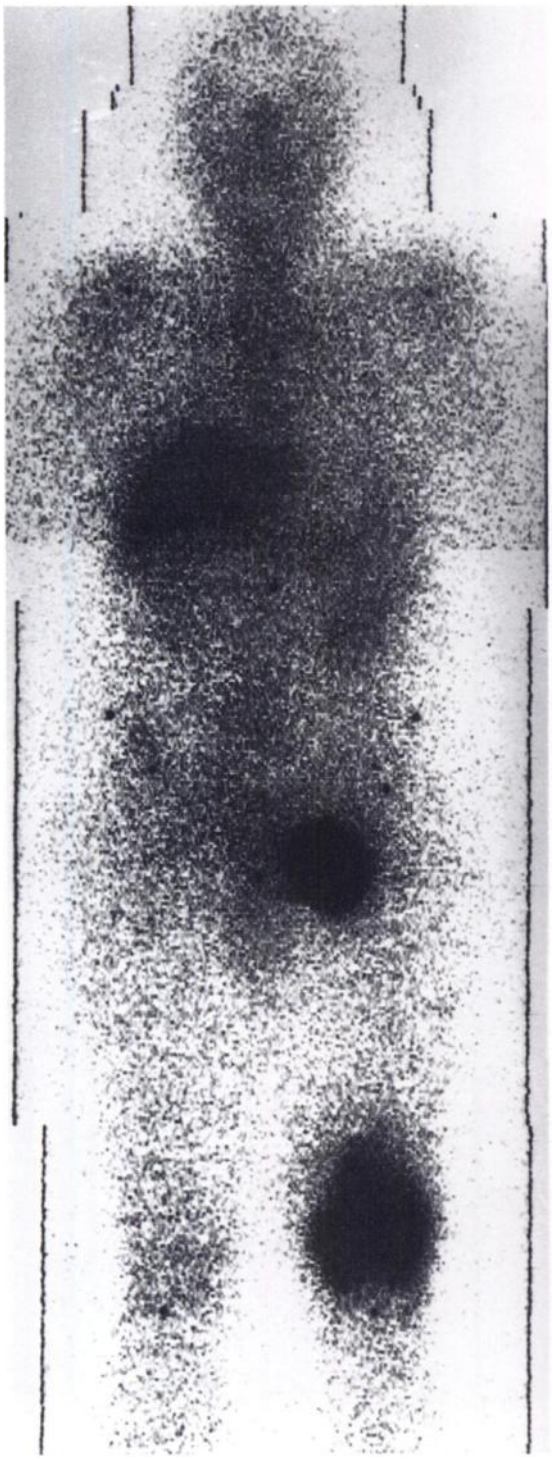


21-year-old male with low-grade FUO of six weeks duration, profuse diaphoresis and general malaise. The only finding upon physical examination was shotty adenopathy of left axilla. Chest X-ray normal.

Gallium-67 spot images disclosed hilar and carinal uptake, confirmed upon mediastinoscopy as stage 2B Hodgkin's disease.

for diagnosis, staging,

Lymphoma



46-year-old male with known history of lymphoma complained of swelling in groin; lymphangiography demonstrated large foamy nodes, some with partial replacement and some with total replacement.

Gallium-67 whole-body scan clearly imaged inguinal adenopathy and, in addition, revealed occult abnormality of left distal femur. Subsequent bone films and biopsy confirmed skeletal involvement.

In hundreds of institutions across the nation, gallium-67 imaging is a valuable adjunct in the diagnosis, staging and assessment of therapy directed against bronchogenic carcinoma, Hodgkin's disease and certain lymphomas.

Gallium-67 imaging can help

- detect primary and metastatic disease, particularly when employed with such traditional nuclear medicine studies as bone, brain and liver scanning
- stage disease, eg, in planning or supplementing laparotomy and lymphangiography; it is particularly valuable for staging disease in patients for whom invasive procedures are contraindicated
- assess efficacy of surgery, radiation therapy or chemotherapy in patients with demonstrated pretherapy gallium-67 uptake

New England Nuclear supplies, upon request, a special nuclear medicine department reference manual on the use of Gallium Citrate Ga 67. It also provides without charge a complete teaching rounds program on the clinical utilization of gallium-67 imaging. The program, which consists of 35mm slides, lecture outlines, home-study monographs and self-examinations, is approved for two hours of elective continuing education credit.

For additional information on gallium-67 imaging, or to schedule the teaching rounds program for your institution, write to the Teaching Program Administrator, New England Nuclear, 549 Albany Street, Boston, Mass. 02118.

Gallium Citrate Ga67

The established tumor imaging agent from the established leader in nuclear imaging

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Please see following page for full prescribing information.

Gallium Citrate Ga67

FOR DIAGNOSTIC USE

DESCRIPTION: Gallium Citrate Ga 67 is supplied in isotonic solution as a sterile, non-pyrogenic diagnostic radiopharmaceutical for intravenous administration. Each milliliter of the isotonic solution contains 2mCi of Gallium Ga 67 on the calibration date, as a complex formed from 9ng gallium chloride Ga 67, 2mg of sodium citrate, 6.8mg sodium chloride, and 0.9% benzyl alcohol w/v as preservative. The pH is adjusted to between 4.5-7.5 with hydrochloric acid and/or sodium hydroxide solution. Gallium Ga 67, with a half-life of 78 hours, is cyclotron produced by the proton irradiation of enriched zinc oxide, is essentially carrier-free and contains negligible concentrations of other radioactive isotopes.

PHYSICAL CHARACTERISTICS

Gallium Ga 67 decays to stable Zinc Zn 67 by electron capture with a physical half-life of 78 hours.

TABLE 1. Principal Radiation Emission Data

Radiation	Mean % per Disintegration	Mean Energy (keV)
Gamma-2	37.6	93.3
Gamma-3	20.5	184.6
Gamma-5	16.0	300.2
Gamma-6	4.4	393.5

TABLE 2. Gallium Ga 67 Decay Chart
Half-Life 78 Hours

Hours	Fraction Remaining	Hours	Fraction Remaining	Hours	Fraction Remaining
-48	1.53	30	0.77	90	0.45
-36	1.38	36	0.73	96	0.43
-24	1.24	42	0.69	108	0.38
-12	1.11	48	0.65	120	0.35
- 6	1.05	54	0.62	132	0.31
0*	1.00	60	0.59	144	0.28
6	0.95	66	0.56	156	0.25
12	0.90	72	0.53	168	0.23
18	0.85	78	0.50		
24	0.81	84	0.47	*Calibration Time.	

EXTERNAL RADIATION

The specific gamma ray constant for Gallium Ga 67 is 1.6R/mCi-hr. at 1cm. The first half value thickness of lead is 0.04mm. A range of values for the relative attenuation of the radiation emitted by this radionuclide that results from interposition of various thicknesses of Pb is shown in Table 3. For example, the use of 8mm of Pb will decrease the external radiation exposure by a factor of 61.

TABLE 3. Radiation Attenuation by Lead Shielding

mm of Pb	Radiation Attenuation Factor	mm of Pb	Radiation Attenuation Factor
1	4.2	5	22
2	7.0	6	31
3	11	7	44
4	15	8	61

CLINICAL PHARMACOLOGY: Carrier-free Gallium Citrate Ga 67 has been found to concentrate in certain viable primary and metastatic tumors. The mechanism of concentration is unknown, but investigational studies have shown that Gallium Ga 67 accumulates in lysosomes and is bound to a soluble intracellular protein.

It has been reported in the scientific literature that following intravenous injection, the highest tissue concentration of Gallium Ga 67—other than tumors—is in the renal cortex. After the first day, the maximum concentration shifts to bone and lymph nodes, and after the first week, to liver and spleen. Gallium is excreted relatively slowly from the body. The average whole body retention is 65% after 7 days, with 26% having been excreted in the urine and 9% in the stools.

INDICATIONS AND USAGES: Gallium Citrate Ga-67 may be useful in demonstrating the presence and extent of the following malignancies: Hodgkins disease, lymphomas and bronchogenic carcinoma. Positive Ga-67 uptake in the absence of prior symptoms warrants follow-up as an indication of a potential disease state.

CONTRAINDICATIONS: None known.

WARNINGS: Gallium Citrate Ga 67 should not be administered to children or to patients who are pregnant or to nursing mothers unless the information to be gained outweighs the potential hazards. Ideally, examinations using radiopharmaceutical drug products, especially those elective in nature of a woman of childbearing capability should be performed during the first few (approximately ten) days following the onset of menses.

PRECAUTIONS: A thorough knowledge of the normal distribution of intravenously administered Gallium Citrate Ga 67 is essential in order to accurately interpret pathologic studies.

The findings of an abnormal gallium concentration usually implies the existence of underlying pathology, but further diagnostic studies should be done to distinguish benign from malignant lesions. Gallium Citrate Ga 67 is intended for use as an adjunct in the diagnosis of certain neoplasms. Certain pathologic conditions may yield up to 40% false negative gallium studies. Therefore a negative study cannot be definitively interpreted as ruling out the presence of disease.

Lymphocytic lymphoma frequently does not accumulate Gallium Ga 67 sufficiently for unequivocal imaging; and the use of gallium with this histologic type of lymphoma is not recommended at this time.

Gallium Citrate Ga 67, as well as other radioactive drugs, must be handled with care and appropriate safety measures should be used to minimize external radiation exposure to clinical personnel. Also, care should be taken to minimize radiation exposure to patients consistent with proper patient management.

No long term animal studies have been performed to evaluate carcinogenic potential.

Adequate reproduction studies have not been performed in animals to determine whether this drug affects fertility in males or females, has teratogenic potential, or has other adverse effects on the fetus. Gallium Citrate Ga 67 should be used in pregnant women only when clearly needed.

Gallium Citrate Ga 67 has been found to accumulate in breast milk and should not be used in nursing mothers.

Safety and effectiveness in children have not been established.

ADVERSE REACTIONS: Severe itching, erythema and rash were observed in one patient of 300 studied.

DOSAGE AND ADMINISTRATION: The recommended adult (70kg) dose of Gallium Citrate Ga 67 is 2-5mCi. Gallium Citrate Ga 67 is intended for intravenous administration only.

Approximately 10% of the administered dose is excreted in the feces during the first week after injection. Daily laxatives and/or enemas are recommended from the day of injection until the final images are obtained in order to cleanse the bowel of radioactive material and minimize the possibility of false positive studies.

Studies indicate the optimal tumor to background concentration of ratios are often obtained about 48 hours post-injection. However, considerable biological variability may occur in individuals, and acceptable images may be obtained as early as 6 hours and as late as 120 hours after injection.

The patient dose should be measured by a suitable radioactivity calibration system immediately prior to administration.

Radiopharmaceuticals should be used by persons who are qualified by specific training in the safe use and handling of radionuclides produced by nuclear reactor or particle accelerator and whose experience and training have been approved by the appropriate government agencies authorized to license the use of radionuclides.

RADIATION DOSIMETRY

The dosimetry values listed in Table 4 for Gallium Citrate Ga 67 are those of the MIRD Committee.*

TABLE 4. Dosimetry of Gallium Citrate Ga 67 for Maximal Dose of 5mCi

	Rads/5mCi		Rads/5mCi
Whole Body	1.30	Testes	1.20
Skeleton	2.20	Gastrointestinal Tract	
Liver	2.30	Stomach	1.10
Bone Marrow	2.90	Small Intestine	1.80
Spleen	2.65	Upper Large Intestine	2.80
Kidney	2.05	Lower Large Intestine	4.50
Ovaries	1.40		

*MIRD Dose Estimate Report No. 2, J. Nucl. Med. 14: 755-6. (1973).

HOW SUPPLIED: Gallium Citrate Ga 67 is supplied sterile and non-pyrogenic for intravenous use. Each ml contains 2mCi of Gallium Ga 67 on the calibration date, as a complex formed from 9ng gallium chloride Ga 67, 2mg of sodium citrate, 6.8mg sodium chloride, and 0.9% benzyl alcohol w/v as preservative. The pH is adjusted to between 4.5-7.5 with hydrochloric acid and/or sodium hydroxide solution.

Vials are available from 3mCi to 18mCi in increments of 3mCi on calibration date.

The contents of the vial are radioactive and adequate shielding and handling precautions must be maintained.

Catalog Number NRP-121

October 1977

New England Nuclear
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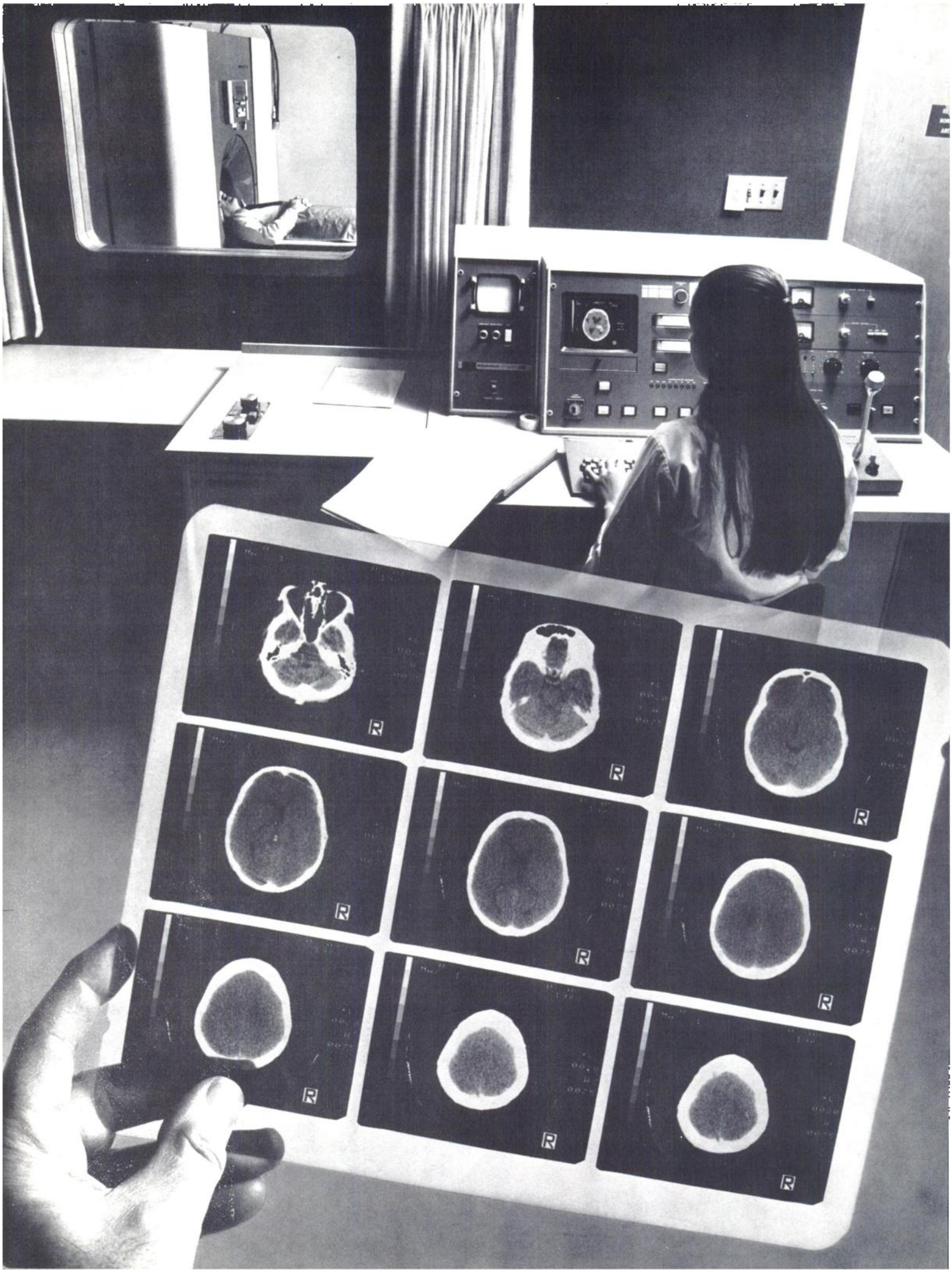

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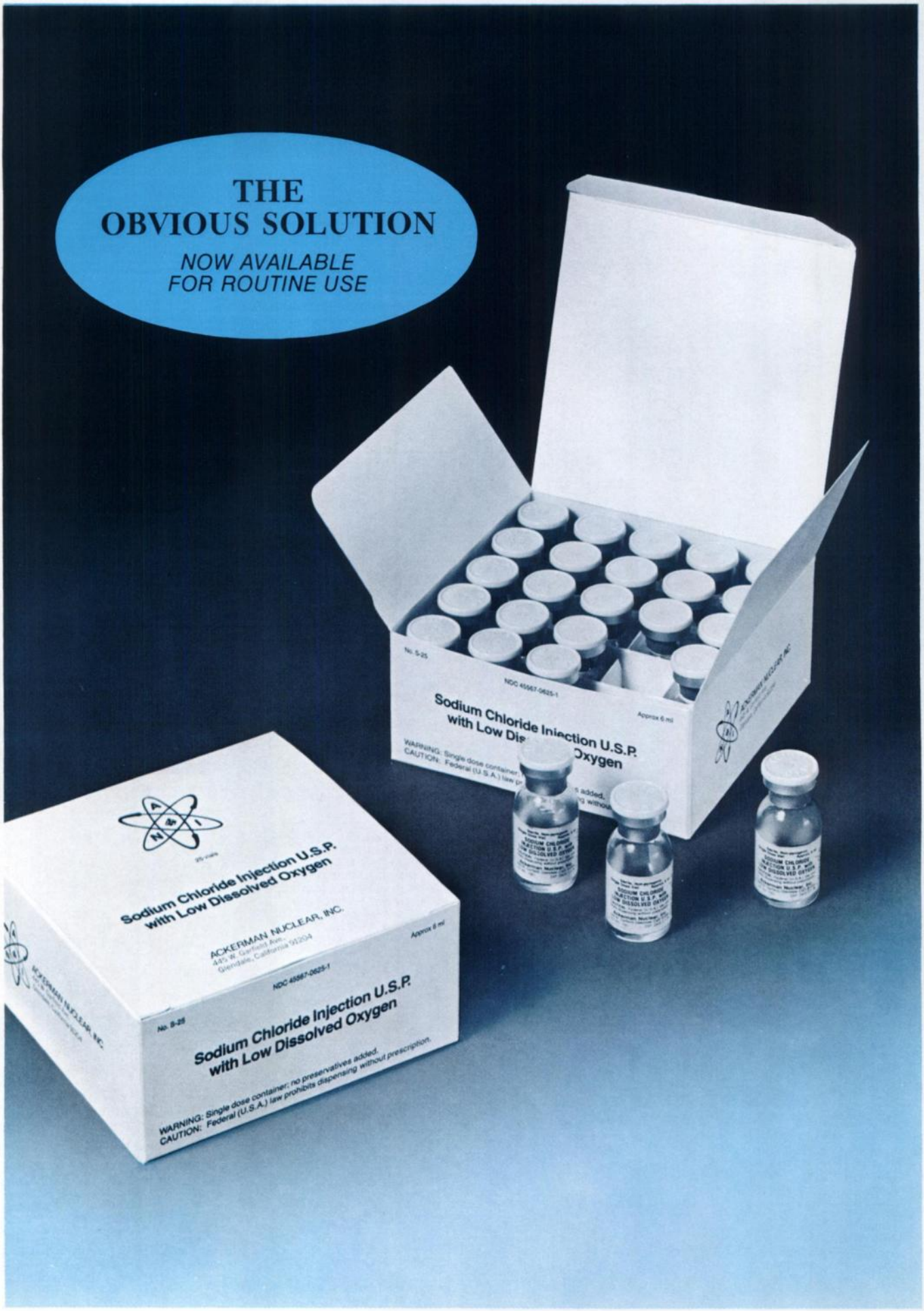
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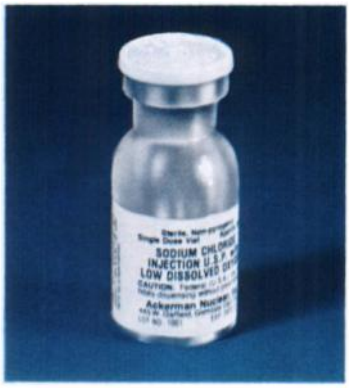

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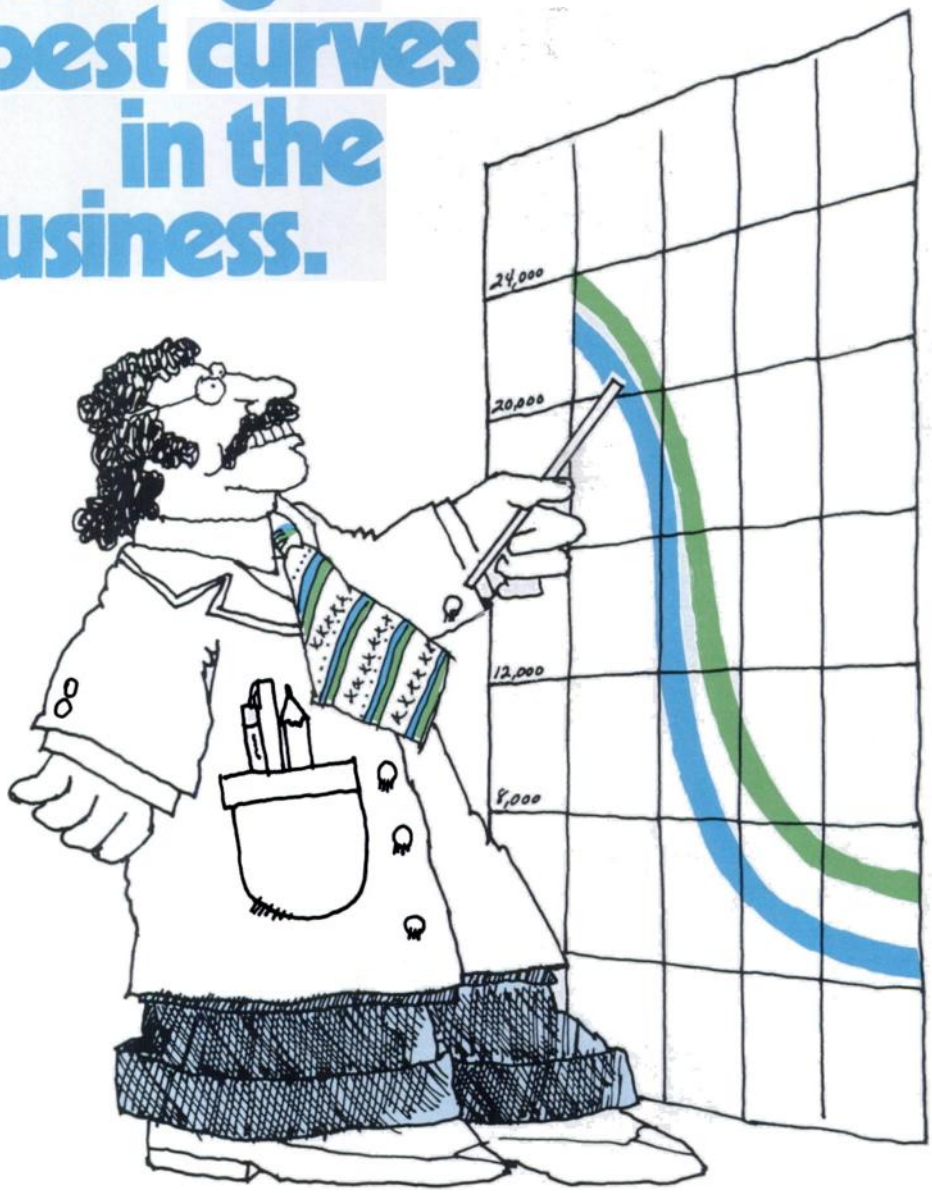

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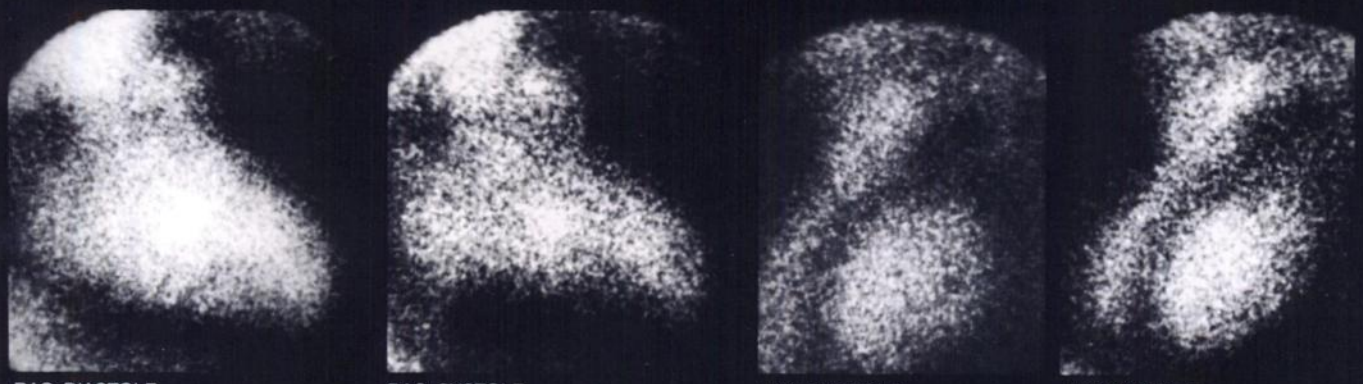
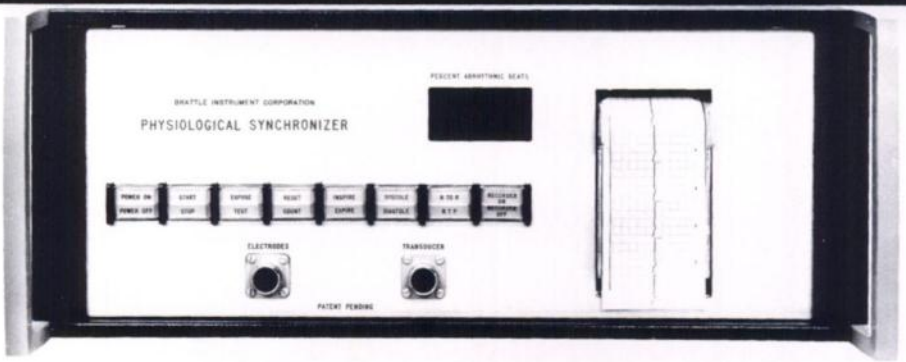


RAO, DIASTOLE | RAO, SYSTOLE | LAO, DIASTOLE | LAO, SYSTOLE

The RAO view shows akinesis of the lower antero-lateral wall and apex; and contraction of the inferior wall and high up the antero-lateral wall. The LAO view shows good contraction posteriorly and akinesis of the septal aspect of the chamber. Patient was injected IV with 20mCi of ^{99m}Tc-labelled Human Serum Albumin. The agent was prepared using the New England Nuclear Electrolysis Kit for labelling HSA. Write or call for a portfolio of Brattle-gated lung, liver and heart studies.



No knobs, no meters, no errors
The spartan panel above tells the second-best part of our story. If you want to photograph peak systole, press the SYSTOLE button. If, say, you want systole only at full expiration, press the EXPIRATION button as well. If only breathing is relevant, don't press the heart button.

The Brattle is connected to the patient and to your gamma (or x-ray or ultrasonic) camera. Whenever the patient is in the selected phase, both the scope and the scaler on your gamma camera are gated ON, and film is exposed. Otherwise, they are OFF.

Brattles lock onto patients—and stay locked on
It doesn't matter if the patient's heart rate and breathing depth change while he's under the collimator because we stay right with him. Brattles contain an ECG to track heart, a plethysmograph to track respiration, and a tiny computer to deduce systole and diastole times from the heart signal. And because it's all built in, your operator need not be a physiologist.

We don't cover our tracks—we print them
The panel lights flash whenever the patient reaches the selected phases; and pushing the RECORDER-ON button gets you an ECG tracing marked with breathing and camera-on times. You can verify function before, during and after exposure.

A single pair of axillary electrodes captures both heart and breath
It's easy. And we supply disposable, pre-filled electrodes.

Some Brattles have been in clinical use for over three years—in community and major hospitals
More than half of our instruments are in community hospitals and the list is growing rapidly. Upon request, we'll supply names of happy users in your area.

What's the next step? Get in touch
Ask your NEN man about Brattles and HSA Kits. He can show you a portfolio of clinical pictures and arrange to have one of our people give you a demo. Or write or call us direct. We'll send you brochures on this and other models, and will give you your own set of clinical pictures and a bibliography on gated scintigraphy. If you wish, we'll even make you a Brattle owner. (This is the best part of our story.)

Brattle Instrument Corporation

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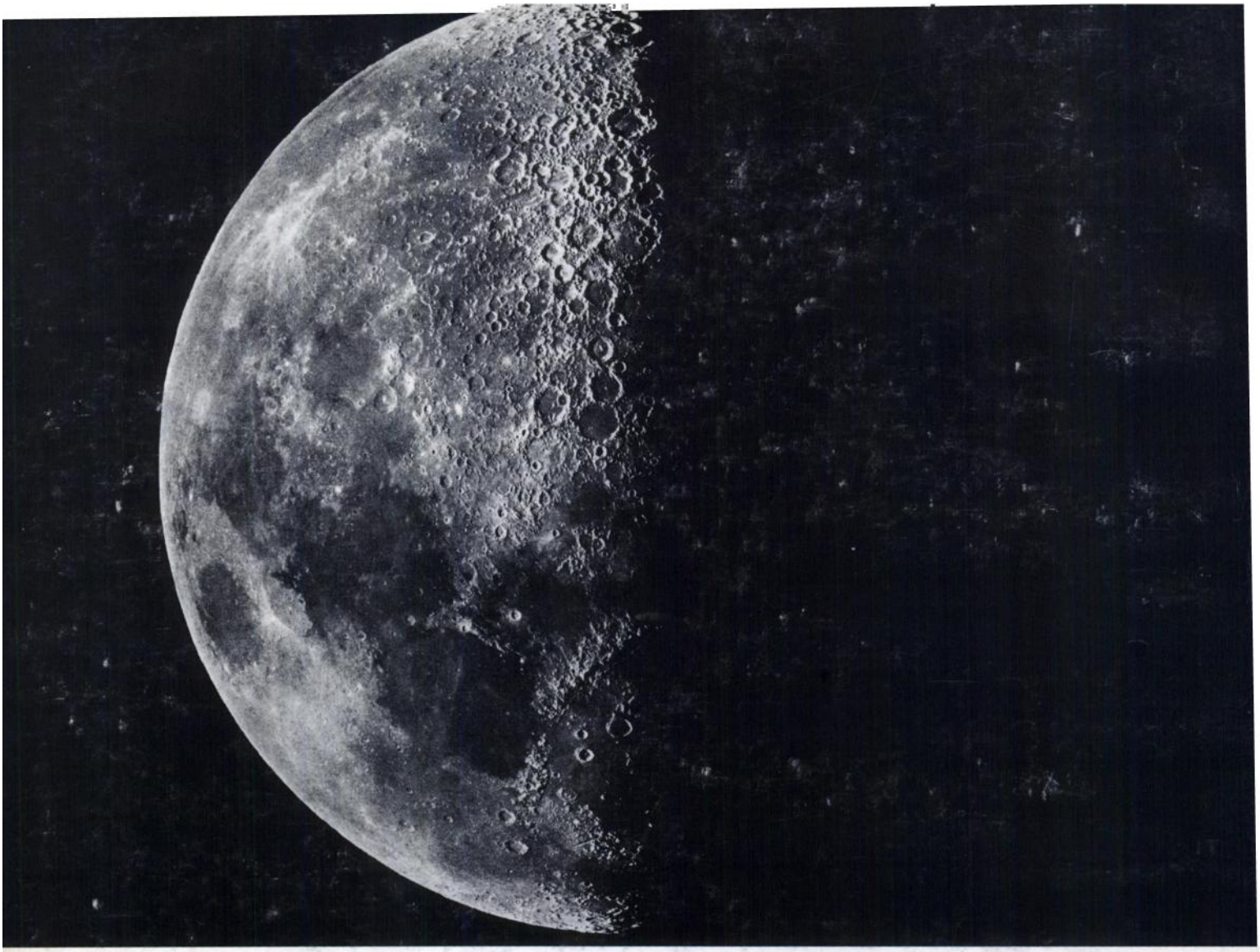

LOEWY & PUISEUX: THE MOON, 1894
Courtesy of Simone Gossner.

When a camera can be taken where one has never been before, man's perception of reality is expanded.

In many instances, our demand to see things more clearly could only be satisfied with technology that finally enabled cameras to go where one has never been before. In diagnostic imaging, Searle Radiographics' Pho/Gamma L.E.M. (low energy mobile) Scintillation Camera satisfies a similar demand in that it can be taken wherever the patient's environment may be, and incorporates state-of-the-art electronics that result in excellent inherent resolution and uniformity, as well as overall system reliability, accuracy, and image stability.

The Scintistore™ Time-compression Storage/Retrieval System docks compactly with the L.E.M. camera for transport and makes ventricular wall motion studies possible, as well as allowing playback of *all* studies in a fraction of real recording time.

Searle's Pho/Gamma L.E.M./ Scintistore combination extends nuclear medicine to the patient's environment to make GREAT IMAGES.

For detailed information on Searle's Pho/Gamma L.E.M./Scintistore combination, contact Searle Radiographics.

SEARLE

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SI-8-8442 1007CM01988