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.

Neoscan means a gallium citrate Ga 67 that MPI will send to you with no additional delivery charge along with your supply of Sodium Iodide I 123, Technetium Prepared Products or Xenon 133-V.S.S. (xenon Xe 133).
Neoscan™
gallium citrate Ga 67

DESCRIPTION: Neoscan for diagnostic use is supplied as a sterile, aqueous solution for intravenous injection. Each milliliter of the solution contains 2.5 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 Zn 68-enriched zinc oxide. The radionuclidic composition, at calibration time, is 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 electve in nature, in women of childbearing 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 that 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 aqueous solution for intravenous use. Each milliliter contains 2.5 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.
Specific. Sensitive. Precise.

Radio Immuno Assay

- $^{125}$I Aldosterone
- $^3$H Aldosterone
- $^{125}$I Amikacin
- $^{125}$I Cortisol
- $^{57}$Co Vitamin B-12
- $^3$H Cyclic AMP
- $^{125}$I Digitoxin
- $^{125}$I Digoxin RIA
- $^{125}$I Folic Acid
- $^3$H Folic Acid
- $^{125}$I Gentamicin
- $^{125}$I Neonatal T-4
- $^{125}$I T-3 RIA
- $^{125}$I T-4 RIA
- $^{125}$I T-3 U
- $^{125}$I TSH
- $^{125}$I Tobramycin
- DPC Controls I, II, III
- $^{125}$I Neonatal TSH
Eadweard Muybridge: Man Doing A Headspring, Plate 365
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With great still life photography, a subject can be captured to reveal its every detail. But often, complete understanding of that subject depends on the ability to project backward and forward in time to correctly perceive its entire function. And for these instances, images that demonstrate motion are essential.

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**New OPS/CON™ Computer-controlled Imaging Station—**
with both static and dynamic capabilities,
increases your flexibility in making

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to our engineering, sales and service people for making our Giant-Field XL-91 Gamma Camera a winner.

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to the excellent technical measurements, these fine clinical results were predictable. They demonstrate that the biggest camera is also the best.

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Intrinsic Resolution 3/32" lead bars with 3/32" spacing visualized using 99mTc point source over entire 16.5" field
Uniformity ± 2% over 16.5" field of view in Autocomp mode
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Integral Linearity Error Less than ± 3%
Count Rate Capability >100K per sec in 20% window
Energy Resolution 14% F. W. H. M. with 99mTc
For high-quality lung perfusion imaging

PULMOLITE™

Technetium Tc 99m Aggregated Albumin Kit

Convenient stores at room temperature.
Rapidly prepare inject sodium pertechnetate Tc 99m into vial, shake for 30 seconds—and it’s ready for administration.
Complete no additional reagents or equipment.
Economical 5 vial package and 30 vial Convenience Pak.

New England Nuclear Medical Diagnostics Division

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.

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.

Safeguards: 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 corticoste-
roid agents should be available for use.

Dosage and Administration: The recommended intravenous dose range for the average patient (70kg) is 1 to 4 milliliters. 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.).

New Supply: 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)-10mg
Normal human serum albumin-10mg
Sodium chloride-10mg
Stannous chloride dihydrate, maximum-0.07mg

Each vial contains 3.6-6.5 x 10⁸ 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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Low* Dissolved Oxygen
Non-preservative normal saline USP

Designed with Nuclear Medicine in mind, Low Dissolved Oxygen, non-preservative, normal saline for routine use is now available from Ackerman Nuclear, Inc.

- **ELUTION:** Use for eluting Technetium-99m generators.

- **DILUTION:** Use for diluting high specific concentrations of Technetium-99m.

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**SODIUM CHLORIDE INJECTION U.S.P. with LOW DISSOLVED OXYGEN**

**DESCRIPTION:**
SODIUM CHLORIDE INJECTION U.S.P. with LOW DISSOLVED OXYGEN is a sterile isotonic solution of sodium chloride in water for injection. It contains no antimicrobial agent. It contains 0.9% sodium chloride and is packaged in single dose vials. The osmolarity is 300 mOsm/1, the dissolved oxygen content is less than 5 ppm.

**INDICATIONS:**
SODIUM CHLORIDE INJECTION U.S.P. with LOW DISSOLVED OXYGEN is indicated for eluting, preparing and/or diluting pharmaceuticals that specify oxidants may cause adverse effects on the final product. SODIUM CHLORIDE INJECTION U.S.P. with LOW DISSOLVED OXYGEN is also used as a fluid and electrolyte replenisher or as an irrigating solution.

**WARNING:**
Excessive amounts of sodium chloride by any route may cause hypokalemia and acidosis. Excessive amounts by the parenteral route may precipitate congestive heart failure and acute pulmonary edema, especially in patients with cardiovascular disease, and in patients receiving corticosteroids or corticotropin drugs that may give rise to sodium retention. No antimicrobial agent has been added.

**PRECAUTIONS:**
Unused amounts should be discarded immediately following withdrawal of any portion of the contents.

**HOW SUPPLIED:**
Catalog No. 3-25

**SODIUM CHLORIDE INJECTION U.S.P. with LOW DISSOLVED OXYGEN**

Each 10 ml single dose vial contains approximately 8 ml. Each ml contains 9 mg sodium chloride providing 0.154 mEq each of sodium and chloride ions. Total osmolarity 300 mOsm/1; pH between 4.5 and 7.0. Dissolved oxygen content less than 5 ppm. Contains no preservatives.

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445 W. Garfield Avenue
Glendale, Calif. 91204

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Decrease the amount of oxygen you add daily and reduce the effect of one more variable from your radiopharmacy. Use Low Dissolved Oxygen saline when preparing kits containing any stannous tin products.

*less than 5 ppm

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For additional information call or write to:

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Pharmaceuticals for Nuclear Medicine
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The UNION CARBIDE Whole Body Imager is a high speed imaging system designed to provide high resolution whole body images, in two tomographic planes, three to five times faster than a conventional rectilinear scanner or gamma camera. In organ mode the system is ideal for Gallium and other static organ imaging procedures.

Two 24" wide scanning assemblies with multiple detectors move in one smooth, noiseless sweep to produce images up to 76" long – as fast as ten minutes.

Each increment of travel of the detector assemblies causes a trace of the distribution of activity across the patient's body to be displayed on the TV monitor and recorded on floppy diskette. Polaroid and/or x-ray film are available for hardcopy. Patient identification, date, isotope and other pertinent information are permanently recorded on the film with the simultaneously obtained anterior and posterior images.

The system requires minimal setup – just the establishment of focal depth and PHA window settings.

Fail-safe operation includes warning signals against improper technique or patient contact.

All raw data are recorded on diskette and available for rapid retrieval and manipulation.

The silence and relative absence of machine motion reduce patient anxiety and involvement, while the rapid setup and scan time combine to increase patient throughput.

The result: rapid, high resolution, simultaneous anterior and posterior images – with no patient repositioning – for fast, accurate diagnoses.

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Gallium Citrate Ga 67

DESCRIPTION
Gallium Citrate Ga 67 is supplied in isotonic solution as a sterile, non pyrogenic diagnostic radiopharmaceutical for intravenous administration. Each milliliter contains 3 millicuries Gallium Ga 67 on the calcium carbonate complex with 2.67 mg sodium citrate in sodium chloride injection, U.S.P., with 0.9% benzyl alcohol w/v, as a preservative. The pH is adjusted to between 5.0-6.0 with hydrochloric acid and/or sodium hydroxide solution. Gallium Ga 67, with a half-life of 76.1 hours, is cyclotron produced by the proton irradiation of Zn, 68 at enriched zinc oxide and is essentially carrier-free. Gallium Ga 67 has a minimum purity of 99% with no more than 1% Gallium Ga 66 and no more than 0.05% of Zinc Zn 65.

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 investitional studies have shown that Gallium Ga 67 concentrates 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 25% having been excreted in the urine and 9% in the stools.

INDICATIONS AND USAGE
Gallium Citrate Ga 67 may be useful to demonstrate the presence and extent of Hodgkin’s disease or lymphoma. 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
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 two (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 interpret pathologic studies accurately. 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. 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
No adverse reactions have been observed with Diagnostic Isotopes’ Gallium Citrate Ga 67 at this time

DOSEAGE AND ADMINISTRATION
The recommended adult (70 kg) dose of Gallium Citrate Ga 67 is 2.5 millicuries. 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 radiomaterial and minimize the possibility of false positive studies.

Studies indicate the optimal tumor to background concentration 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.

HOW SUPPLIED
Gallium Citrate Ga 67 is supplied at a concentration of 3 millicuries/ml at the time of calibration. The contents of the vial are radioactive and adequate shielding and handling precautions must be maintained.
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Extra pre-calibration days give you more activity for the same cost

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See adjacent page for brief summary of package insert.
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Scintadren is a unique new agent for adrenal scintigraphy. Based on a cholesterol derivative substituted at the C₆ position with selenium-75, Scintadren has a higher uptake in the adrenals than 19-[¹³¹I]iodocholsterol, and gives clearer imaging. The result is more reliable diagnostic information, as our clinical trials have proved.

Problems of free iodide uptake by the thyroid simply don’t exist with Scintadren. It saves both physician and patient time: scintigraphy can commence 3-4 days after administration. The radiation dose to the patient compares favourably with alternative agents and radiographic methods.

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And with results like the picture shown here, our story couldn’t be clearer.

Computer enhanced scintigram of left adrenal adenoma in Cushings Syndrome. Nuclear Enterprises Mk 3 γ-camera 2.6 day post injection of Scintadren (kidneys localized with SmC₃.Pₙ₉.Tₗ₈.DTPA) R. Moniz, Department of Nuclear Medicine, University Hospital, Hamburg, FDR.

Scintadren®
reliable adrenal scintigraphy

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To provide you with more productive, patient-oriented nuclear imaging systems designed to match your present and future needs. That's our commitment.

With the introduction of the MaxiCamera™ II System to nuclear imaging, GE ushered in new concepts and standards of performance, results, operator convenience, flexible capability with modular electronics, and much more.

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DataCamera provides exceptional bedside imaging and data analysis for both nuclear physicians and cardiologists.

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A consistent skeletal imaging agent since 1974...

Now also available for routine use as an adjunct in the diagnosis of acute myocardial infarction.

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For brief summary of prescribing information, please see next page.
TechneScan® PYP™ Kit
(Stannous Pyrophosphate)
Kit for the Preparation of Technetium Tc 99m Stannous Pyrophosphate
Diagnostic—For Intravenous Use

CLINICAL PHARMACOLOGY
When injected intravenously, TechneScan PYP Tc 99m has a specific affinity for areas of altered osteogenesis. It is also concentrated in the injured myocardium, primarily in areas of irreversibly damaged myocardial cells.

One to two hours after intravenous injection of TechneScan PYP Tc 99m, an estimated 40 to 50 percent of the injected dose has been taken up by the skeleton, and approximately 0.01 to 0.02 percent per gram of acutely infarcted myocardium. Within a period of one hour, 10 to 11 percent remains in the vascular system, declining to approximately 2 to 3 percent twenty-four hours post injection. The average urinary excretion was observed to be about 40 percent of the administered dose after 24 hours.

INDICATIONS AND USAGE
TechneScan PYP Tc 99m 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.

As an adjunct in the diagnosis of confirmed myocardial infarction (ECG and serum enzymes positive), the incidence of false negative images has been found to be 6 percent. False negative images can also occur if made too early in the evolutionary phase of the infarct or too late in the resolution phase. In a limited study involving 22 patients in whom the ECG was positive and serum enzymes questionable or negative, but in whom the final diagnosis of acute myocardial infarction was made, the incidence of false negative images was 23 percent. The incidence of false positive images has been found to be 7 to 9 percent. False positive images have also been reported following coronary by-pass graft surgery, in unstable angina pectoris, old myocardial infarcts and in cardiac contusions.

CONTRAINDICATIONS
None.

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 child-bearing capability should be performed during the first few (approximately 10) days following the onset of menses.

Warning: Preliminary reports indicate impairment of brain scans using Tc 99m pertechnetate which have been preceded by bone scan. The impairment may result in false positives or false negatives. It is recommended, where feasible, that brain scans precede bone imaging procedures.

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. The TechneScan PYP Kit must be maintained at refrigerator temperature until use.

The contents of the TechneScan PYP reaction vial are intended only for use in the preparation of technetium Tc 99m Stannous Pyrophosphate and are not to be directly administered to the patient.

Sodium pertechnetate Tc-99m solutions containing an oxidizing agent are not suitable for use with the TechneScan PYP Kit. 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.

TechneScan PYP Tc 99m should not be used more than six hours after preparation.

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 TechneScan PYP Tc 99m administration, patients should be encouraged to drink fluids. Patients should void as often as possible after the TechneScan PYP Tc 99m 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.

DOSAGE AND ADMINISTRATION
The recommended adult dose of TechneScan PYP is:
1. Skeletal Imaging — 5 to 15 millicuries (1 to 14 milligrams stannous pyrophosphate).
2. Cardiac Imaging — 10 to 15 millicuries (4 to 7 milligrams of stannous pyrophosphate).

TechneScan PYP Tc 99m is injected intravenously over a 10- to 20-second period. For optimal results, bone imaging should be done 1 to 6 hours following administration. Cardiac imaging should be done 60 to 90 minutes following administration. The acute myocardial infarction can be visualized from 24 hours to 9 days following onset of symptoms, with maximum localization at 48 to 72 hours. Cardiac imaging should be done with a gamma scintillation camera. It is recommended that images be made of the anterior, left anterior oblique and left lateral projections.

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

HOW SUPPLIED
Catalog Number—094 TechneScan PYP Kit

Kit Contains:
5—Stannous Pyrophosphate Reaction Vials (Lyophilized) for the preparation of Technetium Tc 99m Stannous Pyrophosphate.

Reaction Vial Contains:
15.4 mg Sterile Stannous Pyrophosphate (Lyophilized). Hydrochloric acid is added for pH adjustment prior to lyophilization.

5—Pressure-sensitive “Caution—Radioactive Material” labels.

5—Radioassay Information String Tags.

Mallinckrodt, Inc.
675 Brown Road
Hazelwood, MO 63042
NMS, the Artronix Nuclear Medicine System, is a computer system for the acquisition and analysis of gamma camera image data. NMS operates on the Artronix MODULEX multi-task computer system.

NMS consists of a large number of integrated programs which are designed to permit smooth and efficient operation. Various configurations provide for simultaneous acquisition of camera data in either list or frame mode, comprehensive data analysis with interactive graphic capabilities, and programming in both FORTRAN and MUMPS.

In addition to many built-in analysis and display features, the system supports customized data acquisition and analysis.

Command Program Sequences provide users with the ability to design studies for complete organ function imaging by merely specifying a string of different imaging commands. This customized study, created in minutes, can be filed away as an organ function protocol available for unlimited usage.

A complete software package operating in conjunction with the Model 2721/2722 Nuclear Medicine Interface Subsystem with its cache memory and compendium of gated data acquisition modes provides today’s most comprehensive

Nuclear Cardiology acquisition and analysis subsystem.

Bolus Studies can be acquired in combinations of up to 100 frames/second for up to 1,000 total frames. This is the simplest and yet most useful and comprehensive of the analysis procedures.

Tracer Activity Curves provide the basis for the measurement of a broad spectrum of cardiac performance parameters, including left-to-right shunts, cardiac output, stroke volume, pulmonary transit time and both left and right ventricular ejection fractions.

Blood Pool Studies can be acquired directly in frame mode into the cache memory in the NMS interface with the averaged cardiac cycle ranging from 8 to 128 data frames of sizes 128x128 to 32x32 respectively.

Left ventricular ejection fraction, peak fractional ejection rate, peak circumferential fiber shortening, and peak flow time measures are computed and displayed along with the ED and ES images and LV activity curves.

For more information about the Artronix Nuclear Medicine System, call or write Artronix, Inc., or visit Booth 206-208 at the 25th Annual Meeting of the Society of Nuclear Medicine, Anaheim, June 27-30, 1978.
SOLCO® HIDA
for cholecsctintigraphy

99mTc SOLCO HIDA Lyophilized labelling kit for the preparation of
99mTc-diethyl-IDA (N-2,6-diethylacetanilido-iminodiacetate)

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With push-button and remote operation, spirometer and optional kymograph.

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Helps detect, localize, and delineate acute myocardial infarction

**Phosphotec**

**Technetium Tc 99m-Pyrophosphate-Tin Kit**

In detection of acute myocardial infarction, "the agent of choice [of the several 99mTc complexes] at the present time is 99mTc-pyrophosphate." Imaging is particularly useful in detecting recent infarcts when imaging is performed within 24 hours to six days after onset of suggestive symptoms. An effective adjunct in clinical situations such as equivocal ECG's, postoperative cardiac status, and when standard diagnostic aids are difficult to interpret.

Easy preparation. Two steps:
1. Add sterile sodium pertechnetate 99mTc. (Maintain shielding at all times.)
2. Shake gently, assay dose, and inject IV over 10 to 20 seconds. Cardiac imaging can be performed 45-60 minutes postinjection.

Also indicated for fast, dependable skeletal imaging.


See next page for brief summary.
DESCRIPTION: Phosphotec provides all the nonradioactive components required to prepare a sterile, pyrogen-free technetium Tc 99m-pyrophosphate-Tin complex. Each reaction vial contains 40 mg sodium pyrophosphate (equivalent to 23.9 mg anhydrous sodium pyrophosphate) and 1 mg stannous fluoride; the product does not contain a preservative. When sterile, pyrogen-free Sodium Pertechnetate Tc 99m is added to the reaction vial, a technetium Tc 99m-pyrophosphate-Tin complex is formed.

INDICATIONS AND USAGE: Technetium Tc 99m-Pyrophosphate-Tin complex may be used as a bone imaging agent to delineate areas of altered osteogenesis. It is also a cardiac imaging agent used as an adjunct in the diagnosis of acute myocardial infarction.

CONTRAINDICATIONS: None known.

WARNINGS: This product should not be administered to patients who are pregnant or to nursing mothers unless the benefits to be gained outweigh the potential hazards. Ideally, examinations using radiopharmaceuticals, especially those elective in nature, of a woman of childbearing potential should be performed during the first few (approx. 10) days following the onset of menses.

It has been reported that false-positive or false-negative brain scans may result when brain scans using sodium pertechnetate Tc 99m are performed after a bone scan has been done using an agent containing stannous ions, e.g., a pyrophosphate bone agent. This is thought to be due to the interaction of Tc 99m with stannous ions inside red blood cells. Therefore, in those cases where brain scans are indicated along with imaging of bone or myocardial imaging, the brain scan should be performed first, if feasible. Alternatively, another brain imaging agent, such as Tc 99m DTPA, may be employed. False-positive and false-negative myocardial scans may occur; therefore, the diagnosis of acute myocardial infarction depends on the overall assessment of laboratory and clinical findings.

The contents of the Phosphotec reaction vial are intended only for use in the preparation of Technetium Tc 99m-Pyrophosphate-Tin solution and are not to be directly administered to the patient. Any sodium pertechnetate 99mTc solution which contains an oxidizing agent is not suitable for use with Technetium Tc 99m-Pyrophosphate-Tin Kit. The contents of the kit are not radioactive. However, after sodium pertechnetate 99mTc is added, adequate shielding of the final preparation must be maintained. Technetium Tc 99m-Pyrophosphate-Tin Solution must be used within 12 hours of reconstitution.

PRECAUTIONS: Technetium Tc 99m-Pyrophosphate-Tin solution, as well as other radioactive drugs, must be handled with care and appropriate safety measures should be used to minimize radiation exposure to clinical personnel. Also, care should be taken to minimize radiation exposure to the patients consistent with proper patient management. Both prior to and following administration of Technetium Tc 99m-Pyrophosphate-Tin solution, the patient should be encouraged to drink fluids and to void as often as possible thereafter to minimize radiation exposure to the bladder and background radiation during imaging if not contraindicated by the patient’s cardiac status. The patient’s cardiac condition should be stable before performing imaging procedure. Interference from chest wall lesions such as breast tumors and healing rib fractures can be minimized by employing three projections (e.g., anterior, lateral, and left anterior oblique).

Adverse reproductive 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. This drug 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 the drug since many drugs are excreted in human milk. Safety and effectiveness in children have not been established.

ADVERSE REACTIONS: No adverse reactions specifically attributable to the use of Technetium Tc 99m-Pyrophosphate-Tin have been reported.

HOW SUPPLIED: In a kit containing five reaction vials (5 ml size).
Most bone agents perform reasonably well in thin, young patients. **OSTEOLITE** provides high-quality images—even in the obese and the elderly.

Comparison images of same +300 lb female patient, 60 years old.

**OSTEOLITE**
Technetium Tc 99m Medronate Sodium Kit (MDP)
Whether you perform two bone scans a day or three per hour.

**Most rapid blood clearance**

- Ninety minutes after injection, MDP blood clearance is approximately equal to that of typical pyrophosphate agents at six hours postinjection.
- At three hours, MDP blood levels are considerably less than those of EHDP and pyrophosphate.

**Result:** low-background studies, whether you must scan early to meet patient-flow demands, or at three hours for more optimal image detail.

**Lowest soft tissue activity**

The "difference in soft tissue activity (highest with polyphosphate and lowest with MDP) is discernible in clinical images." A University of Minnesota study found that only 4% of 175 MDP images showed moderate to marked soft tissue activity, compared to 17% of EHDP images.

**Result:** highest assurance of imaging all skeletal structures.

**Highest target-to-background differential**

OSTEOLITE's rapid blood clearance and lower soft tissue uptake enable current gamma cameras to routinely resolve radius and ulna, tibia and fibula, phalanges, etc.

**Result:** confidence of detecting resolution-challenging alterations in osteogenesis...even roentgenographically "invisible" fractures and small metastases near the limits of state-of-art visualization.

**Convenient storage and preparation**

Available in 5-vial or 30-vial "Convenience Packs;" OSTEOLITE can be stored and used at room temperature (15-30°C).

---

Blood clearance of MDP in humans, following IV injection, compared to three other \(^{99m}\text{Tc}\) complexes and \(^{18}\text{F}\) (corrected for physical decay), assuming blood volume was 7% of body weight. PYP indicates pyrophosphate and Poly P denotes polyphosphate. (Adapted with permission from Subramanian G et al: J Nucl Med 16:744, 1975.)
OSTEOLITE™
Technetium Tc 99m Medronate Sodium Kit (Formerly Known as MDP)

DESCRIPTION: New England Nuclear's OSTEOLITE™ Technetium Tc 99m Medronate Sodium Kit (formerly known as MDP), is supplied sterile and non-pyrogenic in lyophilized kit form suitable for reconstitution with sodium pertechnetate Tc 99m to form a diagnostic skeletal imaging agent for intravenous administration. Each vial contains 10mg medronate disodium and 0.85mg stannous chloride dihydride; pH is adjusted to between 7.0-7.5 with hydrochloric acid and/or sodium hydroxide solution. The contents of the vial are lyophilized and stored under nitrogen.

PHYSICAL CHARACTERISTICS
Technetium Tc 99m decays by isomeric transition with a physical half-life of 6.2 hours. (SOURCE: Martin, M. J. Nuclear Data Project, Oak Ridge National Laboratory, March, 1976) Phosphors that are useful for imaging studies are listed in Table 1.

Table 1. Principal Radiation Emission Data—Technetium Tc 99m

<table>
<thead>
<tr>
<th>Emission Characteristics</th>
<th>Mean Radiation Disintegration</th>
<th>Energy (keV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gamma-2</td>
<td>88.96</td>
<td>140.5</td>
</tr>
</tbody>
</table>

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. Physical Decay Chart: Technetium Tc 99m Half-Life 6.02 Hours

<table>
<thead>
<tr>
<th>Hours Remaining</th>
<th>Fraction Remaining</th>
<th>Hours</th>
<th>Fraction Remaining</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>1.000</td>
<td>8</td>
<td>0.884</td>
</tr>
<tr>
<td>15</td>
<td>0.884</td>
<td>9</td>
<td>0.868</td>
</tr>
<tr>
<td>10</td>
<td>0.868</td>
<td>11</td>
<td>0.851</td>
</tr>
<tr>
<td>5</td>
<td>0.851</td>
<td>12</td>
<td>0.835</td>
</tr>
<tr>
<td>3</td>
<td>0.835</td>
<td>18</td>
<td>0.819</td>
</tr>
<tr>
<td>2</td>
<td>0.819</td>
<td>24</td>
<td>0.804</td>
</tr>
<tr>
<td>1</td>
<td>0.804</td>
<td>36</td>
<td>0.790</td>
</tr>
<tr>
<td>0</td>
<td>0.790</td>
<td>120</td>
<td>0.775</td>
</tr>
</tbody>
</table>

*Calibration Time

EXTERNAL RADIATION
The specific gamma ray constant for Technetium Tc 99m is 0.85R/mCi-hr. at 1cm. The half value layer is 0.22mm of Pb. To facilitate control of radiation exposure from milli-curies amounts of Technetium Tc 99m, the use of a 0.35mm thick standard radiation filtration lead shield will attenuate the radiation emitted by a factor greater than 104.

Table 3. Radiation Attenuation By Lead Shielding

<table>
<thead>
<tr>
<th>Shield Thickness (Pb)mm</th>
<th>Coefficient of Attenuation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2</td>
<td>0.5</td>
</tr>
<tr>
<td>0.95</td>
<td>10^-1</td>
</tr>
<tr>
<td>1.8</td>
<td>10^-2</td>
</tr>
<tr>
<td>2.7</td>
<td>10^-3</td>
</tr>
<tr>
<td>3.6</td>
<td>10^-4</td>
</tr>
<tr>
<td>4.5</td>
<td>10^-5</td>
</tr>
<tr>
<td>5.4</td>
<td>10^-6</td>
</tr>
<tr>
<td>6.3</td>
<td>10^-7</td>
</tr>
</tbody>
</table>

CLINICAL PHARMACOLOGY: Upon intravenous injection, Technetium Tc 99m OSTEOLITE exhibits a specific affinity for areas of altered osteogenesis. In humans, blood levels fall to 4-10% of the injected dose by two hours post-injection and to 3-5% by three hours. During the first 24 hours following its administration in patients with normal renal function, 50-75% of the radioactivity is excreted into the urine and less than 2% of the injected dose remains in the vascular system.

Uptake of the Technetium Tc 99m in bone appears to be related to osteogenic activity and to skeletal blood perfusion. The deposition in the skeleton is bilaterally symmetrical, with increased accumulation in the axial structure as compared to the appendicular skeleton. There is increased activity in the distal aspect of long bones as compared to the diaphyses. In pediatric patients, in whom the epiphyseal centers are still open, there is more marked accumulation of the radiopharmaceutical in the diaphyses of long bones than is seen in adults in whom the epiphyseal centers are closed. Localized areas of abnormal accumulation of the radiopharmaceutical may be seen in primary skeletal malignancies, metastatic malignancies to bone, acute or chronic osteomyelitis, arthritis, recent fractures, areas of ectopic calcification, Paget's disease, regional migratory osteoporosis, areas of aseptic necrosis and, in general, any pathological situation involving bone in which there is increased osteogenic activity or localized increased osteogenic blood perfusion. Since increased osteogenic activity and localized increased osseous blood perfusion are not usually present in chronic bone diseases, bone imaging agents, in general, are not effective in detecting such diseases. Localized areas of decreased accumulation of the radiopharmaceutical may be noted in areas of bone which have received localized fields of external radiation or to which blood flow has been interrupted. OSTEOLITE has also been noted to accumulate in areas of acute myocardial infarction from one to fourteen days after the pathologic event.

INDICATIONS AND USE: Technetium Tc 99m OSTEOLITE should be used as a bone imaging agent to delineate areas of altered osteogenesis.

CONTRAINDICATIONS: None known.

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

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

PRECAUTIONS: A thorough knowledge of the normal distribution of intravenously administered Technetium Tc 99m medronate sodium is essential in order to accurately interpret pathologic studies. Technetium Tc 99m medronate sodium, as well as any radiopharmaceutical 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 care.

The Technetium Tc 99m labeling reaction involved in preparing Technetium Tc 99m medronate 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 metabolic distribution of the prepared agent, and its use is not recommended.

Adaptable 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 medronate 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 radiopharmaceutical material.

Safety and effectiveness in children have not been established.

ADVERSE REACTIONS: None reported.

DOSEAGE AND ADMINISTRATION: The recommended dose for the average 70kg adult patient is 15mCi with a range of 10-20mCi. The patient dose should be measured by a suitable radiocactivity calibration system immediately prior to administration. Optimal imaging results are obtained within one to four hours after administration.

OSTEOLITE should be used within six hours after aspecific reconstitution with sodium pertechnetate Tc 99m. For optimum results this time should be minimized. The vial contains no bacteriostat.

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 governmental agencies authorized to license the use of radionuclides.

RADIATION DOSIMETRY
The estimated absorbed radiation dose to an average patient (70kg) from an intravenous injection of a maximum dose of 20 millicuries of Technetium Tc 99m OSTEOLITE is shown in Table 4.

Table 4. Absorbed Radiation Dose—Technetium Tc 99m Medronate Sodium

<table>
<thead>
<tr>
<th>Organ</th>
<th>(rads/20mCi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Body</td>
<td>0.13</td>
</tr>
<tr>
<td>Bone Total</td>
<td>0.70</td>
</tr>
<tr>
<td>Red Marrow</td>
<td>0.56</td>
</tr>
<tr>
<td>Kidneys</td>
<td>0.62</td>
</tr>
<tr>
<td>Liver</td>
<td>0.16</td>
</tr>
<tr>
<td>Bladder Wall</td>
<td>2.60</td>
</tr>
<tr>
<td>Ovaries</td>
<td>4.8 hr void</td>
</tr>
<tr>
<td>Testes</td>
<td>2.0 hr void</td>
</tr>
<tr>
<td>Stomach</td>
<td>1.1 hr void</td>
</tr>
<tr>
<td>Small Intestines</td>
<td>1.1 hr void</td>
</tr>
</tbody>
</table>

HOW SUPPLIED: NEN’s OSTEOLITE™ Technetium Tc 99m Medronate Sodium Kit is supplied as a set of five or thirty vials, sterile and non-pyrogenic. Each nitrogen-flushed vial contains in lyophilized form:

Medronate Disodium—10mg
Stannous Chloride Dihydride—0.85mg

The pH is adjusted to be between 7.0-7.5 with hydrochloric acid and/or sodium hydroxide solution. The contents of the vial were lyophilized under nitrogen. Store at room temperature (15°-30° 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.

INSTRUCTIONS FOR PREPARATION OF TECNETIUM Tc 99m OSTEOLITE
Aspetically inject 2 to 8mL of sodium pertechnetate Tc 99m (pertechnetate in isotonic saline without a bacteriostat) into the supplied vial of OSTEOLITE enclosed by a radiation shield. Swirl for at least ten seconds to dissolve completely. Label appropriately. Suitable labels have been supplied with each OSTEOLITE Kit. Use within six hours after reconstitution. For optimum results, this time should be minimized.

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

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

Do not use if there is a vacuum in the immediate drug container or if air is injected into the container when the dose is withdrawn.

Catalog Number NRP-420 (5 vial kit)
Catalog Number NRP-420C (30 vial kit)
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**MULTIPLE, SIMULTANEOUS IMAGING**

with the CMS BILATERAL COLLIMATOR and a LARGE FIELD CAMERA

Simultaneous, dual, end systolic and end diastolic multiple gated images. Selected from a sequence of eleven intervals. Study courtesy of S.M. Spies, M.D. and J.L. Quinn III, M.D., Northwestern Memorial Hospital.

---

**Technetium Tc99m Sulfur Colloid Kit-Diagnostic For Intravenous Use**

Description: Each kit contains a sterile vial made with a sterile, gelatin-based pharmaceutical, a single use needle, a ring of use, and a syringe. Each kit is filled with 5 milliliter of technetium Tc99m labeled technetium Tc99m sulfur colloid. The vial contains 5 milliliters of technetium Tc99m sulfur colloid and 5 milliliters of gelatin. When reconstituted, the sterile solution contains a radiopharmaceutical that is used in nuclear medicine imaging. The radiopharmaceutical is designed to be administered intravenously. A single kit is used to prepare the radiopharmaceutical for imaging.

**Table 1: Physical Properties**

<table>
<thead>
<tr>
<th>Properties</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viscosity</td>
<td>5 cP</td>
</tr>
<tr>
<td>Density</td>
<td>1.023</td>
</tr>
<tr>
<td>Color</td>
<td>Colorless</td>
</tr>
</tbody>
</table>

**Table 2: Radiochemical Properties**

<table>
<thead>
<tr>
<th>Properties</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiochemical purity</td>
<td>98%</td>
</tr>
<tr>
<td>Radioactivity</td>
<td>140 MBq</td>
</tr>
</tbody>
</table>

**Table 3: Pharmacokinetic Properties**

<table>
<thead>
<tr>
<th>Properties</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Half-life</td>
<td>60 min</td>
</tr>
<tr>
<td>Clearance</td>
<td>3 L/h</td>
</tr>
<tr>
<td>tissue distribution</td>
<td>Liver</td>
</tr>
</tbody>
</table>

**Table 4: Technical Specifications**

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiopharmaceutical</td>
<td>5 ml</td>
</tr>
<tr>
<td>Vial</td>
<td>5 ml</td>
</tr>
<tr>
<td>Syringe</td>
<td>5 ml</td>
</tr>
</tbody>
</table>

---

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  — stand-alone unit for greater flexibility
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- One film size
- Dual/triple intensities
- Optional patient I.D. systems

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Model 2400 and 2900 Multi-Image Recorders contain independent Film Recorder units which quickly attach to the CRT faceplate of any current nuclear imaging console. The separate control Console provides selection of all recording parameters—format selection, single, dual or triple intensity, and even mixing of formats for greater diagnostic information.

NEED MORE VERSATILITY!

Model IIE-5000 Multiple-Lens, Stand-Alone Multi-Imager is plug-compatible with any nuclear imaging camera made today and offers dual body, 1, 4, 9, 16 and 36 exposure formats on 8" x 10" film. Manual-auto operation, 3 intensities, switchable format selection, handy readout for position identification and IIE's high resolution (no drop-out) optics are all standard features.

Positive Patient ID. Model IIE-5000 can be equipped with input keyboard to add up to 32 alpha-numerical characters for ID—on the film—simply and conveniently—AND individual images can also be photographically marked with up to 32 characters.

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### Radiochemical Purity Analysis

**Radioactive Material:** Technetium 99m

**Lot No.:** 456-712

**Kit No.:** IN K-15

**Absorbent:** Whatman 

**Solvent:** Normal saline

**Date:** 30 Jan 78

<table>
<thead>
<tr>
<th>Sample Number</th>
<th>Ratio</th>
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<td>17</td>
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<tr>
<td>16</td>
<td>0.019</td>
</tr>
<tr>
<td>15</td>
<td>0.049</td>
</tr>
</tbody>
</table>

*Multiply ratio by 100 to get percentage.*

---

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Tomographic Scanner
defines lesions better with 12 GREAT IMAGES.

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Phone: (301) 666-9500 Cable "JOHNLAB"
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- Virtually eliminates error
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Whole-body gallium-67 study of patient with biopsy-confirmed Hodgkin’s disease in axillary nodes; no evidence of disease elsewhere.

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**TABLE 1. Principal Radiation Emission Data**

<table>
<thead>
<tr>
<th>Radiation</th>
<th>Mean % per Disintegration Mean Energy (keV)</th>
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<tr>
<td>Gamma-2</td>
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<td>Gamma-3</td>
<td>20.5</td>
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**TABLE 2. Gallium Ga 67 Decay Chart**

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<td>90.85</td>
</tr>
<tr>
<td>6</td>
<td>1.05</td>
<td>90.62</td>
</tr>
<tr>
<td>4</td>
<td>1.05</td>
<td>90.31</td>
</tr>
<tr>
<td>6</td>
<td>0.95</td>
<td>89.56</td>
</tr>
<tr>
<td>12</td>
<td>0.90</td>
<td>87.53</td>
</tr>
<tr>
<td>18</td>
<td>0.85</td>
<td>85.50</td>
</tr>
<tr>
<td>24</td>
<td>0.81</td>
<td>83.47</td>
</tr>
</tbody>
</table>

**EXTERNAL RADIATION**

The specific gamma ray constant for Gallium Ga 67 is 1.69mR/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 radiatiation exposure by a factor of 61.

**TABLE 3. Radiation Attenuation by Lead Shielding**

<table>
<thead>
<tr>
<th>Radiation</th>
<th>Radiation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attenuation Factor mm of Pb Attenuation Factor</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>42</td>
</tr>
<tr>
<td>2</td>
<td>70</td>
</tr>
<tr>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>4</td>
<td>15</td>
</tr>
</tbody>
</table>

**CLINICAL PHARMACOLOGY:** Carrier-free Gallium Citrate Ga 67 has been found to concentrate in certain variable 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 25% having been excreted in the urine and 9% in the stools.

**INDICATIONS AND USAGE:** Gallium Citrate Ga 67 may be useful in demonstrating the presence and extent of the following malignancies: Hodgkin's disease, lymphomas and bronchogenic carcinoma. Positive Gallium 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.

**DOSEAGE AND ADMINISTRATION:** The recommended adult (70 kg) dose of Gallium Citrate Ga 67 is 2mCi. 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 ratio is 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 Ga 67 for Maximal Dose of 5mCi**

<table>
<thead>
<tr>
<th>Radiation</th>
<th>Rads/mCi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole Body</td>
<td>1.20</td>
</tr>
<tr>
<td>Skeleton</td>
<td>2.20</td>
</tr>
<tr>
<td>Liver</td>
<td>2.30</td>
</tr>
<tr>
<td>Bone Marrow</td>
<td>2.50</td>
</tr>
<tr>
<td>Spleen</td>
<td>2.65</td>
</tr>
<tr>
<td>Kidney</td>
<td>2.05</td>
</tr>
<tr>
<td>Ovaries</td>
<td>1.40</td>
</tr>
</tbody>
</table>

**HOW SUPPLIED:** Gallium Citrate Ga 67 is supplied sterile liquid and non-pyrogenic for intravenous use. Each ml contains 2mCi of Gallium Ga 67 on the calibration date, as a complex formed from 9g gallium chloride Ga 67, 2mg of sodium citrate, 5.8mg 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 vials are radioactive and adequate shielding and handling precautions must be maintained.

**Catalog Number:** NIP121

October 1977
Use Radx's NEW plastic film holder to organize, view and file Polaroid/100 mm images

Many CT, Ultrasound and Nuclear Medicine Imaging devices use a Polaroid format for image reproduction. These images are the result of a very significant investment of both time and money by the medical community, yet they present an interesting problem in viewing and storage.

Radx has developed a pocketed (4 rows of 3 pockets per row) plastic film holder in a 14" x 17" format to provide you with a means of organizing, viewing and filing your Polaroids. The holder may be divided between rows to allow you to file 3, 6, 9, or 12 films per holder without wasting the remaining. The cost?? As little as 6¢ per image.

For maximum protection and the highest in optical clarity, specify Radx, the leader in quality film holders.

Other sizes available:

<table>
<thead>
<tr>
<th>Format</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polaroid</td>
<td>14 x 17 (pocketed)</td>
</tr>
<tr>
<td>105 mm</td>
<td>14 x 17</td>
</tr>
<tr>
<td>100 mm</td>
<td>14 x 17 (pocketed)</td>
</tr>
<tr>
<td>90 mm</td>
<td>14 x 17</td>
</tr>
<tr>
<td>70 mm</td>
<td>14 x 17</td>
</tr>
<tr>
<td>70 mm</td>
<td>8½ x 12½</td>
</tr>
<tr>
<td>35 mm</td>
<td>5 x 8</td>
</tr>
</tbody>
</table>

RADX • P.O. Box 19164 • Houston, Texas 77024 • (713) 468-9628
DynaMo, Picker's high-resolution mobile scintillation camera, extends the role of nuclear medicine to every corner of the hospital. This battery-powered unit can move at a speed of 1.5 mph (2.4 kph) and then slip into the most crowded ER, CCU, ICU, cardiac catheter lab, neurology, neonatal or pediatric department, or any postoperative care unit, outpatient clinic, isolation ward, or patient room. Or, it can stand on its own as a main general purpose camera, or perform as a spare system for use during peak workloads.

**A complete nuclear department ready to roll into place.** On its own, DynaMo's high-resolution images — 3.6 mm FWHM — make it the equal of our finest small field of view cameras. Its 5-motion detector and its integral tape recorder make it a virtual department in itself. Its modularity, superior uniformity, and high counting efficiency make DynaMo a typical member of the Picker Dyna® Camera 4 family, an all-around camera system with a broad range of performance capabilities that deliver superior clinical images. DynaMo's quick-change collimators feature the flip focus diverging/converging and the 15° slant-hole cardiac collimator. All this works to the convenience of the operator and the comfort of the patient.
**Ejection fraction where you need it.** No more waiting while the data is being processed back at the computer. When used in conjunction with Picker’s Cardiac Module accessory, DynaMo lets you obtain instant on-line, sequential ejection fraction right at the patient’s bedside, without the services of a computer-trained technologist or a costly nuclear computer.

**The Picker investment.** We’ve committed the last 20 years to the development and improvement of the nuclear medicine diagnostic devices. The future promises many new roles for the nuclear medicine department. Every Picker DynaCamera system has been planned to meet this future. Today, DynaMo can help your hospital deliver better, surer and quicker diagnoses, increase patient throughput and cut costs. DynaMo also has the ability to grow in performance and responsibility to accept tomorrow’s tasks. DynaMo has been built to go…and to grow.

For additional information, contact your Picker representative, or write Picker Corporation, 12 Clintonville Road, Northford, CT 06472 (203/484-2711), or Picker International, 595 Miner Road, Cleveland, OH 44143.
Dependable bone

Anterior

R.  L.

Posterior

L.  R.
Excellent in vitro stability
Greater than 98% labeling efficiency 8 hours after preparation. Osteoscan contains sodium ascorbate, an antioxidant that inhibits action of radiolysis by-products and oxidants capable of causing complex breakdown and resultant soft tissue visualization.

Compatible with all types of technetium
Delivers consistently high-quality scans, using either instant or generator technetium.

Plus these other Osteoscan benefits
- very low tin level to minimize potential for liver visualization and for interference with subsequent brain scans
- rapid blood clearance
- high target-to-nontarget ratio
- diphosphonate's P-C-P bond for excellent in vivo stability

For further information about Osteoscan, please contact: Arnold Austin, Technical Manager, Professional Services Division, Procter & Gamble (513) 977-5547.

In Europe, contact: Philips-Duphar B.V., Cyclotron and Isotope Laboratories, Petten, Holland.
See following page for a brief summary of package insert.
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 disodium etidronate and 0.16 mg stannous chloride as active ingredients. Upon addition of ADDITIVE-FREE 99mTc-pertechnetate, these ingredients combine with 99mTc to form a stable soluble complex.

ACTIONS (CLINICAL PHARMACOLOGY)
When injected intravenously, 99mTc-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 99mTc-labeled OSTEOSCAN.

Three hours after intravenous injection of 1 ml 99mTc-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 99mTc-labeled OSTEOSCAN excreted in the feces is below the level detectable by routine laboratory techniques.

INDICATIONS
OSTEOSCAN is a skeletal imaging agent used to demonstrate areas of altered osteogenesis.

CONTRAINDICATIONS
None.

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 selective in nature, of a woman of childbearing capability should be performed during the first few (approximately 10) days following the onset of menses.

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.

The 99mTc-generator should be tested routinely for molybdenum breakthrough and aluminum. If either is detected, the elute should not be used.

PRECAUTIONS
Both prior to and following 99mTc-labeled OSTEOSCAN administration, patients should be encouraged to drink fluids. Patients should void as often as possible after the 99mTc-labeled OSTEOSCAN injection to minimize background interference from accumulation in the bladder and unnecessary exposure to radiation.

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.

ADVERSE REACTIONS
None.

DOSEAGE AND ADMINISTRATION
The recommended adult dose of 99mTc-labeled OSTEOSCAN is 1 ml with a total activity range of 10-15 mCi. 99mTc-labeled OSTEOSCAN should be given intravenously by slow injection over a period of 30 seconds within eight (8) hours after its preparation. Optimum scanning time is 3-4 hours postinjection.

The patient dose should be measured by a suitable radioactivity calibration system immediately prior to administration.
Technetium 99m

HSA

Technetium Tc 99m Human Serum Albumin Reagent Kit

Five sterile multidose reaction vials each containing 21 mg human serum albumin and 0.23 mg stannous tartrate, lyophilized. Hydrochloric acid was added prior to lyophilization for pH adjustment.

REAGENT KIT FOR CARDIAC BLOOD POOL IMAGING

Maximum vial activity 100 mCi/3 ml

Easy to prepare (see directions): Just add sterile preservative-free water, Technetium 99m pertechnetate, then shake. Requires no electrolytic equipment or time-consuming procedures.

High blood concentrations: Approximately 60% remains in the circulation after 2 hours, approximately 45% after 4 hours (in normal patients).

Consistently high binding efficiency: Technetium binding range of 90-99% immediately after tagging.

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.

For ordering, customer service, and technical information on HSA (Product Number UC-HA-80)
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

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CintiChem®

TECHNETIUM 99m

HSA Multi-dose Kit

TECHNETIUM Tc 99m
HUMAN SERUM ALBUMIN
MULTIDOSE REAGENT KIT
DIAGNOSTIC—FOR INTRAVENOUS USE

description
The kit consists of 5 multidose reaction vials each containing a lyophilized mixture of 21 mg human serum albumin and 0.23 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 2.5-3.0 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 used in this preparation was nonreactive when tested for hepatitis B surface antigen (HBsAg) 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
| Gamma-2 | 87.9 |
| 140.5 |


external radiation
The specific gamma-ray constant for Technetium Tc 99m is 0.8 R/mc/ml/hr 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
<table>
<thead>
<tr>
<th>Pb thickness (mm)</th>
<th>Coefficient of attenuation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2</td>
<td>0.5</td>
</tr>
<tr>
<td>0.95</td>
<td>1.0</td>
</tr>
<tr>
<td>1.8</td>
<td>10.0</td>
</tr>
<tr>
<td>2.7</td>
<td>10.0</td>
</tr>
<tr>
<td>3.6</td>
<td>10.0</td>
</tr>
<tr>
<td>4.5</td>
<td>10.0</td>
</tr>
</tbody>
</table>

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
<table>
<thead>
<tr>
<th>Tc 99m, half-life 6.03 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>frac</td>
</tr>
<tr>
<td>-----</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
</tbody>
</table>

*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 radiolabeled 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 mini-

um of background and organ interference. In humans, a two-component blood clearance rate is observed. The T1/2 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. 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 99m Human Serum Albumin.

Each dose should be measured by a suitable radioactive 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 radiopharmaceuticals and whose experience and training have been approved by the appropriate government agency authorized to license the use of radiopharmaceuticals.

radiation dosimetry
The estimated absorbed radiation doses(2) to an average age 20 year person by an intravenous injection of maximum dose of 5 millicuries of Technetium 99m Human Serum Albumin are shown in Table IV.

Table IV. estimated absorbed dose
<table>
<thead>
<tr>
<th>Absorbed radiation dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Br</td>
</tr>
<tr>
<td>Mar</td>
</tr>
<tr>
<td>Kidneys</td>
</tr>
<tr>
<td>Bladder</td>
</tr>
<tr>
<td>Ovaries</td>
</tr>
<tr>
<td>Tests</td>
</tr>
<tr>
<td>Total Body</td>
</tr>
</tbody>
</table>


how supplied
kit contents
5. STERILE MULTIDOSE REACTION VIALS (10 cc., silver aluminum overseal), each containing 21 mg human serum albumin and 0.23 mg stannous tartrate, lyophilized. Hydrochloric acid was added prior to lyophilization for pH adjustment.

1 RADIATION SHIELD for preparation and storage of a Technetium Tc 99m Human Serum Albumin preparation.

10. 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 after 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 1.0 ml of Sterile Water for Injection; withdraw an equal volume of air.

3. Mix contents by swirling.

4. Place vial in radiation shield provided.

5. Aseptically swab rubber septum of shielded vial.

6. Aseptically inject up to 100 millicuries Sodium Pertechnetate Tc 99m in a maximum of 3 ml into the vial; withdraw an 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.


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:

\[ C = \frac{A}{V} \]

where \( C \) equals radioactivity concentration of the preparation (millicuries/ml). \( A = \) Tc 99m activity added to the reaction mixture vessel (millicuries).

\[ V = \text{Total volume in the final mixture (ml)} \]

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 I of 10 CFR Part 35 or under equivalent license of Agreement States.

Clinical Diagnostics
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Help your cardiologist study heart kinetics non-invasively with Brattle-gated scintiphotos.

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 99mTc-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.

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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.

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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
243 Vassar Street • Cambridge, Massachusetts 02139 • 617-661-0300
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.

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