A versatile, disposable system

Xenon Xe 133-V.S.S. includes everything you need for a Xenon Xe 133 ventilation study. The completely disposable system includes the Xenon Xe 133 contained in a valve-shield, a CO₂ absorber and bag for rebreathing and collection of expired xenon, and a filter/mouthpiece assembly.

One system can be used for single-breath, rebreathing and wash-out studies.

The valve-shield can deliver either a concentrated or a dispersed dose.

Safe, convenient assembly

Xenon Xe 133-V.S.S. can be assembled in less than a minute. Radiation exposure is minimized because there is no need to dilute the xenon gas or transfer it to a delivery system. After assembly, the ventilation study may begin immediately.

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

Xenon Xe 133-V.S.S. (Xenon Xe 133) Ventilation Study System

DESCRIPTION: The Xenon Xe 133-Ventilation Study System consists of a sealed frangible capsule containing 10 millicuries ±20% of Xenon Xe 133 gas at calibration time and date with less than 1% carrier xenon in air.

INDICATIONS AND USAGE: Study of pulmonary ventilation

WARNINGS: Xenon Xe 133 should not be administered to children or 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 capability should be performed during the first few (approximately 10) days following the onset of menses.

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. Xenon Xe 133 should be used in pregnant women only when clearly needed.
CONSIDER MPI's XENON Xe133-V.S.S. (Xenon Xe133) VENTILATION STUDY SYSTEM

True, single-unit dose

The MPI Xenon Xe 133-V.S.S. contains enough Xenon Xe 133 for one ventilation study. You only use what you need and are not "locked into" an expensive delivery system that requires daily use to justify costs. Another advantage of single-unit dosage is that the risk of cross infection via reusable apparatus is significantly reduced. Further safety is afforded by the filter/mouthpiece assembly.

Reduced radiation exposure

The Xenon Xe 133 is supplied in a sealed frangible capsule. The valve-shield is designed to prevent radiation leaks during transport and use. Additionally, a shield to reduce radiation exposure to patient and attending personnel and a valve assembly to minimize the escape of exhaled xenon during washout studies are available as accessory components.

PRECAUTIONS: Xenon Xe 133 gas, 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 and to patients consistent with proper patient management. Exhaled Xenon Xe 133 gas should be controlled in a manner that is in compliance with the appropriate regulations of the government agency authorized to license the use of radionuclides. Xenon Xe 133 gas delivery systems, i.e., respirators or spirometers, and associated tubing assemblies must be leak-proof to avoid loss of radioactivity into the laboratory environs not specifically protected by exhaust systems. Xenon Xe 133 adheres to some plastics and rubber and should not be allowed to stand in tubing or respirator containers for such unrecognized loss of radioactivity from the dose for administration may render the study non-diagnostic.

ADVERSE REACTIONS: Adverse reactions specifically attributable to Xenon Xe 133 have not been reported.

DOSAGE AND ADMINISTRATION: The recommended activity range for pulmonary ventilation studies in the average patient (70 kg) is 2 to 20 millicuries (0.03 to 0.3 millicuries/kg).

HOW SUPPLIED: Each Ventilation Study System (V.S.S.) contains Xenon Xe 133 in a sealed frangible capsule containing 10 millicuries ± 20% at calibration time and date stated on the label. The sealed capsule is enclosed in a metal valve-shield which is sealed with a plastic shrink-band to prevent accidental loss of xenon during shipping. A key is provided to remove the end plugs of the valve-shield and to turn the valve fitting which breaks the sealed capsule of Xenon Xe 133. The V.S.S. also includes a disposable filter/mouthpiece assembly and a breathing-collection bag with an attached CO₂ absorber canister.

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Correct digitalis treatment, DIGOCTK 125 kit for digoxin radioimmunoassay, with iodinated tracer, in coated tube.)
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Raytheon’s newest gamma camera development

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... And it’s supported by a team of knowledgeable, responsive people at ...

RAYTHEON MEDICAL ELECTRONICS

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Tel: 800-243-9058
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.

Precautions: The use of Tc 99m aggregated albumin is contraindicated in patients 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 radiopharmaceutical.

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.

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-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 cortisone-like agents should be available for use.

Dosage and Administration: The recommended intravenous dose range for the average patient (70kg) is 1 to 4 mlicuries. 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)-1.0mg
Normal human serum albumin-10mg
Sodium chloride-10mg
Stannous chloride dihydrate, maximum-0.07mg

Each vial contains 3.6-6.5 x 10⁶ aggregated albumin particles.

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

Included in each vial 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. NRR-415
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.

**REAGENT KIT FOR CARDIAC BLOOD POOL IMAGING**

**Maximum vial activity** 30 mCi/1 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.

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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.
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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 precitrated, mixed solution of 7 mg mL -1 human serum albumin and 0.05 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 2.5-3.3 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 against specificity 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

<table>
<thead>
<tr>
<th>energy (keV)</th>
<th>% of total efficiency (%/mCi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>140.5</td>
<td>87.9</td>
</tr>
</tbody>
</table>


external radiation

The specific gamma ray constant for Technetium Tc 99m is 0.08 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 decreases the external radiation exposure by a factor of 1,000.

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>time (hours)</th>
<th>remaining fraction</th>
<th>remaining fraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1.000</td>
<td>0.5</td>
</tr>
<tr>
<td>1</td>
<td>0.891</td>
<td>0.5</td>
</tr>
<tr>
<td>2</td>
<td>0.806</td>
<td>0.5</td>
</tr>
<tr>
<td>3</td>
<td>0.715</td>
<td>0.5</td>
</tr>
<tr>
<td>4</td>
<td>0.633</td>
<td>0.5</td>
</tr>
<tr>
<td>5</td>
<td>0.563</td>
<td>0.5</td>
</tr>
<tr>
<td>6</td>
<td>0.502</td>
<td>0.5</td>
</tr>
</tbody>
</table>

*Calibration Time (Time of Preparation)

clinical pharmacology

Normal Human Albumin, being a normal component of blood, leaves the vascular space at a rate slow enough to permit imaging procedures utilizing radiolabeled tags. Technetium Tc 99m Human Serum Albumin does not rapidly leak from the vascular space, nor is there significant accumulation in organs other than the site of injection, the kidneys and bladder. Therefore, the vascular system may be imaged with a mini-
Early detection of deep vein thrombosis of the legs can be accomplished using I-125 labelled fibrinogen and the Model 145A. The leg is scanned after intravenous injection of the labelled fibrinogen. As a thrombosis develops, the radio-active fibrinogen is detected at predetermined points and measured directly as a percentage of the precordial count.

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  Slow — 14 seconds
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- Detector: NaI (TI) crystal, 1" diam. x 1 mm thick, mounted on PMT with 7 mg/cm² aluminum window

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Head Examination – Anterior View Dose – 14 mCi 99mTc Diphosphonate Collimator – Ultraline

Thallium 201 Study – Anterior View Dose – 2 mCi Thallium 201 Counts – 300k Collimator – Ultraline

Pyrophosphate M.I. Study – LAO View Dose – 16 mCi 99mTc Pyrophosphate Counts – 1500 ID. 147 seconds Collimator – Ultraline

Thallium 201 Study – Anterior View Dose – 1.6 mCi Thallium 201 Counts – 300k. 362 seconds Collimator – Ultraline
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.

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

References:
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"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 KCIO$_4$

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

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

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

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

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

Mean 3.40 \times 10^{-3}

Tc-99m glucuate sodium kit.

**Description:** New England Nuclear's GLUCOSCAN

Tc-99m Glucuate 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 glucuate 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:**

Tc-99m decays by isomeric transition with a physical half-life of 6.22 hours (SOURCE: Martin, M.J., Nuclear Data Project, CRNL, March, 1976). Photons that are useful for imaging studies are listed in Table 1.

### Table 1. Principal Radiation Emission Data

<table>
<thead>
<tr>
<th>Radiation Energy (keV)</th>
<th>Mean Energy</th>
<th>Mean %</th>
<th>Gamma-2</th>
<th>88.96</th>
<th>140.5</th>
</tr>
</thead>
</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. Technetium Tc 99m Physical Decay Chart

<table>
<thead>
<tr>
<th>Half-life Time (Hours)</th>
<th>Hours Remaining</th>
<th>Fraction Remaining</th>
<th>Hours Remaining</th>
<th>Fraction Remaining</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1000</td>
<td>5</td>
<td>562</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>891</td>
<td>6</td>
<td>501</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>794</td>
<td>7</td>
<td>447</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>708</td>
<td>8</td>
<td>398</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>631</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Calibration Time*

**External Radiation:**

The specific gamma ray constant for Technetium Tc 99m is 0.89/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 interception 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^{-4}.

### 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>5</td>
</tr>
<tr>
<td>0.95</td>
<td>5</td>
</tr>
<tr>
<td>1.8</td>
<td>5</td>
</tr>
<tr>
<td>2.7</td>
<td>5</td>
</tr>
<tr>
<td>3.6</td>
<td>5</td>
</tr>
<tr>
<td>4.5</td>
<td>5</td>
</tr>
<tr>
<td>5.4</td>
<td>5</td>
</tr>
<tr>
<td>6.3</td>
<td>5</td>
</tr>
</tbody>
</table>

**Clinical Pharmacology:**

Tc-99m glucuate sodium has been shown 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.

Tc-99m glucuate 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 Glucuate Sodium may detect vascular stenoses and arteriovenous malformations. This is not concentration of the agent by the salivary glands or the choroid plexus.

**Indications and Usage:**

Technetium Tc 99m Glucuate Sodium is used for brain imaging. Technetium Tc 99m Glucuate 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 determine 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 Glucurate 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 Glucurate 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 Glucurate 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 biological distribution of the prepared agent, and its use is not recommended.

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

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. Technetium Tc 99m Glucurate 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 Glucurate Sodium.

**Dosage and Administration:**

The recommended dose for the average (70kg) adult patient is 10-20 microcuries for both renal and brain imaging. Technetium Tc 99m Glucurate Sodium is intended for intravenous administration only.

Technetium Tc 99m Glucurate 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 bacteriostatic agent.

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 radiocides 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. Asceptic 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 Glucurate Sodium are shown in Table 4.

### Table 4. Radiation Absorbed Doses

<table>
<thead>
<tr>
<th>Tissue</th>
<th>Absorbed Dose (Rads/20 millicuries)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kidneys</td>
<td>3.4</td>
</tr>
<tr>
<td>Liver</td>
<td>0.20</td>
</tr>
<tr>
<td>Bladder Wall</td>
<td>5.60</td>
</tr>
<tr>
<td>Ovaries</td>
<td>0.32</td>
</tr>
<tr>
<td>Testes</td>
<td>0.20</td>
</tr>
<tr>
<td>Whole Body</td>
<td>0.15</td>
</tr>
</tbody>
</table>

**How Supplied:**

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

Sodium Glucurate 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 Glucurate Sodium Kit:**

Satisfactorily inject 3 to 7 ml 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 ensure 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 observed.

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 (3 vial kit)

Catalog Number NRP-180C (30 vial kit)
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Technetium Tc99m Sulfur Colloid kit-Diagnostic For Intravenous Use

Description: Each kit contains a reaction vessel made of sterile, pyrogen-free, heat-sealed polyethylene containers containing 1.0 mg or more of Technetium Tc99m Sulfur Colloid contained in a patient dose of 10-50 mL, a control dose of 10-50 mL, and a quality control dose of 10-50 mL. The Technetium Tc99m Sulfur Colloid is contained in the vessel and is ready for use. The kit contains instructions for use, a reference chart, and a safety data sheet. The preparation of the Technetium Tc99m Sulfur Colloid is not to be used for therapeutic purposes.

Precautions: F.A.D. The Technetium Tc99m Sulfur Colloid is for use in the diagnostic imaging of the heart and blood vessels. The Technetium Tc99m Sulfur Colloid is to be administered intravenously.

Contraindications: None.

Adverse reactions: None.

Dosage and administration: The Technetium Tc99m Sulfur Colloid is administered intravenously. The dose is determined by the physician and is based on the patient's weight, the type of examination, and the type of equipment used.

Preparation: The Technetium Tc99m Sulfur Colloid is supplied as a sterile, pyrogen-free, heat-sealed polyethylene container containing 1.0 mg or more of Technetium Tc99m Sulfur Colloid. The Technetium Tc99m Sulfur Colloid is ready for use as received. The container is to be kept refrigerated until time of use. The Technetium Tc99m Sulfur Colloid is to be administrated intravenously.

Refrigeration: None.

Storage: None.

Disposal: None.

Table of Contents

1. Product Information.
2. Safety Information.
3. Preparation.
4. Administration.
5. Dosage and Administration.
6. Storage and Handling.
7. Disposal.

For more information, please contact...

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You can rely on the commercial manufacturers of computer systems for your comprehension of their instrumentation. But you can really be confident that the information is complete and objective?

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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.

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.
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 (thromboembolography, 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.

Ideal examinations using radiopharmaceuticals, especially those elective in nature, of a woman of childbearing capacity 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 radiopharmaceutical.

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 agitated 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 or potential to cause harm to 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 ensure 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 isocyanic reactions to preparations of Tc 99m labeled aggregated albumin have been reported.

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- **New valve system:**
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- **Better shielding:**
  To reduce radiation levels during elution, an additional lead plate has been inserted inside between the tubing and the canister.

  A redesigned auxiliary shield is available that provides added reduction in surface radiation levels on all sides and the top.

- **Reduced weight (smaller units):**
  A change in the configuration of the internal column shield allows weight reduction of our smaller generators.

See following page for brief summary.
Ultra-TechneKow® FM
(technetium Tc-99m Generator)
For the Production of Sodium Pertechnetate Tc 99m

DESCRIPTION

The Ultra-TechneKow FM Generator is prepared with fission-produced molybdenum-99. This generator provides a closed system for the production of sterile metastable technetium-99m, which is produced by the decay of molybdenum-99. Sterile, pyrogen-free isotonic solutions of Sodium Pertechnetate Tc 99m can be obtained conveniently by periodic aseptic elution of the generators. These solutions should be crystal clear.

The generator consists of a sealed glass chamber containing specially processed alumina. This treated alumina has a high absorption capacity for molybdenum-99 and a low affinity for technetium-99m. As a result, elution of the generator yields a solution of technetium-99m containing negligible amounts of molybdenum-99.

ACTIONS

The pertechnetate ion distributes in the body similarly to the iodide ion but is not organifiable when trapped in the thyroid gland. Pertechnetate tends to accumulate in intracranial lesions with excessive neovasularity or an altered blood-brain barrier. It also concentrates in thyroid gland, salivary glands, stomach and choroid plexus. After intravascular administration it remains in the circulatory system for sufficient time to permit blood pool, organ perfusions, and major vessel studies. It gradually equilibrates with the extracellular space. A fraction is promptly excreted via the kidneys.

INDICATIONS

Sodium pertechnetate Tc-99m is used for brain imaging, thyroid imaging, salivary gland imaging, placenta localization and blood pool imaging.

CONTRAINdications

None.

WARNINGs

This radiopharmaceutical should not be administered to patients who are pregnant or during lactation 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.

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.

At the time of administration the solution should be crystal clear.
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POSITIONS OPEN

NUCLEAR MEDICINE RESIDENCY—EXTENSIVE clinical base of imaging, in-vitro testing, in-vivo testing, and combined University Hospital VA Hospital program. Opportunities for clinical and laboratory research. Write: W. N. Tauxe, M.D., Professor of Radiology (Pathology) (Chief, Nuclear Medicine), University of Alabama Hospitals, Birmingham, AL 35233. "An Equal Opportunity/Affirmative Action Employer."

RESIDENCY POSITIONS AVAILABLE: THE DEPARTMENT OF Nuclear Medicine at William Beaumont Hospital (919-beds) offers a two-year AMA approved residency in Nuclear Medicine. The 11,000 square foot, modern department is staffed by four full-time board certified Nuclear Medicine physicians, two radiopharmacists, three physicians, one Ph.D. immunochromelitist, and three technologists. Training is highly clinical in orientation, yet the atmosphere is academic with full access to the William Beaumont research facility. Procedures (31,000 per year) are balanced between imaging and radiopharmacy. The Department also houses Nuclear Medicine technicians in its AMA approved programs. For further information and applications for July, 1979, contact Howard Dworin, M.D., Chief Nuclear Medicine Department, William Beaumont Hospital, Royal Oak MI 48072.

NUCLEAR MEDICINE RESIDENCY AVAILABLE/July, 1979. Two year accredited affiliated program including 700-bed VA General Hospital, 500-bed County Hospital and 1,000-bed Air Force Medical Center; an equal opportunity employer. Comprehensive training in basic sciences, laboratory sciences, computer technology, patient care services, and research. Contact: L. Nusynowitz, M.D., Division of Nuclear Medicine, University of Texas Health Science Center, San Antonio, Texas, 78284 (512) 691-6038.


NUCLEAR PHARMACIST: APPLICANTS should have completed one-year pharmaceutical education and pharmacy degree. We will provide clinical training if necessary. Salary commensurate with experience. Submit resume to: Pharmacies, Inc., 35721 Coolidge Hwy., Oak Park, Mich. 48237. Attention: Personnel.

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 250 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.

NUCLEAR MEDICINE RESIDENCY—The two year integrated program including 710-bed VA General Hospital, 600-bed County Medical Complex and two large community hospitals. Several camera systems interfaced to computer. Ultrasound training included. Positions available to July 1979. Nondiscrimination in employment. Contact: M. D. Chief Nuclear Medicine Service VA Center, Milwaukee, WI 53193 414-384-2000, EXT 2138

ASSISTANT CHIEF, NUCLEAR MEDICINE SERVICE. The Minneapolis Veterans Administration Medical Center seeks candidate for the position of Assistant Chief, Nuclear Medicine Service effective July 1, 1979. Requirements include certification by the ABNM, a strong patient orientation and expertise in all phases of clinical nuclear medicine, including imaging, radiopharmacy and internal radiation therapy. In addition, the Assistant Chief, Nuclear Medicine Service will have specific responsibilities in research and education. Applications from all qualified candidates are welcome. Inquiries, including a curriculum vitae and an application, should be sent to: Rex B. Shafer, M.D., Chief, Nuclear Medicine Service (115), VA Medical Center, 54th Street and 4th Avenue South, Minneapolis, MN 55417. An Equal Opportunity Employer.

CONFIDENTIAL SERVICE NATIONWIDE. We are a search firm dealing nationwide in the Health Care Industry. ALL FEES PAID BY EMPLOYER. Forward resume with salary requirements and location preferences to BMI, Health Care Division, P.O. Box 6457, Columbia, S. C. 29206, (803) 787-8710.

NUCLEAR PHYSICIAN. THE NEW YORK Hospital and Cornell University Medical College are seeking a Board certified or Board eligible Nuclear Physician with 2 to 5 years' experience in Nuclear Medicine. The successful candidate will fill a staff position in the Division of Nuclear Medicine at The New York Hospital, New York, New York. Contact: Howard Dworin, M.D., Chief Nuclear Medicine Department, New York Zephyr, New York 10021.

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NUCLEAR PHYSICIAN TO JOIN a VA Medical Center. The nuclear medicine service is active in imaging, including cardiac imaging and has a full range of radiopharmaceuticals. It is fully integrated in the Department of Nuclear Medicine, State University of New York at Buffalo and has a major role in training physicians and technologists. Candidate should be board certified or eligible in nuclear medicine and have interest in teaching and research. Salary negotiable. Contact: J. Steinbach, M.D., Chief, Nuclear Medicine Service, Veterans Administration Medical Center, 3495 Bailey Avenue, Buffalo, New York 14222. Position includes travel (716) 834-9200, extension 380. Equal opportunity employer.

PHYSICIAN, NUCLEAR MEDICINE. State Univ. of New York at Buffalo has two openings at the Ass't/Assoc. Prof. level. Approved Residency and B.S. in N.M. Technology Programs. One position as Chief at the Buffalo General Hospital and one as Associate Chief at the West Veteran's Hospital. Large central radiopharmacy and research staff. Nuclear Medicine has full departmental status in the Medical School and is recognized as an Oppor- tunity Employer. Contact Monte Blau, Ph.D., Chairman, Dept. of Nuclear Medicine, 3495 Bailey Ave., Buffalo, NY 14225.

NUCLEAR MEDICINE TECHNOLLOGIST: to serve as educational coordinator/instructor for new clinical science program in small college. Minimum qualifications: B.S., but M.S. preferred; currently registered; three years experience. To begin July 1, 1979. Salary commensurate with experience and education. Please contact: Dr. Betty F. Thacker, Director, Clinical Science Program, Wheeling College, Wheeling, W. Va. 26003; (304) 243-2229. An Equal Opportunity Employer.

NUCLEAR MEDICINE RESIDENCY. BEGINNING July 15, 1979, an approved two-year program at VA Medical Center integrated with University of California, San Francisco. Training in all aspects of Nuclear Medicine, including basic science, clinical imaging, cardiac and pharmacologic imaging, radiopharmaceuticals, and research opportunities. For details contact: Ralph J. Cavalaris, M.D., Chief, Nuclear Medicine Service, V.A. Medical Center, 4150 Clement Street, San Francisco, California 94121, Telephone: (415) 221-4810 ext. 461. Foreign medical graduates must have passed V.Q.E. An equal opportunity employee.

CHIEF NUCLEAR MEDICINE TECHNOLOGIST/SUPERVISOR.

We have a full-time day position available for an ARRT with 5 years experience. You must be familiar with nuclear medicine. Contact: Chief, Nuclear Medicine Service, Buffalo General Hospital, Buffalo, New York 14222. Day position Monday to Friday 8:00 AM - 5:00 PM, and Wednesday—9:00 PM.

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LOCUM TENENS: PHYSICIAN needed to cover nuclear medicine imaging section from February 7 to February 28, 1979 (or any portion thereof). Contact: Direcro, Department of Nuclear Medicine, Veterans Hospital, 777 Rural Avenue, Williamsport, PA 17701

NUCLEAR MEDICINE—INTERNAL MEDICINE.

ABNM—ABNM Certified or eligible. To share established practice. Inquire: El Paso Nuclear Medicine Associates, P.O. Box 3461, El Paso, Texas 79923

WE ARE CURRENTLY RECRUITING FOR a Nuclear Medicine Physician to fill a Junior Staff position vacany. This individual will also have responsibility for staffing the Nuclear Medicine Section at the West Haven Veterans Hospital. Applicants must be fully trained in Nuclear Medicine and have demonstrated research and teaching ability. Applications from women and members of minority groups are encouraged. Salary negotiated. Contact: Dr. Alan J. Steinbach, West Haven, Connecticut 06510. Deadline for applicants is February 15, 1979. "Equal Opportunity/ Affirmative Action Employer."

NUCLEAR MEDICINE TECHNICIANS. Intermediate level positions, available in our new cardiology laboratory. Experience in RATION/NUCLIDE Cardiac procedures a must. Reimbursement. Excellent employee benefits, free parking available. Contact: Richard Deluca, The Methodist Hospital, 3333 Bertner, Houston, Texas Zip 77030. Call 713-790-3341

NUCLEAR MEDICINE TECHNOLOGIST: Immediate full-time opening in progressive department of 239-bed hospital in Washington State. Full range of nuclear imaging procedures, cardiac exercise stress tests, and gamma camera studies. Computer cameras and rectilinear scanners in use. Imaging only. Prefer technologist with several years experience. Yakima offers abundant out-
door recreational opportunities, sunshine and pleasant climate. Competitive salary; comprehensive benefit program. Contact: Rae E. Bowe, Director of Nuclear Medicine Department, St. Elizabeth Hospital, 110 South 9th Avenue, Yakima, Washington 98902, Phone 509/575-5066, E.O.E.

NUCLEAR MEDICINE RESIDENCY: Two year program in Nuclear Medicine with two positions available. Requirement for admission is completion of at least post-doctoral training as outlined by the American Board of Nuclear Medicine. Positions offered are in a 600 bed general hospital, with over 7,000 scans and 11,000 in-vitro studies yearly. This program is dedicated to the clinical aspect of Nuclear Medicine, with research projects of a clinical nature. Two full-time Nuclear Medicine physicians direct the training, with the assistance of associated physicians, a radiation physicist and a radiopharmacist. Equipment includes five functional gamma cameras and large modern computer facilities. Contact: Dr. R. Spiegelhoff, M.D., Director of Nuclear Medicine, St. Luke's Hospital, 2900 W. Oklahoma Avenue, Milwaukee, WI 53215.

FACULTY POSITION IN VETERINARY Radiology, School of Veterinary Medicine, University of California at Davis. Assistant Professor: Duties include developing and performing nuclear medicine and ultrasonic diagnostic examinations for large and small animals; teaching formal classes and laboratory for undergraduates in the professional curriculum of Veterinary Medicine in the area of nuclear medicine procedures and interpretation and teaching house officers; and developing a productive research program in nuclear medicine and ultrasound. Interest in the development and application of ultrasound for diagnosis. Qualifications include a DVM, PhD, or comparable degree in Health Sciences, specialty board certification in veterinary radiology or a specialty board in nuclear medicine desired. Board eligible candidates should apply. Research achievement important; teaching aptitude required. Submit curriculum vitae and the names of three references to Dr. T. E. O'Brien, Chairman, Search Committee, Department of Radiological Sciences, School of Veterinary Medicine, University of California at Davis, California 95616. Applications will be accepted through January 31, 1979 or until a suitable candidate is found. The University of California is an equal opportunity employer and encourages applications from women and members of minority groups.

REGISTERED NUCLEAR MEDICAL TECH- nologist with Radiological Technology experience preferable. 160-bed JCAH accredited Hospital. Full-time plus call. Excellent salary and fringe benefits. Contact Chief Radiology Technician, St. Luke's Hospital, Aberdeen, S.D. 605 223-5109 extension 266.

REGISTERED NUCLEAR MEDICINE TECH- nologist. Immediate full-time positions available in Nuclear Medicine Imaging Dept. at 560 bed medical center affiliated with School of Medicine. Require experience with scintillation cameras, rectilinear scanners and basics of radiopharmacy. NO IN-VITRO experience necessary. Competitive salary, excellent fringe benefits. For further information or to apply, contact: Ms. Jan Mulally, NMT, Dept. of Nuclear Medicine, Methodist Medical Center of Illinois, 221 N.E. Glen Oak Ave., Peoria, Illinois 61636 or phone (309) 672-5595 or 5594.

POSITIONS WANTED

NUCLEAR MEDICINE PHYSICIAN. ABNM, ABIM. Experienced and competent in all phases of Nuclear Medicine (Imaging, R1A, Computers) and Diagnostic Ultrasound. Private practice and academic background. Have established several laboratories. Age under 40. Seek directorship position with large progressive hospital, multispecialty clinic or radiology group. Write for C.V. and further information. Reply Box 100, Society of Nuclear Medicine, 475 Park Ave., So., NY, NY 10016.

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Residency training encompasses the full spectrum of nuclear medicine procedures, both in vivo and in vitro, in pediatric and adult patients. A mobile nuclear medicine capability emphasizes critically ill patients. Because of a substantial commitment to education, including a bachelor's degree program in nuclear medicine technology, the faculty of the Nuclear Medicine Section is very broad based. Trainees attend lectures and laboratories in radiation physics, instrumentation, radiopharmacy, radioimmunoassay, radiobiology, and radiation health in addition to the usual clinical nuclear medicine courses and seminars.

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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ATLAS OF CARDIOVASCULAR NUCLEAR MEDICINE: Selected Case Studies. Edited by H. William Strauss, M.D., et al. Using selected case studies, this superbly illustrated atlas describes—and depicts—normal and abnormal images commonly seen in cardiovascular diseases. The authors suggest "check list" to assure correct interpretations of gated blood pool scans, and myocardial perfusion images—and include follow-up studies. 1977. 208 pp., 665 illus. Price, $44.50.


A New Book! ATLAS OF PEDIATRIC NUCLEAR MEDICINE. By Philip O. Alderson, M.D.; David L. Gilday, M.D., B.Eng., F.R.C.P.; and Henry N. Wagner, M.D.; with 2 assistants. This graphic atlas provides a broad overview of tracer procedures you can use to evaluate your pediatric clients. Organized according to systems, it uses case studies to examine congenital diseases, oncologic diagnosis, trauma, metabolic disorders and other acquired conditions. December, 1978. Approx. 256 pp., 789 illus. About $44.50.


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For further information, contact:

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Two traineeships available immediately at the Donner Laboratory, Lawrence Berkeley Laboratory, University of California, for research in the area of cardiovascular disease, circulatory physiology, non-invasive physiological imaging, and nuclear medicine research. The National Research Service Awards pay $10,000 to $13,000 per annum, depending on experience. Training and research experience will be carried out in the context of a National Heart, Lung & Blood Institute Fellowship Program within the Donner Laboratory Research Medicine Group, which conducts an active program in advanced nuclear medical instrumentation, radionuclide development, positron emission tomography, electron microscopy, basic hematology, and computer methods for cardiovascular research. The participating professionals include nuclear medicine specialists, hematologists, radiologists, pathologists, physicists, and chemists. Facilities include emission tomography instrumentation, cyclotrons, large and small computer facilities, animal surgery and techniques laboratories, with technical staff. Prefer background training in physiology, nuclear medicine, organic chemistry, or physics. US citizens or permanent residents are eligible to apply. Send resume, transcripts, and name and phone number of two references to:

Dr. Thomas F. Budinger,
Donner Laboratory, Lawrence Berkeley Laboratory,
University of California, Berkeley, CA 94720
(415) 843-2740, ext. 5435
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NUCLEAR MEDICINE PHYSICIAN

The Miriam Hospital has two openings in the Division of Nuclear Medicine

1 DIRECTOR --candidate should be board certified in Nuclear Medicine with special expertise in Nuclear Cardiology. Position carries University appointment at appropriate level dependent upon training and experience.

2 ASSISTANT DIRECTOR --candidate should be board certified or eligible in Nuclear Medicine with special expertise, training and experience in Nuclear Cardiology. Position carries appropriate faculty appointment depending on training and experience.

Inquiries and Curriculum Vitae should be received by February 1, 1979, addressed to:
Abraham Lesser, MD
Physician-in-Chief
THE MIRIAM HOSPITAL
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Applications for a one year training program in Nuclear Medicine Technology are being accepted by the Geisinger Medical Center. Classes will begin September 4, 1979. Standard qualifications are preferred, but other qualifications will be reviewed on an individual basis.

Inquiries should be sent to:
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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.
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Amersham
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Second International Symposium on Radiopharmaceuticals
March 19-22, 1979

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<thead>
<tr>
<th>Name:</th>
<th>Last</th>
<th>First</th>
<th>Degree</th>
</tr>
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<td>Zip Code</td>
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I am attending the 2nd International Symposium on Radiopharmaceuticals
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<th>Medium</th>
<th>Deluxe</th>
</tr>
</thead>
<tbody>
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<td>Double/Twin</td>
<td>$47</td>
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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
KEYNOTE SPEAKER: Gov. Dixie Lee Ray
PANEL ON REGULATORY AFFAIRS:
Leaders from Gov't., Industry & Users
RADIONUCLIDE PRODUCTION
P. Silvester (U.K.)
QUALITY CONTROL:
K. Kristiansen (Denmark)
ICE BREAKER COCKTAIL PARTY

Tuesday - March 20
FUNCTIONAL IMAGING:
H. Atkins
(Brookhaven Nat'l Lab.)
INORGANIC RADIOPHARMACEUTICALS
E. Deutsch
(Univ. of Cincinnati)
ORGANIC RADIOPHARMACEUTICALS
A. Wolf
(Brookhaven Nat'l Lab.)
IMMUNOLOGY
R. Ekins (U.K.)
ONCOLOGY / HEMATOLOGY:
J. Adelstein
(Peter Bent Brigham Hospital)
G. Ege
(Canada)

Wednesday - March 21
RES/BILIARY:
M. Loberg
(Univ. of Maryland)
RENAL:
S. Winchell
(Medi+Physics)
CENTRAL NERVOUS SYSTEM:
M. J. Welch
Mallinckrodt Inst. of Rad.

Thursday - March 22
PANCREAS, PROSTATE AND ADRENALS:
M. Blou (SUNY, Buffalo)
THYROID:
H. Nishyama (FDA)
SKELETAL:
M. Francis
(Procter & Gamble Co.)
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(Mass. Gen. Hosp.)
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<th>HVL For 99m Tc</th>
<th>Size of Vial Accommodated</th>
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<td>3 mm</td>
<td>10</td>
<td>5 thru 30 ml</td>
<td>225.00</td>
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<td>77</td>
<td>6 mm</td>
<td>20</td>
<td>5 thru 30 ml</td>
<td>275.00</td>
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<td>78</td>
<td>9 mm</td>
<td>30</td>
<td>50 and 100 ml</td>
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<td>79</td>
<td>12 mm</td>
<td>40</td>
<td>5 thru 30 ml</td>
<td>750.00</td>
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**ACTIVITY:** Xenon Xe 133 gas is a mixture of xenon-133 gas, a radioactive substance, in a 5% gas in carbon dioxide admixture. The radioactive substance is a noble gas that decays by emitting gamma rays. The gamma rays are used to detect lung abnormalities.

**INDICATIONS:** Xenon Xe 133 gas is used for the detection of lung abnormalities in patients with a history of lung disease, such as chronic obstructive pulmonary disease (COPD) or emphysema. It can also be used to evaluate the effectiveness of bronchodilators and other treatments for lung disease.

**CONTRAINDICATIONS:** Xenon Xe 133 gas is contraindicated in patients with a history of severe bronchospasm or asthma, a history of anaphylactic reactions to xenon gas, or a history of other severe reactions to xenon gas.

**PRECAUTIONS:** Xenon Xe 133 gas should be administered by trained professionals, such as radiologists or respiratory therapists. Patients should be monitored closely for any adverse reactions, such as bronchospasm or hypotension.

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**PHYSICAL CHARACTERISTICS:**

- **Technetium Tc 99m:** 109.6 keV gamma rays with an energy of 0.635 MeV.
- **Half-life:** 6.03 hours.
- **Dosimetry:**
  - 0.08 to 0.10 mCi for bronchography.
  - 0.10 to 0.25 mCi for pulmonary function studies.

**DOSIMETRY:** The estimated absorbed radiation dose (in mrem) to an average patient (70 kg) for pulmonary function studies and central blood flow studies from a maximum dose of 20 millicuries of xenon Xe 133 gas is as shown in Table 3.

**Table 1. Principal Radiation Emission Data Xenon Xe 133**

<table>
<thead>
<tr>
<th>Component</th>
<th>Mean %</th>
<th>Mean Energy (keV)</th>
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<tbody>
<tr>
<td>Gamma-2</td>
<td>34.99</td>
<td>81.0</td>
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<tr>
<td>Gamma-3</td>
<td>9.84</td>
<td>103.8</td>
</tr>
<tr>
<td>Gamma-4</td>
<td>74.23</td>
<td>125.1</td>
</tr>
</tbody>
</table>

**Table 2. Radiation Attributions by Attenuation**

- **Shield Thickness (in mm):**
  - 0.10
  - 0.95
  - 2.0
  - 4.0
  - 6.0
  - 9.0

**Table 3. Pulmonary Function Testing**

- **Volume:**
  - 0.08 to 0.10 mCi for bronchography.
  - 0.10 to 0.25 mCi for pulmonary function studies.

**Table 4. Pulmonary Function Testing**

- **Dose:**
  - 0.08 to 0.10 mCi for bronchography.
  - 0.10 to 0.25 mCi for pulmonary function studies.

**Table 5. Radiation Dose**

- **Dose:**
  - 0.08 to 0.10 mCi for bronchography.
  - 0.10 to 0.25 mCi for pulmonary function studies.

**Table 6. Pulmonary Function Testing**

- **Dose:**
  - 0.08 to 0.10 mCi for bronchography.
  - 0.10 to 0.25 mCi for pulmonary function studies.
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<table>
<thead>
<tr>
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<tr>
<td></td>
<td>SI-14</td>
<td>SI-22</td>
</tr>
<tr>
<td></td>
<td>SI-15</td>
<td>SI-23</td>
</tr>
<tr>
<td></td>
<td>SI-18</td>
<td>SI-24</td>
</tr>
<tr>
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<td>SI-21</td>
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<table>
<thead>
<tr>
<th>Company Name</th>
<th>City, State</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACKERMAN NUCLEAR, INC.</td>
<td>Glendale, CA</td>
<td>70A,71A</td>
</tr>
<tr>
<td>ADAC</td>
<td>Cupertino, CA</td>
<td>44A,45A</td>
</tr>
<tr>
<td>ATOMIC PRODUCTS</td>
<td>Center Moriches, NY</td>
<td>23A</td>
</tr>
<tr>
<td>BECKMAN INSTRUMENTS, INC.</td>
<td>Irvine, CA</td>
<td>42A,43A</td>
</tr>
<tr>
<td>BRATTLE INSTRUMENT</td>
<td>Cambridge, MA</td>
<td>IBC</td>
</tr>
<tr>
<td>CAPINTEC, INC.</td>
<td>Montvale, NJ</td>
<td>81</td>
</tr>
<tr>
<td>CARDIAC MEDICAL SYSTEMS</td>
<td>Northbrook, IL</td>
<td>41A</td>
</tr>
<tr>
<td>CIS RADIOPHARMACEUTICALS</td>
<td>Bedford, MA</td>
<td>34A,35A</td>
</tr>
<tr>
<td>CLINICAL ASSAYS</td>
<td>Cambridge, MA</td>
<td>83A</td>
</tr>
<tr>
<td>COLLEGE OF AMERICAN PATHOLOGISTS</td>
<td>Skokie, IL</td>
<td>64A</td>
</tr>
<tr>
<td>COMPUTER METHODS SUPPLEMENTS</td>
<td>Bedford Heights, OH</td>
<td>36A</td>
</tr>
<tr>
<td>CORDIS CORPORATION</td>
<td>Miami, FL</td>
<td>81A</td>
</tr>
<tr>
<td>DIAGNOSTIC BIOCHEMISTRY</td>
<td>San Diego, CA</td>
<td>27A</td>
</tr>
<tr>
<td>DIAGNOSTIC ISOTOPES</td>
<td>Bloomfield, NJ</td>
<td>21A</td>
</tr>
<tr>
<td>DIAGNOSTIC PRODUCTS</td>
<td>Los Angeles, CA</td>
<td>3A,52A</td>
</tr>
<tr>
<td>DUNN INSTRUMENTS</td>
<td>San Francisco, CA</td>
<td>54A,55A</td>
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<td>EASTMAN KODAK COMPANY</td>
<td>Rochester, NY</td>
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<td>Milwaukee, WI</td>
<td>78A,79A</td>
</tr>
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<td>HUMANETICS, INC.</td>
<td>Carrollton, TX</td>
<td>60A</td>
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<td>JASINS &amp; SAYLES</td>
<td>Framingham, MA</td>
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<td>JOHNSTON LABORATORIES</td>
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<td>85A</td>
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<td>KEWAUNEE SCIENTIFIC EQUIPMENT CORP.</td>
<td>Adrian, MI</td>
<td>58A</td>
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<td>R.S. LANDAUER, JR. &amp; CO.</td>
<td>Glenwood, IL</td>
<td>82A</td>
</tr>
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<td>3M MEDICAL PRODUCT</td>
<td>St. Paul, MN</td>
<td>40A,41A</td>
</tr>
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<td>St. Louis, MO</td>
<td>46A,47A,48A</td>
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<td>MEDI-PHYSICS, INC.</td>
<td>Emeryville, CA</td>
<td>IFC,1A</td>
</tr>
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<td>MEDI-RAY, INC.</td>
<td>Tuckahoe, NY</td>
<td>53A</td>
</tr>
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<td>C.V. MOSBY CO.</td>
<td>St. Louis, MO</td>
<td>61A</td>
</tr>
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<td>NEW ENGLAND NUCLEAR</td>
<td>Boston, MA</td>
<td>8A,29A,30A,31A,32A,73A,74A,75A,76A</td>
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<td>NISE, INC.</td>
<td>Cerritos, CA</td>
<td>34A</td>
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<td>NUCLEAR ASSOCIATES</td>
<td>Carle Place, NY</td>
<td>28A</td>
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<td>NUCLEAR MEDICAL SYSTEMS</td>
<td>Newport Beach, CA</td>
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</tr>
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<td>NUCLEAR PACIFIC</td>
<td>Seattle, WA</td>
<td>72A</td>
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<td>Hamden, CT</td>
<td>87A</td>
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<td>O’NEILL ENTERPRISES</td>
<td>Ann Arbor, MI</td>
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<td>PICKER CORPORATION</td>
<td>Cleveland, OH</td>
<td>14A,15A</td>
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<td>PROCTER &amp; GAMBLE CO.</td>
<td>Cincinnati, OH</td>
<td>24A,25A</td>
</tr>
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<td>RADIOCHEMICAL CENTRE</td>
<td>Amersham, England</td>
<td>13A,33A,49A,59A,66A</td>
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<td>Houston, TX</td>
<td>26A,63A</td>
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<tr>
<td>RAYTHEON COMPANY</td>
<td>Burlington, MA</td>
<td>6A</td>
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<td>Des Plaines, IL</td>
<td>BC</td>
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<td>New York, NY</td>
<td>56A,57A,58A,60A,62A</td>
</tr>
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<td>Vercelli, Italy</td>
<td>4A,37A,69A</td>
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<td>Princeton, NJ</td>
<td>5A,65A</td>
</tr>
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<td>Canoga Park, CA</td>
<td>84A</td>
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<td>UNION CARBIDE CORPORATION</td>
<td>Rye, NY</td>
<td>10A,11A,88A</td>
</tr>
<tr>
<td>UNION CARBIDE IMAGING SYSTEMS</td>
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NEN Thallium 201 phantom at 2” distance from collimator.
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The picture on your left does not provide adequate resolution for cardiac work.

**AFTER**
NEN Thallium 201 phantom at 2” distance from collimator.
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The picture on the right is more than adequate!

Picker 2C with ultrafine collimator.

Picker 2C with ultrafine collimator and SX-11 detector head.

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<td>2C</td>
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BRIEF SUMMARY OF PRESCRIBING INFORMATION

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 Technetium 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 any 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, to pregnant women 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 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.

The contents of the vial 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 Aggregated Albumin is physically unstable and as such the particles will settle with time. Failure to agitate the vial 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 preparation. Refrigerate at 2° to 8°C after preparation. If blood is withdrawn into the syringe, unnecessary delay prior to injection may result in a loss of activity.

The contents of the vial are under a nitrogen atmosphere and should be protected from air. On preparation with Sodium Pertechnetate Tc 99m, the contents of the vial should be mixed by gentle swirling to avoid changes in particle size. 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 patient 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 Technetium Tc 99m labeled aggregated albumin have been reported.

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

how supplied

kit contents

5 STERILE MULTIDOSE REACTION VIALS (10 cc. silver aluminum overseal), each containing 0.34 mg MAA Aggregated Normal Serum Albumin (Human) 2.0 x 10^-8 ± 25% particles, 0.27 mg stannous tartrate, 0.6 ml of isotonic saline, hydrochloric acid and/or sodium hydroxide may have been added for pH adjustment.

RADIATION SHIELD for preparation and storage of Technetium Tc 99m Aggregated Albumin preparation.

PRESSURE-SENSITIVE LABELS for final Technetium Tc 99m Aggregated Albumin preparation.

PACKAGE INSERT.

FOR FULL PREPARATION AND PRESCRIBING INFORMATION, SEE PACKAGE INSERT.

Notes:
1. See package insert for full preparation instructions.
3. Refer to Union Carbide and competitive package inserts for full lung dosimetry information.

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CintiChem is a registered trademark of Union Carbide Corporation.
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 $^{99m}$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.

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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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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.)

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