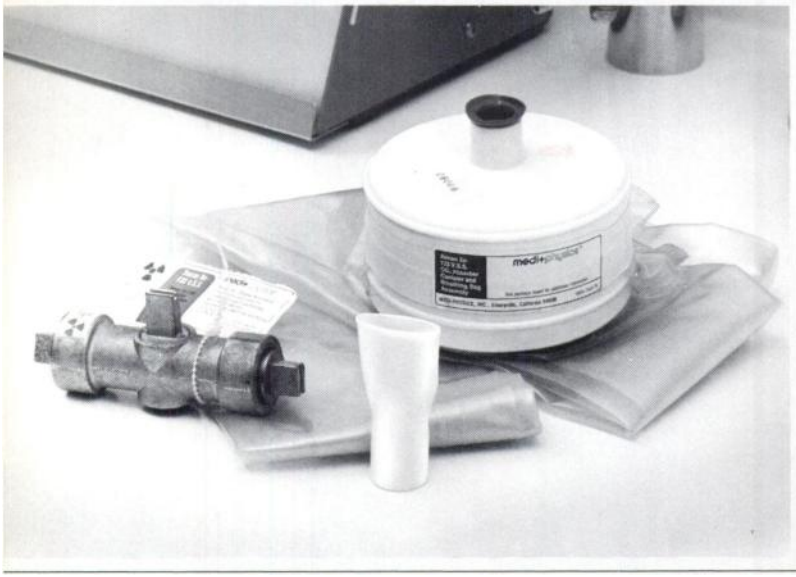
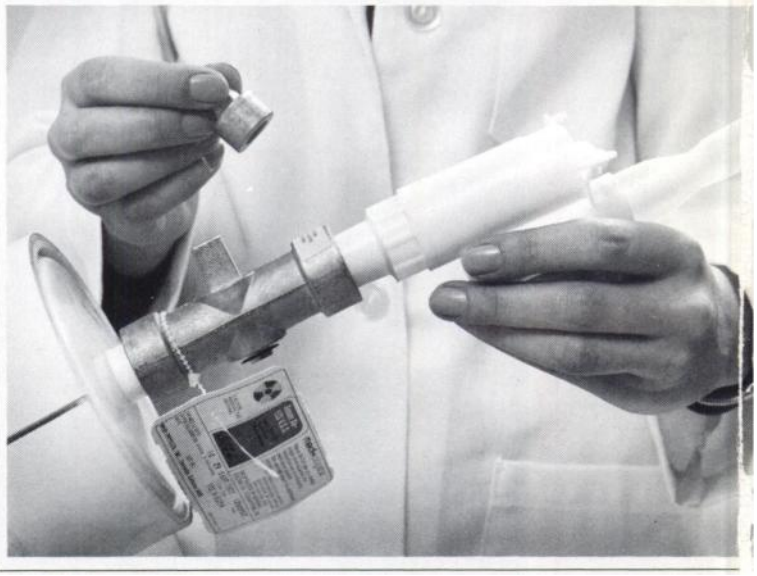
# CONSIDERING XENON?





## A versatile, disposable system

Xenon 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 $CO_2$ absorber and bag for rebreathing and collection of expired xenon Xe 133, and a mouthpiece.

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 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. (Ventilation Study System)**
**Xenon Xe 133 Diagnostic**

**DESCRIPTION:** The Xenon Xe 133-Ventilation Study System (V.S.S.) consists of a sealed plastic tube containing 10 millicuries ±20% of Xenon 133 gas at calibration time and date with less than 1% carrier Xenon in air.

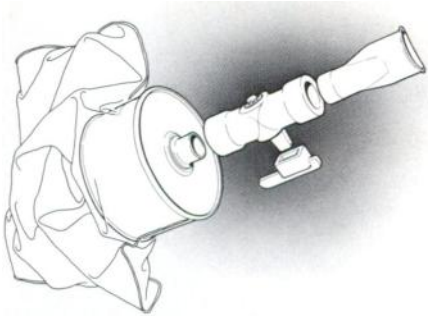
**INDICATIONS AND USAGE:** Study of pulmonary ventilation.

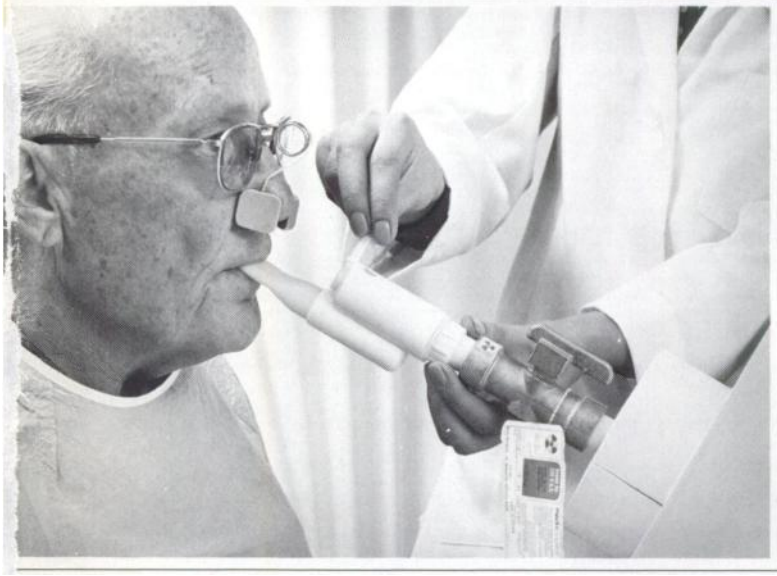
**CONTRAINDICATIONS:** None known.

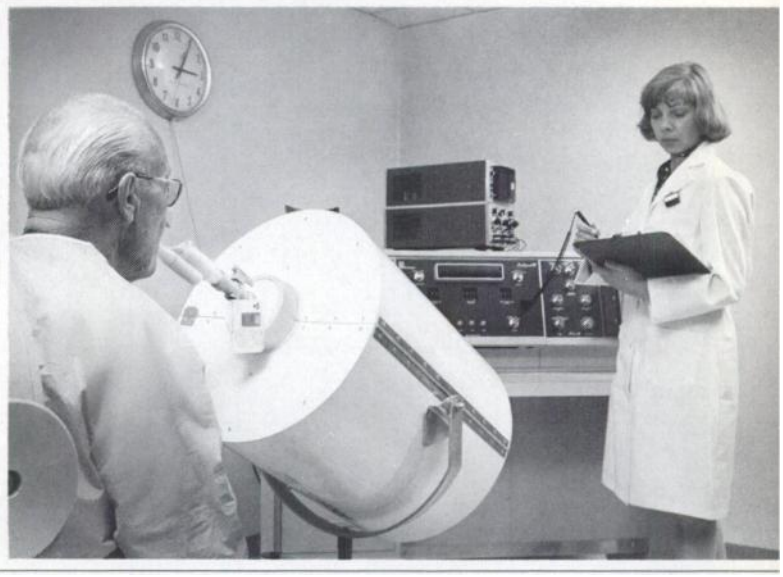
**WARNINGS:** Xenon Xe 133 should not be administered to children or to patients who are pregnant, or to nursing mothers unless the benefits to be gained outweigh the potential hazards. Ideally, examinations using radiopharmaceuticals, especially those elective in nature, of a woman of childbearing capability 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 133-V.S.S. (VENTILATION STUDY SYSTEM) Xenon Xe 133 diagnostic







## True, single-unit dose

The MPI Xenon 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.

## Reduced radiation exposure

The xenon Xe 133 is supplied in a sealed plastic container. 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 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 the 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 133 in a sealed plastic tube containing 10 millicuries ±20% at calibration time and date stated on the label.

The sealed plastic tube is enclosed in a metal valve-shield which is sealed with a plastic shrink band to prevent accidental loss of Xenon 133 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 plastic tube. The V.S.S. also includes a disposable mouthpiece and a breathing-collection bag with an attached $CO_2$ absorber canister.

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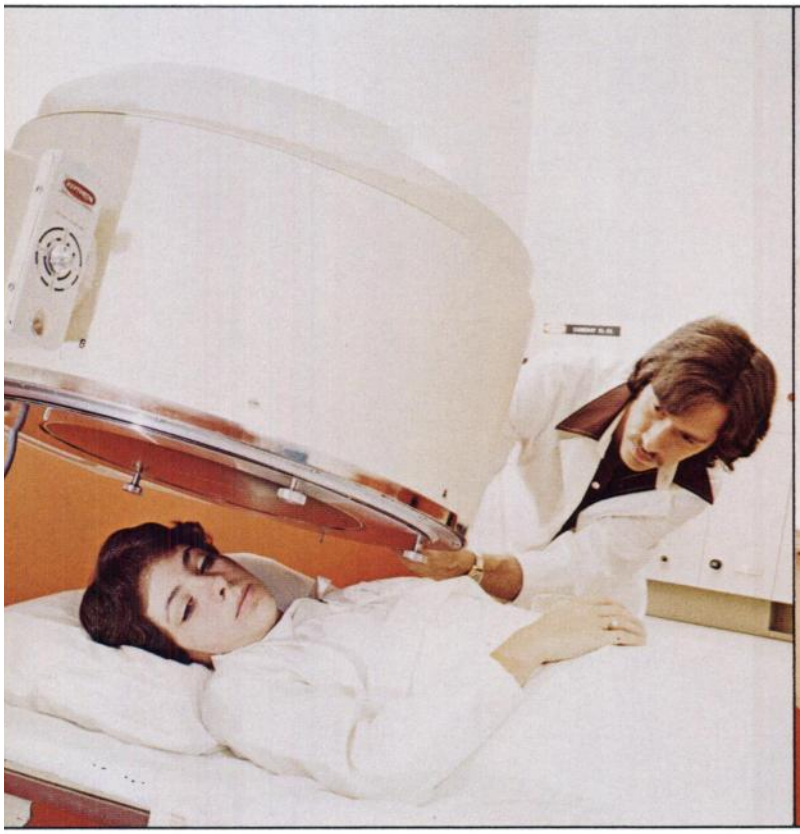
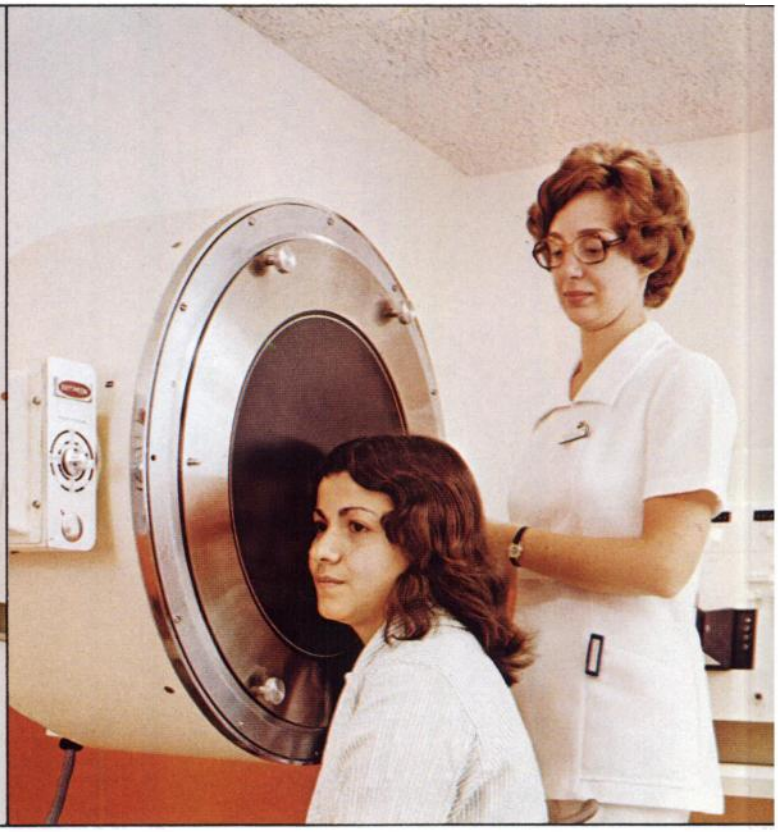
# Abington Memorial chose a camera for maximum image quality and convenience.





## The choice: The Raytheon XL-91

The 520-bed Abington Memorial Hospital in Abington, PA, outside Philadelphia, has added a new Raytheon XL-91 gamma camera to its new wing. And right from start-up the XL-91 has been producing images of superior resolution, with much greater patient accessibility and operator convenience than other equipment.

The reasons for the XL-91's success at Abington are clear. At 16½ inches the XL-91 provides the widest undistorted field of view of any gamma camera. The XL-91's exclusive Autocomp circuitry achieves ±2% uniformity and — with as many as four memories — permits users to calibrate to four different isotopes or collimators.

Patient comfort, operator convenience, superior high resolution images. No wonder Abington Memorial had the XL-91 working a full patient schedule just days after delivery. And outstanding customer acceptance of the XL-91 — such as at Abington Memorial — is the reason Raytheon has had to expand its sales and service coverage greatly. From coast to coast, wherever you are, Raytheon is now near you.

If you'd like more information on the XL-91, write or phone Raytheon Company, Medical Electronics, 70 Ryan Street, Stamford, CT 06907. Telephone: 800-243-9058. We will put you in touch with your nearest Raytheon sales engineer.

RAYTHEON

## The Raytheon XL-91...the 91-tube image maker.

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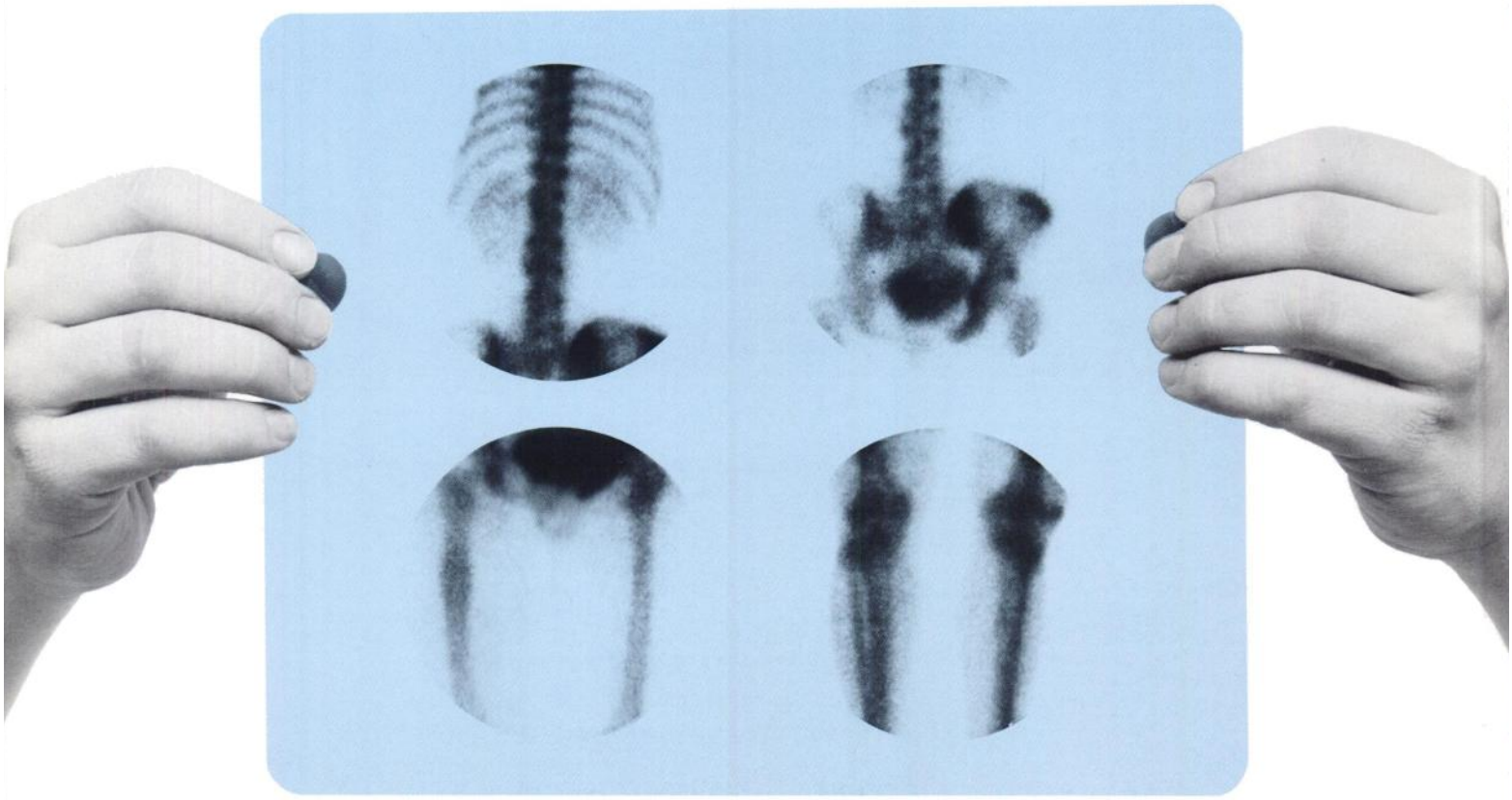
THE ELSCINT DYMAX LARGE FIELD CAMERA

# Not for everyone!

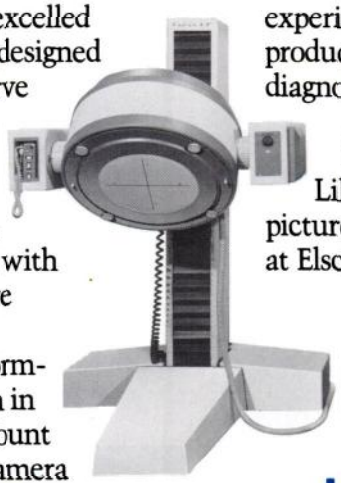


Dymax gives you what you want: unexcelled images! But the Dymax has *not* been designed for everyone. It is manufactured to serve the needs of those individuals who demand only the finest quality and performance.

Stop and look at the images shown. We invite comparison of these images with those of *any* other manufacturer. Have you seen better images?

The Dymax LF gives you 3% uniformity with 3 mm. or better bar resolution in a 400 mm. field of view. And image count rates up to 200,000 cps. All this in a camera and console system which occupies a mere 50″ x 60″ of floor space.

Elscint's precision engineering and long experience in nuclear medicine imaging produce the image quality so vital to accurate diagnoses. The Dymax LF is not for everyone . . . but it may well be the camera you've been looking for.



Like to see more scans or get the total picture on the Dymax LF? Contact us today at Elscint Inc., 138-160 Johnson Avenue, Hackensack, NJ 07602. Telephone: (201) 487-5885

elscint inc.

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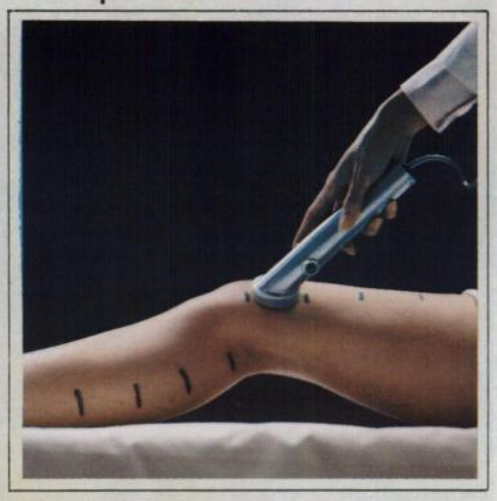
**DVT** DIAGNOSIS

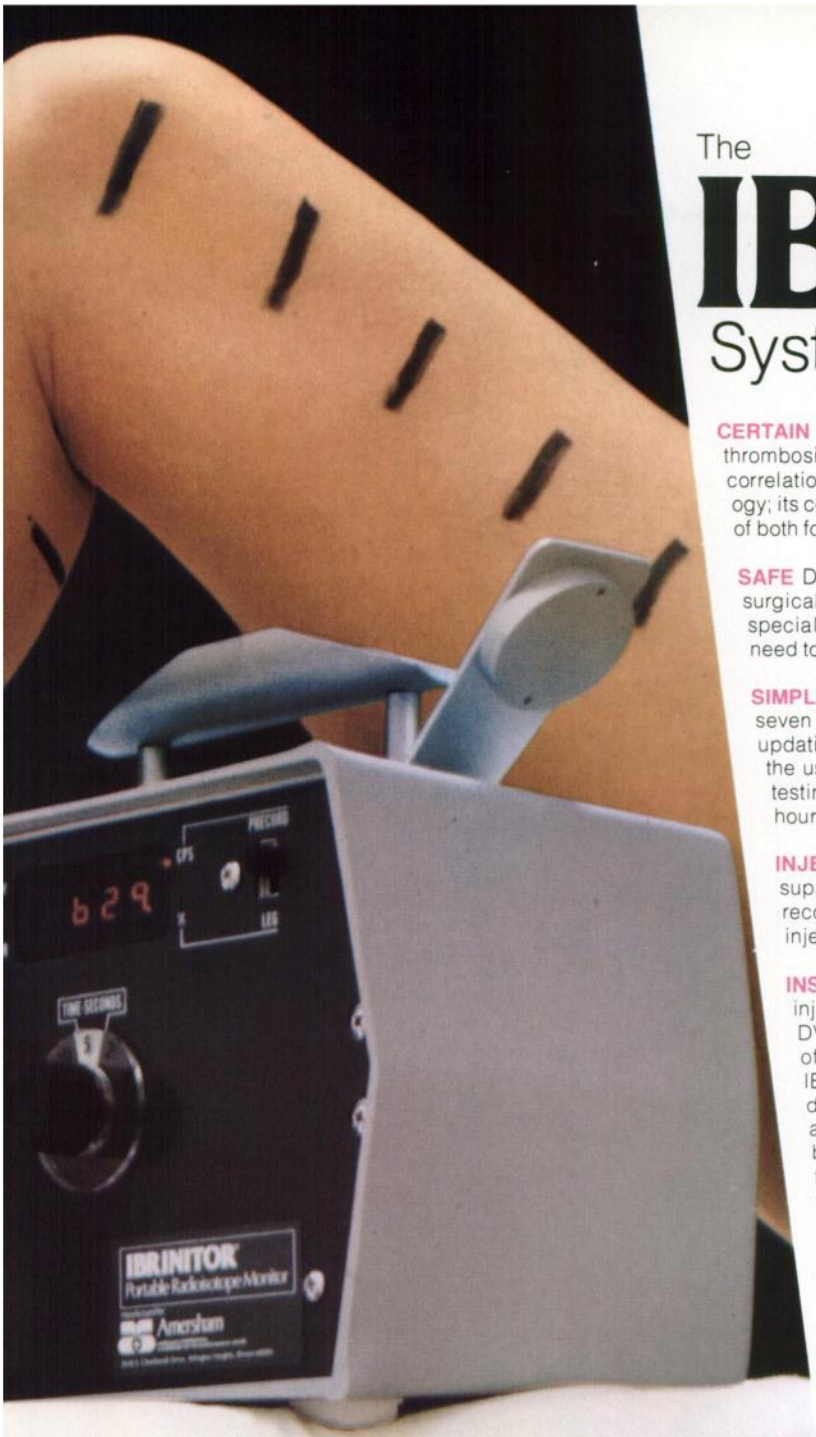
Certain,
Safe,
Simple:

**Read between the lines**

Inject

Inspect






The

# IBRIN System

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

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

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

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

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

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

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

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

*See following page for brief summary of package insert.*

## Detect

Amersham
AMERSHAM CORPORATION:
A SUBSIDIARY OF THE RADIOCHEMICAL CENTRE

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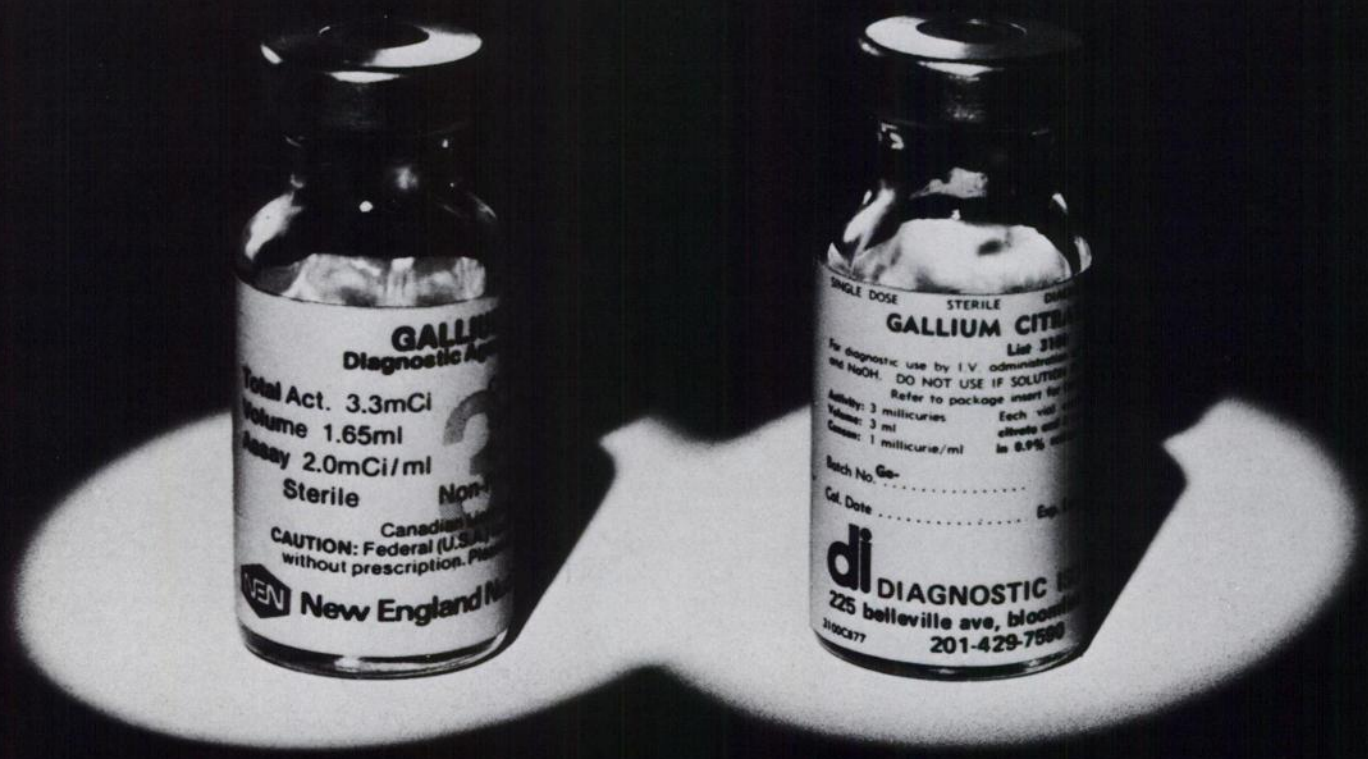


Gallium Citrate Ga 67 for routine use is now available from Diagnostic Isotopes, Inc., giving you a choice of suppliers for this product. Gallium Citrate extends the DI product line of quality controlled radiopharmaceuticals.

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# Look into your patient from a different point of view.

True three dimensional imaging is possible now with **Gamma-CAT:** the unique gamma emission computerised tomography system from SELO.

Selo **Gamma-CAT:** requires you to administer only the same radioisotope dose as for conventional scintigraphy but allows you to perform:

- Whole body transaxial tomography - up to 64 slices can be achieved in less than 8 minutes.
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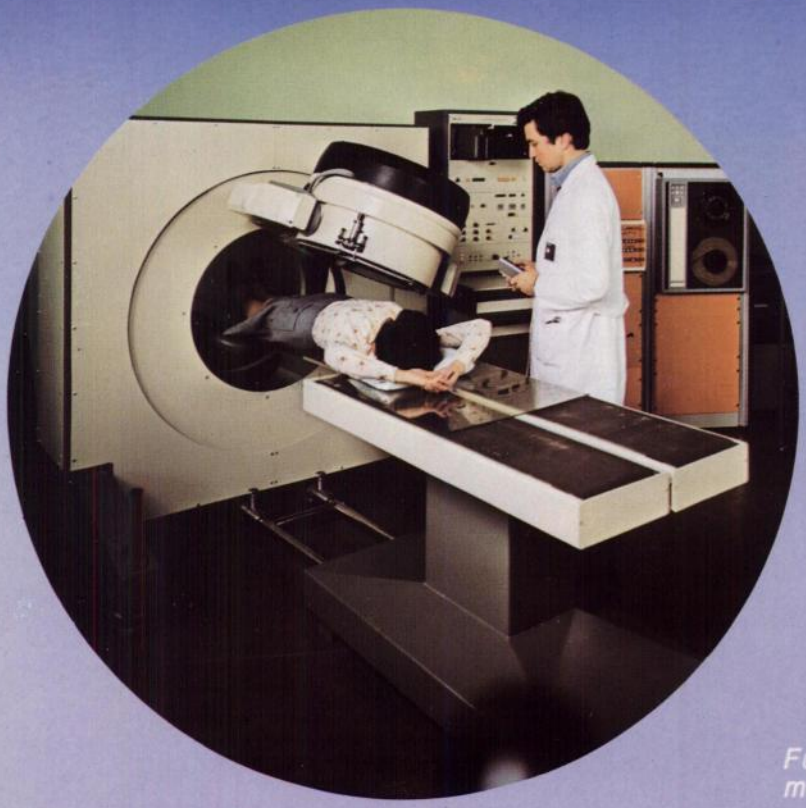

*Further information for individual enquiries may be obtained by writing to:*

*SELO is seeking to extend it's distributor network. Enquiries regarding representation will be welcomed.*

SELO

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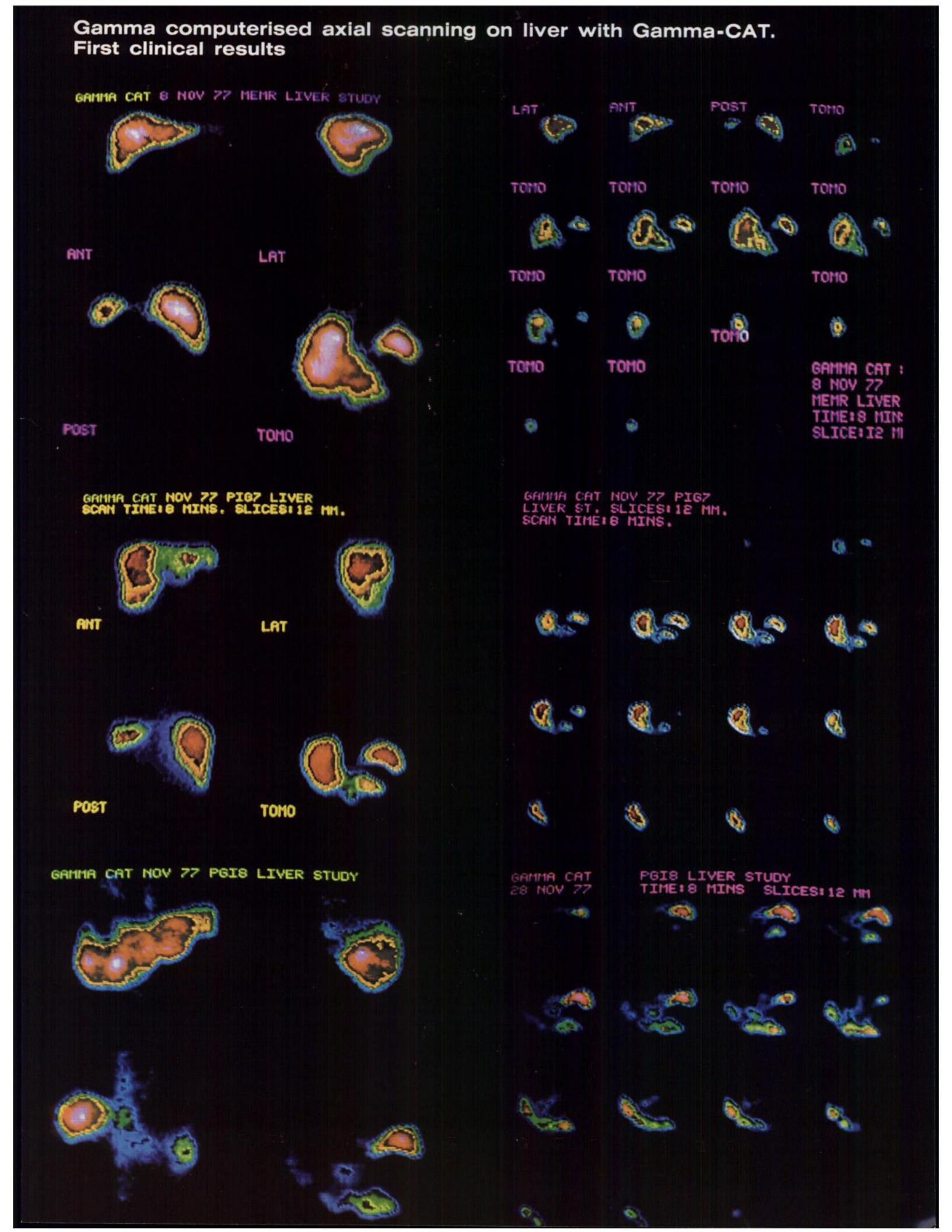
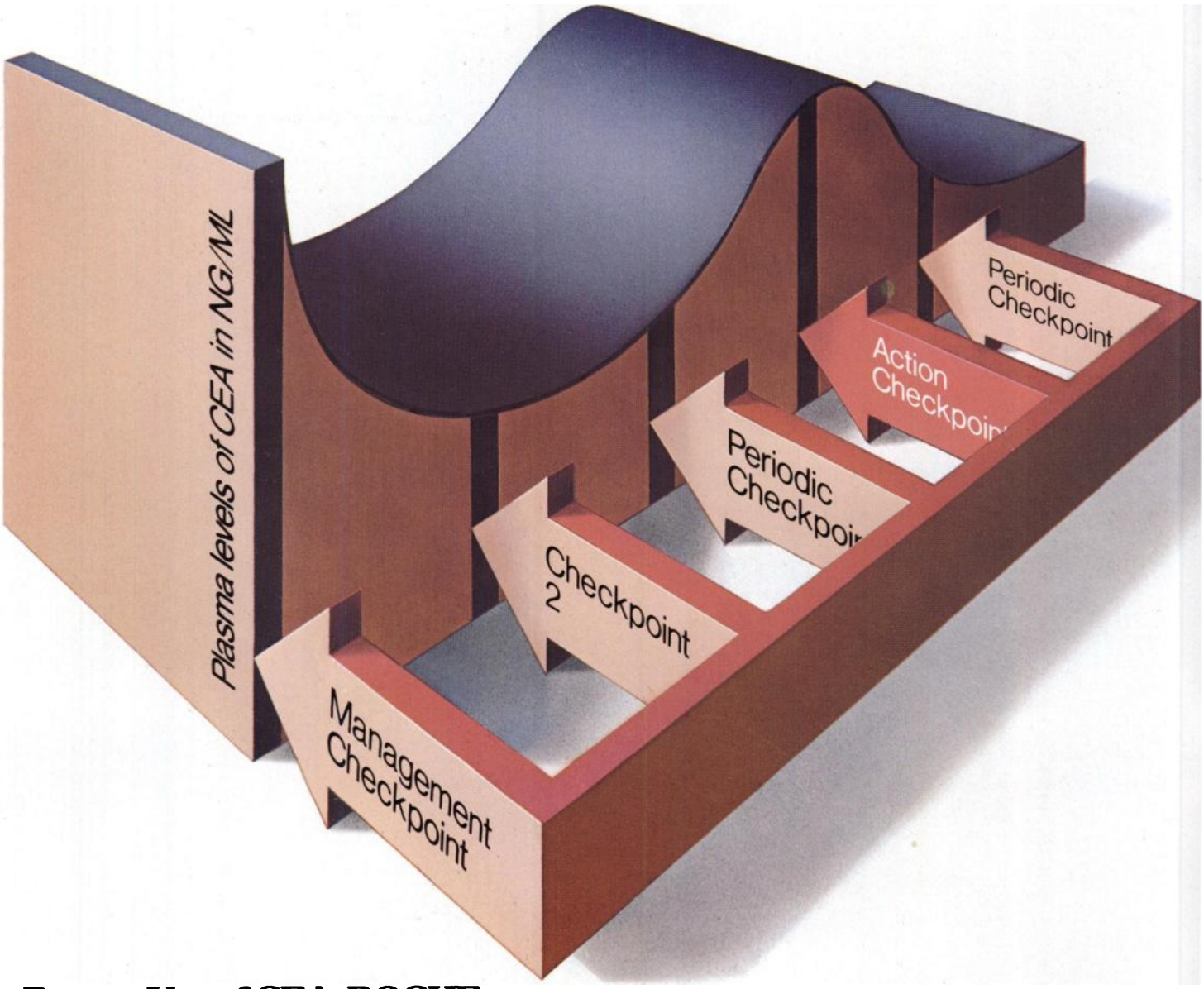
# Gamma computerised axial scanning on liver with Gamma-CAT. First clinical results



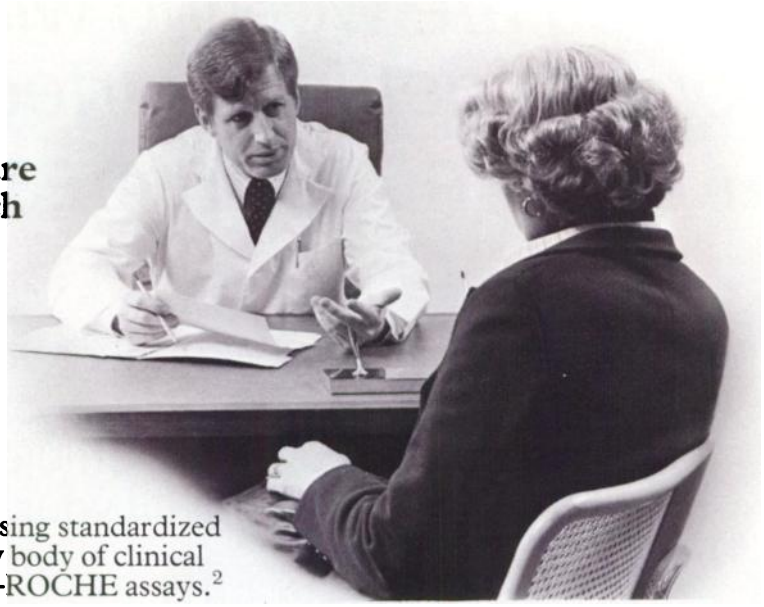
# Manage the Cancer Patient with CEA-ROCHE™




## Proper Use of CEA-ROCHE

1. Management checkpoint #1: establish initial (pre-treatment) titer.
2. Checkpoint #2: post-surgical/post-treatment titer.
3. Periodic checkpoints: serial titers remain in "normal" range.
4. **Action checkpoint: after successive significant titer increases, consider adjustment of therapy or complete diagnostic workup**
5. Periodic checkpoints: "normal" readings– good prognosis

**"The value of monitoring the patients with serial determinations of plasma CEA cannot be overemphasized. One may even argue that by doing so, we are likely to detect recurrent disease much earlier than if we were only to rely on the more conventional clinical methods of cancer detection...[1]".**



## The Most Extensive Clinical Trial of a Product in Diagnostic History

Investigators in over 100 leading medical centers, using standardized reagents and procedure, generated an extraordinary body of clinical data on more than 20,000 patients and 50,000 CEA-ROCHE assays.[2]

The conclusion:

**CEA-ROCHE is an extremely important dimension in the management of the cancer patient**

## Availability of CEA-ROCHE As a Management Aid Provides Multiple Benefits for the Clinician and the Patient.

### For the Clinician:

the opportunity to effectively chart the patient's course; recurrence is indicated by rising titers, often months before symptoms appear[1]

### For the Patient:

the possibility of earlier detection of recurrence, earlier and more effective therapy, and potentially improved prognosis

# CEA-ROCHE™

## Carcinoembryonic Antigen assay

may be ordered from

- Roche Clinical Laboratories, Inc.
  A complete reference laboratory
  (201) 526-2400 (800)631-5250
- Major Hospital and Private Laboratories

Additional information may be obtained from

- Your Roche Representative
- the Professional Services Department
  (201) 235-2355

Attn: JG

Please send more information on monitoring cancer patients with CEA-ROCHE.™

I am particularly interested in:

☐ GI cancer ☐ Breast cancer ☐ GU cancer ☐ Lung cancer

Name _____ Specialty/Title _____

Institution _____

Address _____

City _____ State _____ Zip _____

CA-2P


ROCHE LABORATORIES
Division of Hoffmann-La Roche Inc.
340 Kingsland Street, Nutley, N.J. 07110
(201) 235-2355

References:
1. Mavligit GM, *et al: Cancer 36:* 2421-2427, Dec (Suppl) 1975
2. Data on file, Roche Diagnostics, Nutley, New Jersey 07110

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# ***Xenon Delivery System***

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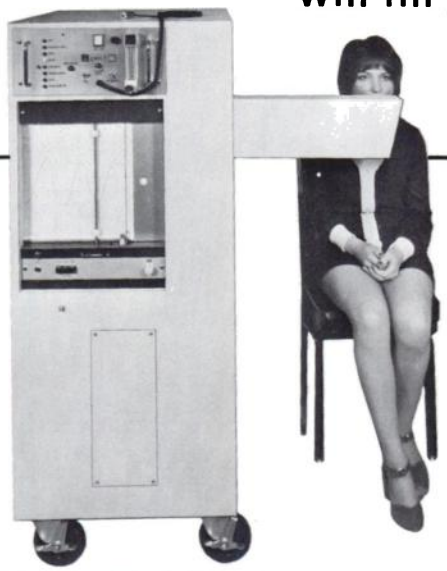
Whatever your xenon work-load, budget or expertise, one of these efficient delivery systems will fill your needs.



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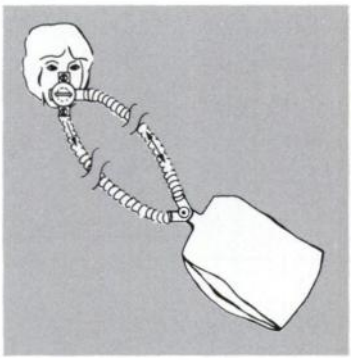
With push-button and remote operation, spirometer and optional kymograph.

**"XDS" SEMI-AUTOMATIC XENON DELIVERY SYSTEM**

Almost as versatile as the LFU system, but at ⅓ the cost.

**E-Xe-Breathe DISPOSABLE Bag System.**

The ideal low-cost system until the work-load is increased.



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Compatible with any radio-xenon gas handling system.

Only 15″ x 15″ x 15¼″ high.

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# HSA Multi-dose

# 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**

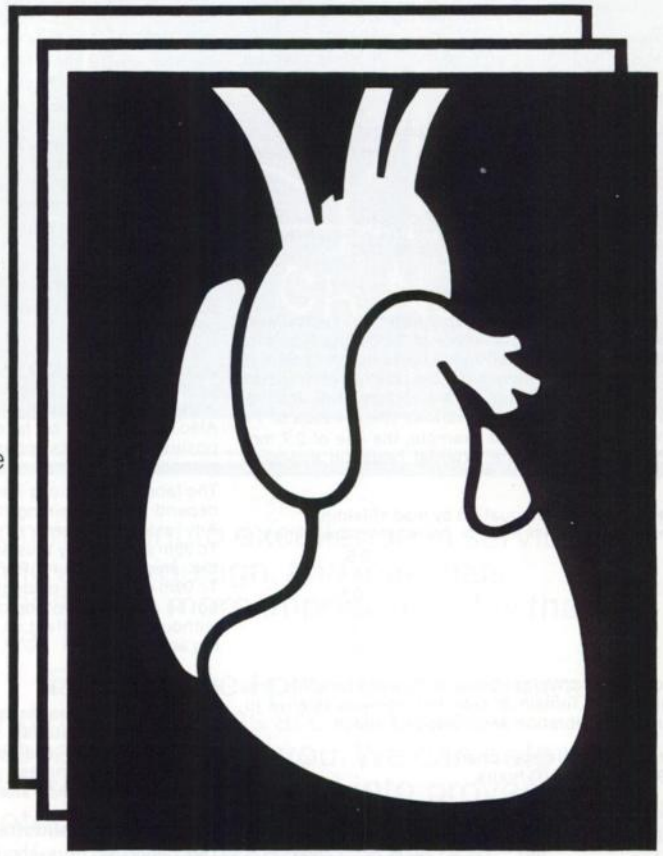
**Easy to prepare** (see directions): Just add sterile preservative-free water, Technetium 99m pertechnetate, then shake. Requires no electrolytic equipment or time-consuming procedures.

**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.



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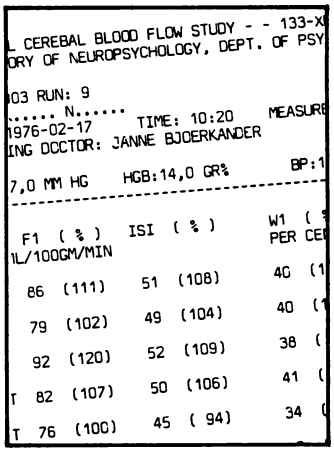
(REVERSE SIDE: PRODUCT INFORMATION)

# A DYNAMIC QUANTITATIVE STUDY OF rCBF.

Victoreen's new Meditronic Cerebrograph gives you dynamic quantitative measurement of regional Cerebral Blood Flow. Its computerized printout provides on-the-spot data on the functional level of the brain — data that cannot be obtained by other investigative methods.

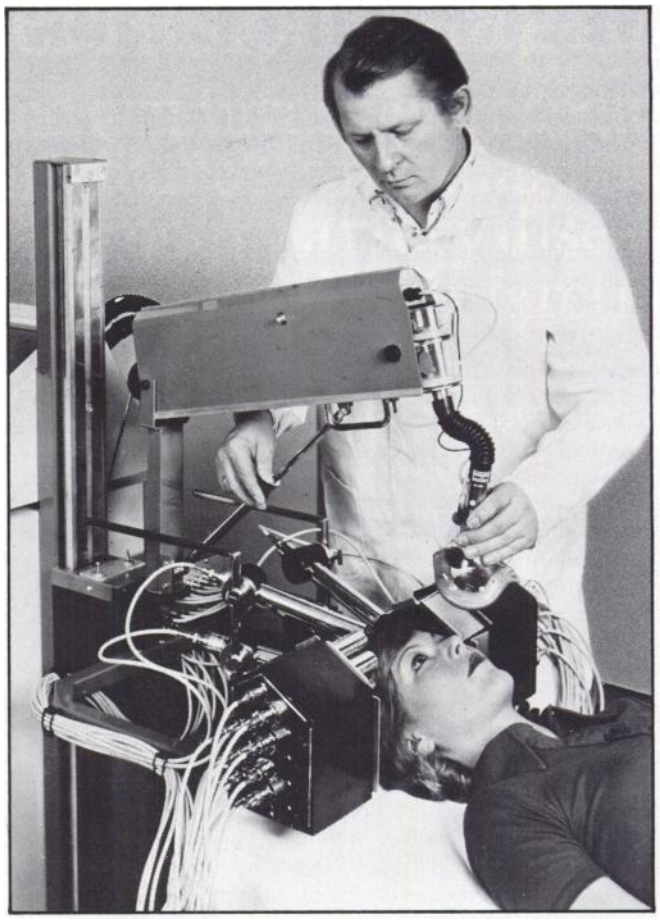
And the new Meditronic Cerebrograph gives you a choice of three $^{133}$Xenon administration techniques: inhalation, intravenous or intracarotid injection.

Using the $^{133}$Xenon inhalation method (Obrist, Risberg et al.) or the intravenous method, a safe and simple measurement of rCBF is obtained. It eliminates the trauma of intracarotid artery puncture. Permits simultaneous bilateral measurements, enabling an unaffected hemisphere to serve as reference for an affected one. Is widely used for research volunteers and on a broad patient spectrum for frequent measurements over prolonged periods.




The $^{133}$Xenon intracarotid injection method (Lassen, Ingvar et al.) provides higher resolution, increases accuracy on white flow matter measurements, and is normally combined with a carotid angiogram.

And when you buy a Meditronic Cerebrograph you get a complete system, including a push-button Xenon administration system with trap. An air-detector. Up to 32 brain detectors with interchangeable collimators. A mobile detector stand that permits measurements with patients sitting or supine. Nuclear electronics and accumulation interface rack-mounted in cabinet. And your choice of on-line table-top or off-line data calculators and clinically verified proprietary computer programs.



The cerebrograph that gives you a dynamic quantitative printout of rCBF. The result of more than 10 years' worldwide experience by Meditronic in multi-detector rCBF equipment.

Sold and serviced exclusively in the United States and Canada by Victoreen Instrument Division, Sheller-Globe Corporation.

***Write: Victoreen Instrument Division***

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# CintiChem®

Technetium 99m

# HSA Multi-dose

# 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.

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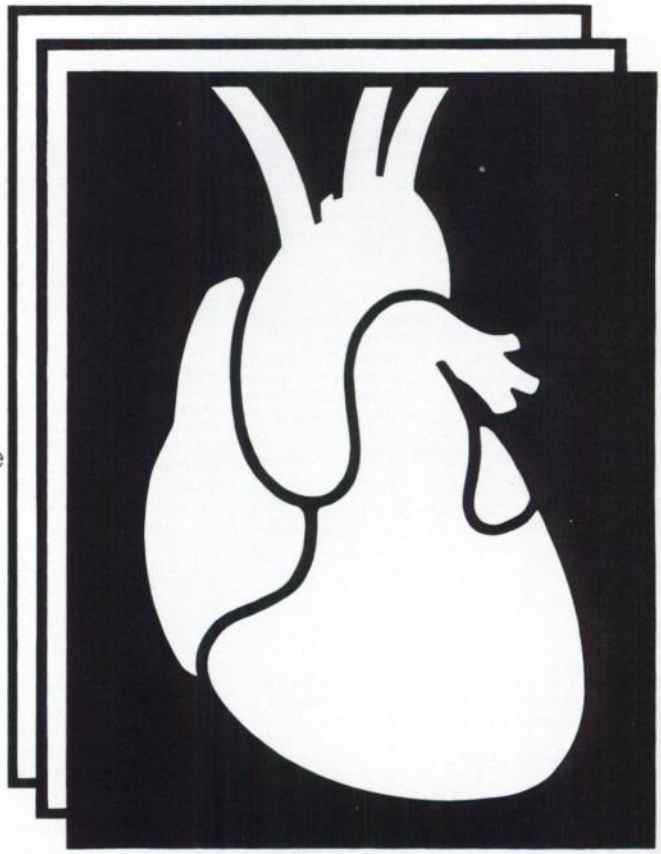
**Stable formulation:** Uses stannous tartrate, which is more stable to air oxidation than stannous chloride.

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



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**Clinical Diagnostics**
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Tuxedo, New York 10987

(REVERSE SIDE: PRODUCT INFORMATION)

# 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 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 ($HB_SAg$) by radioimmunoassay.

#### physical characteristics

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

**table I.** principal radiation emission data

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

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

#### external radiation

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

**table II.** radiation attenuation by lead shielding

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

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

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

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

*Calibration Time. (Time of Preparation)

### clinical pharmacology

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

### indications and usage

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

### contraindications

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

### warnings

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

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

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

### precautions

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

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

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

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

Safety and effectiveness in children have not been established.

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

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

### adverse reactions

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

### dosage and administration

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

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

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

#### radiation dosimetry

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

**table IV.** estimated absorbed dose

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

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

### how supplied

#### kit contents

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 provided the vials and syringes read background with an appropriate low range survey meter. It is suggested that all identifying labels be destroyed before discarding.

#### directions

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

1. Aseptically swab rubber septum of sterile vial containing the sterile, lyophilized human serum albumin.
2. Aseptically inject 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.
13. Maintain adequate shielding of the radioactive preparation.
14. Do not use the preparation after 3 hours from the time of formulation.

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

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

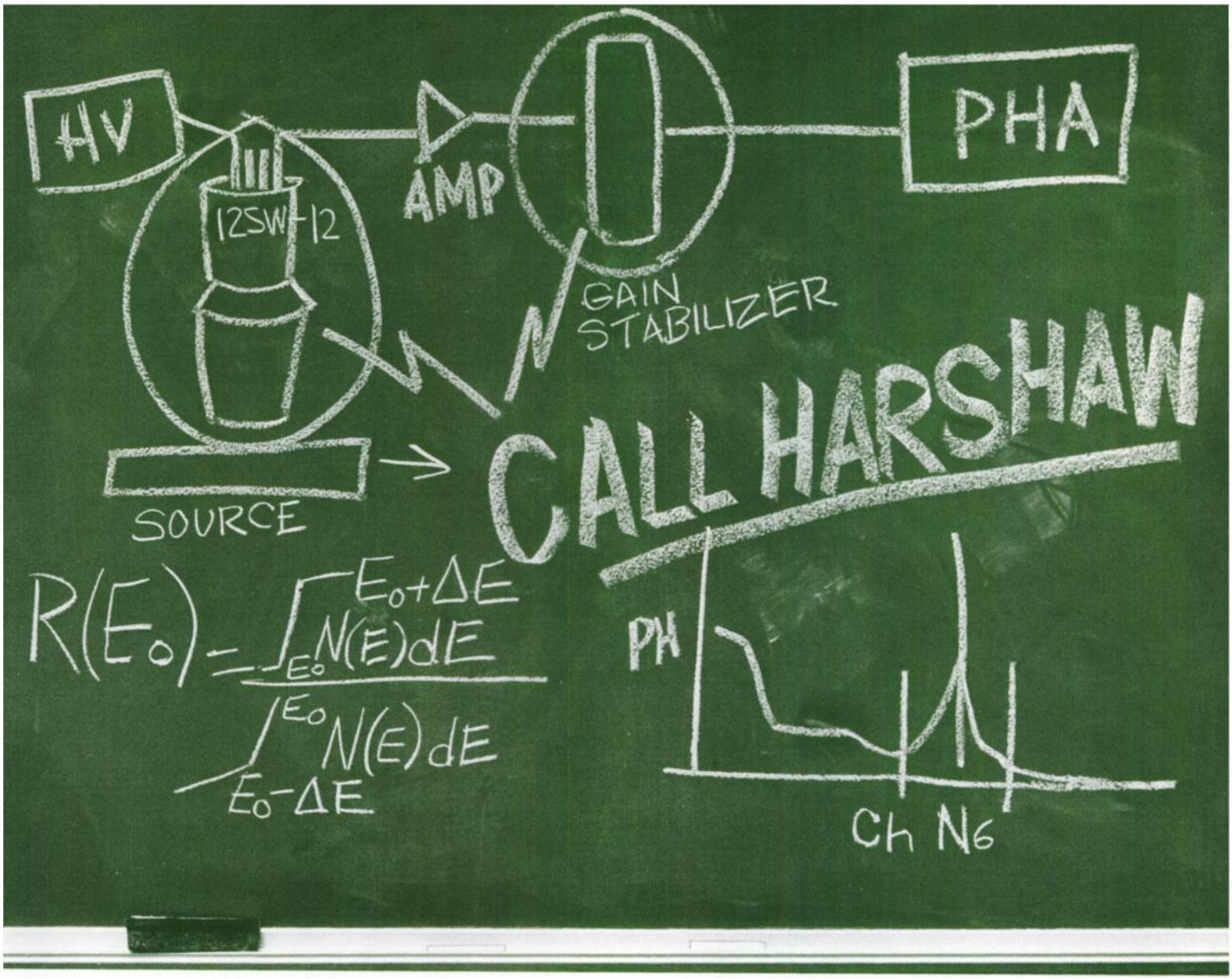
A = Tc 99m activity added to the reaction mixture vessel (millicuries).

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

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

UNION CARBIDE

**Clinical Diagnostics**

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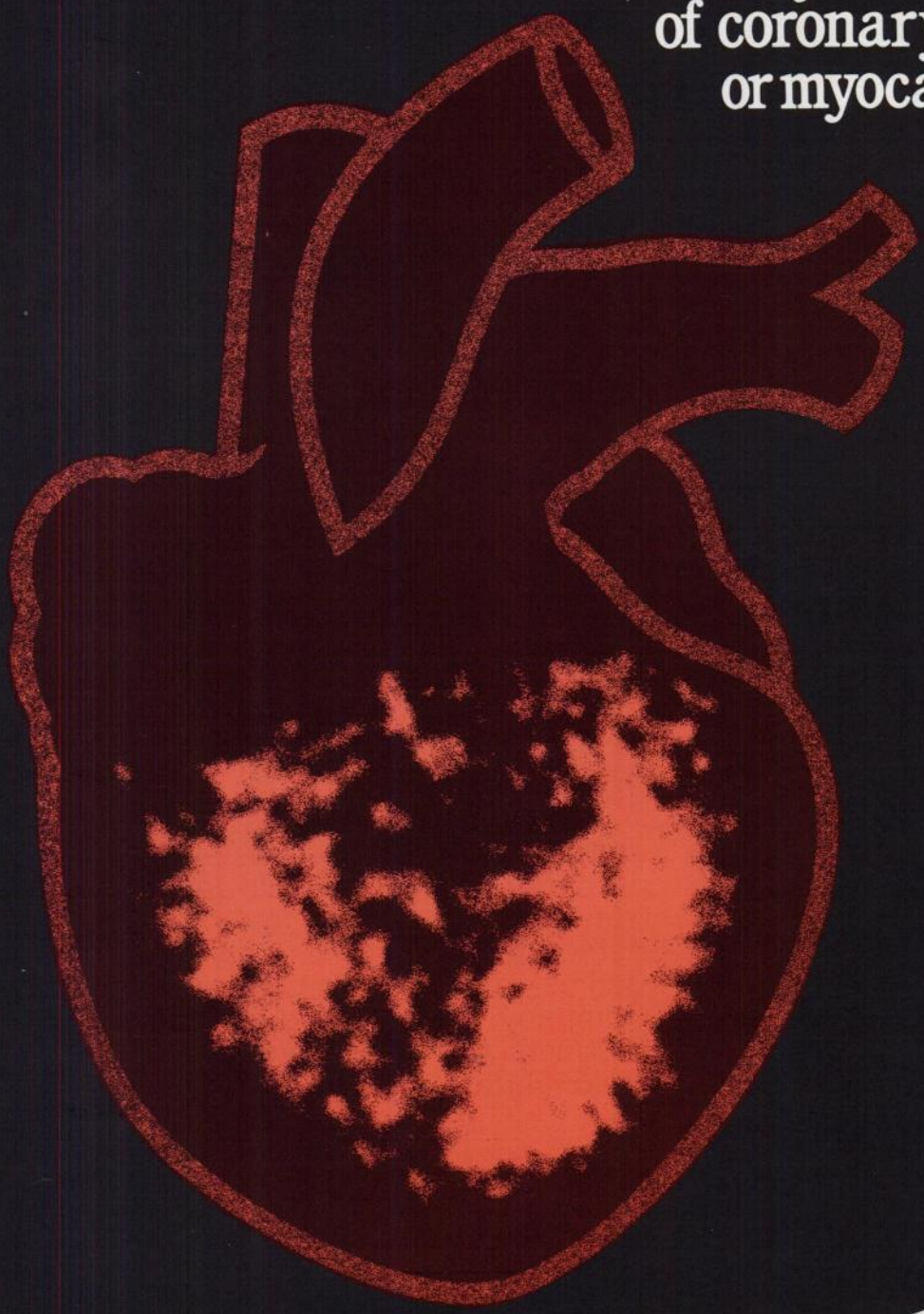
of coronary artery disease
or myocardial infarction.



NEN New England Nuclear®

## Thallous Chloride Tl 201
## For Diagnostic Use

November 1977

**Indications and Usage:** Thallous Chloride Tl 201 may be useful in myocardial perfusion imaging for the diagnosis and localization of myocardial infarction.

It may also be useful in conjunction with exercise stress testing as an adjunct in the diagnosis of ischemic heart disease (atherosclerotic coronary artery disease).

**Contraindications:** None known.

**Warnings:** In studying patients in whom myocardial infarction or ischemia is known or suspected, care should be taken to assure continuous clinical monitoring and treatment in accordance with safe, accepted procedure. Exercise stress testing should be performed only under the supervision of a qualified physician and in a laboratory equipped with appropriate resuscitation and support apparatus.

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

**Precautions:** Data are not available concerning the effect of marked alterations in blood glucose, insulin, or pH (such as is found in diabetes mellitus) on the quality of thallium Tl 201 scans. Attention is directed to the fact that thallium is a potassium analog, and since the transport of potassium is affected by these factors, the possibility exists that the thallium may likewise be affected.

Thallous Chloride Tl 201, as all radioactive materials, must be handled with care and used with appropriate safety measures 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.

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. Thallous Chloride Tl 201 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:** Adverse reactions related to use of this agent have not been reported to date.

**Dosage and Administration:** The recommended adult (70kg) dose of Thallous Chloride Tl 201 is 1-1.5mCi. Thallous Chloride Tl 201 is intended for intravenous administration only.

For patients undergoing resting thallium studies, imaging is optimally begun within 10-20 minutes after injection. Several investigators have reported improved myocardial-to-background ratios when patients are injected in the fasting state, in an upright posture, or after briefly ambulating.

Best results with thallium imaging performed in conjunction with exercise stress testing appear to be obtained if the thallium is administered when the patient reaches maximum stress and when the stress is continued for 30 seconds to one minute after injection. Imaging should begin within ten minutes post-injection since target-to-background ratio is optimum by that time. Several investigators have reported significant decreases in the target-to-background ratios of lesions attributable to transient ischemia by two hours after the completion of stress testing.

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

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

**How Supplied:** Thallous Chloride Tl 201 for intravenous administration is supplied as a sterile, non-pyrogenic solution containing at calibration time, 1mCi/ml of Thallous Tl 201, 9mg/ml sodium chloride, and 9mg/ml of benzyl alcohol. The pH is adjusted to between 4.5-6.5 with hydrochloric acid and/or sodium hydroxide solution. Vials are available in the following quantities of radioactivity: 1.5, 3.0, 4.5, 6.0, and 9.0 millicuries of Thallous Tl 201.

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

**Catalog Number NRP-427**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**Radiopharmaceutical Division**

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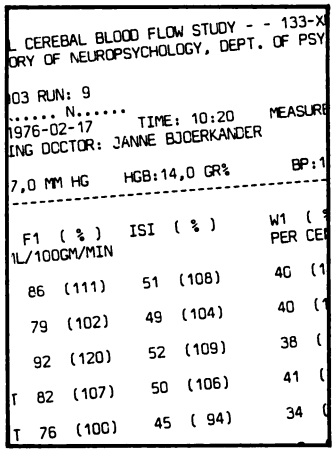


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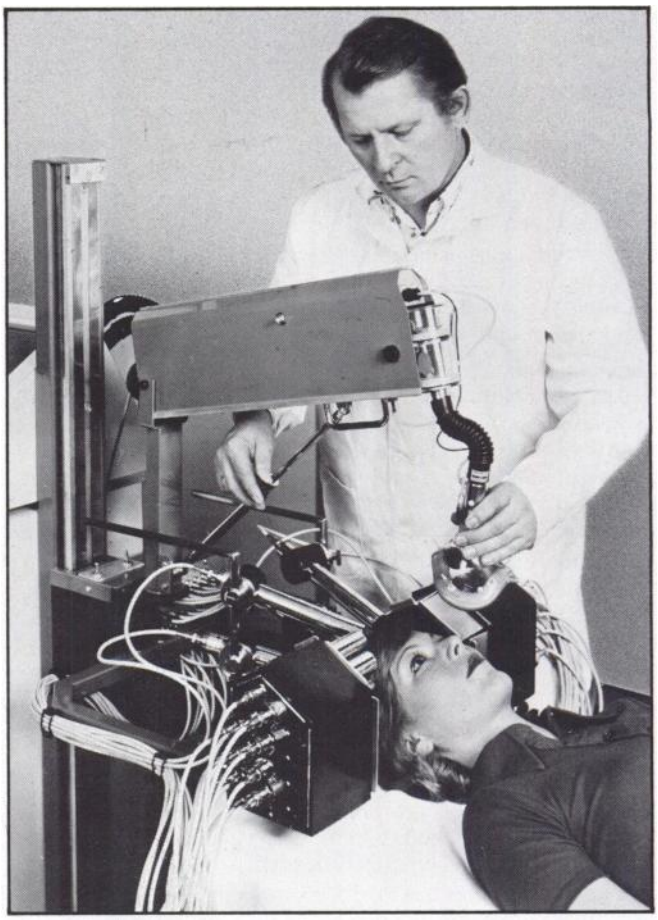

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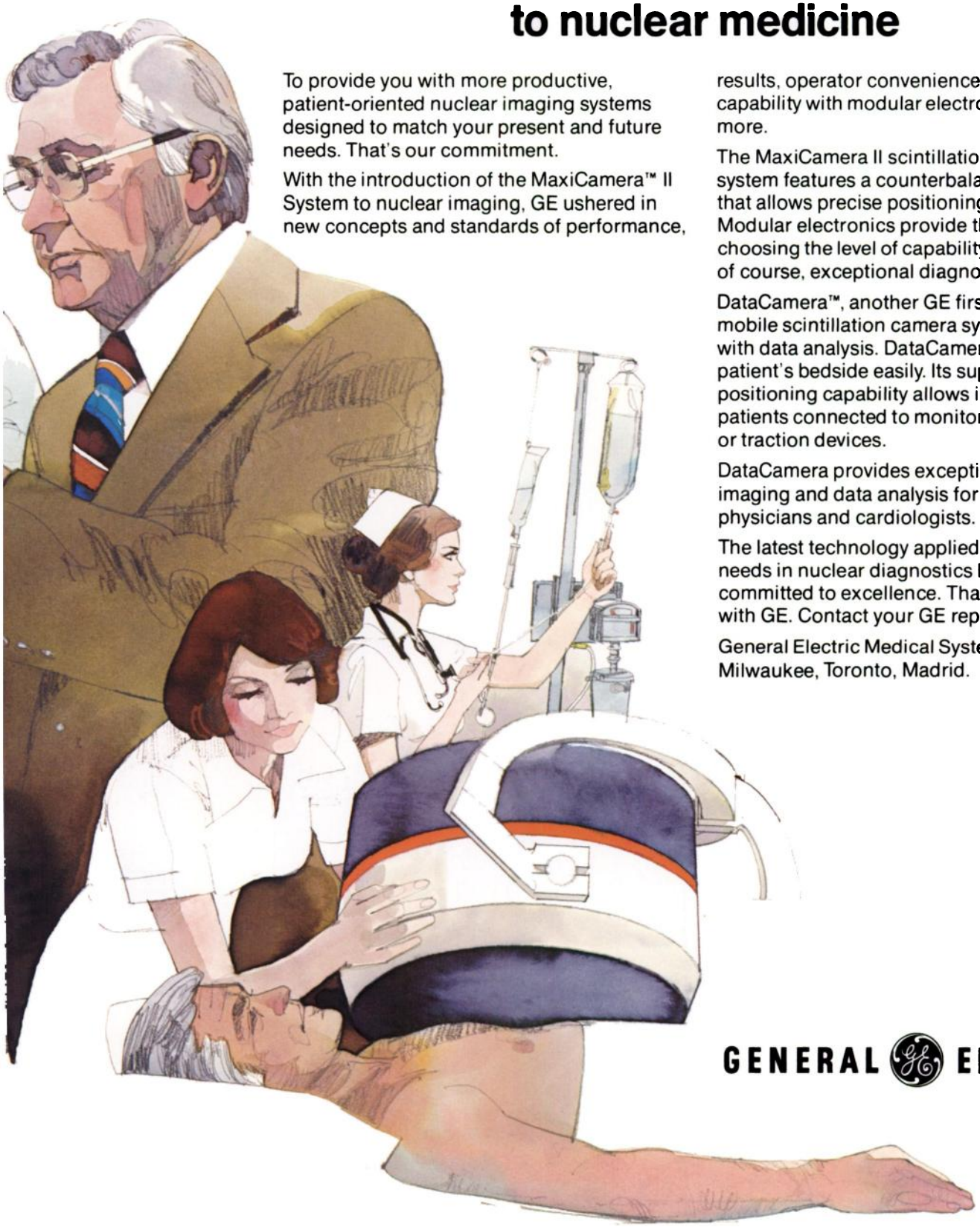

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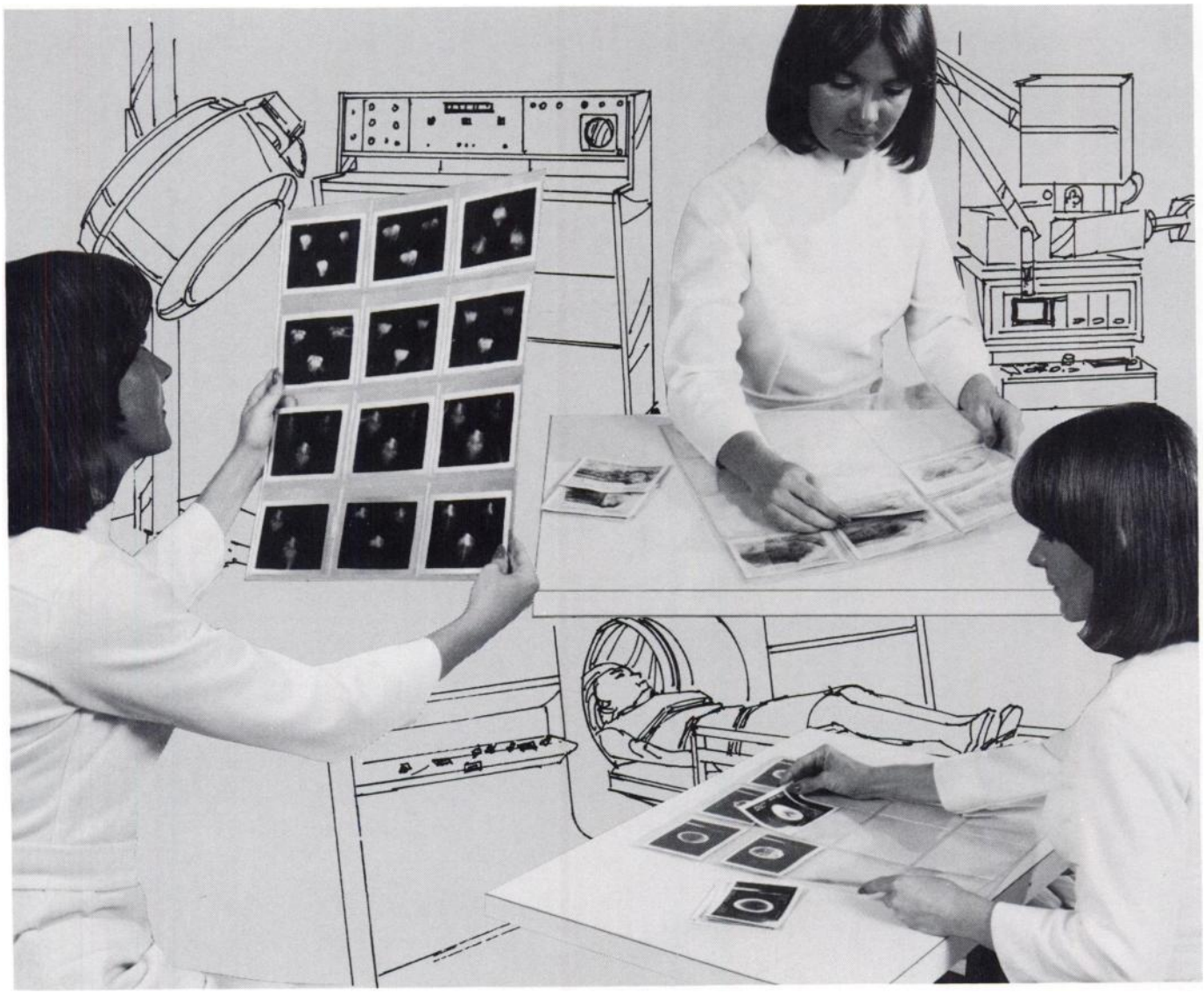

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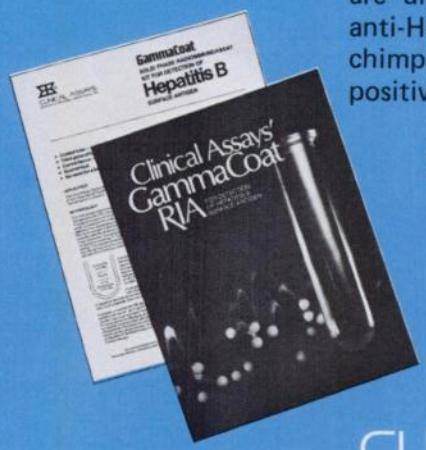


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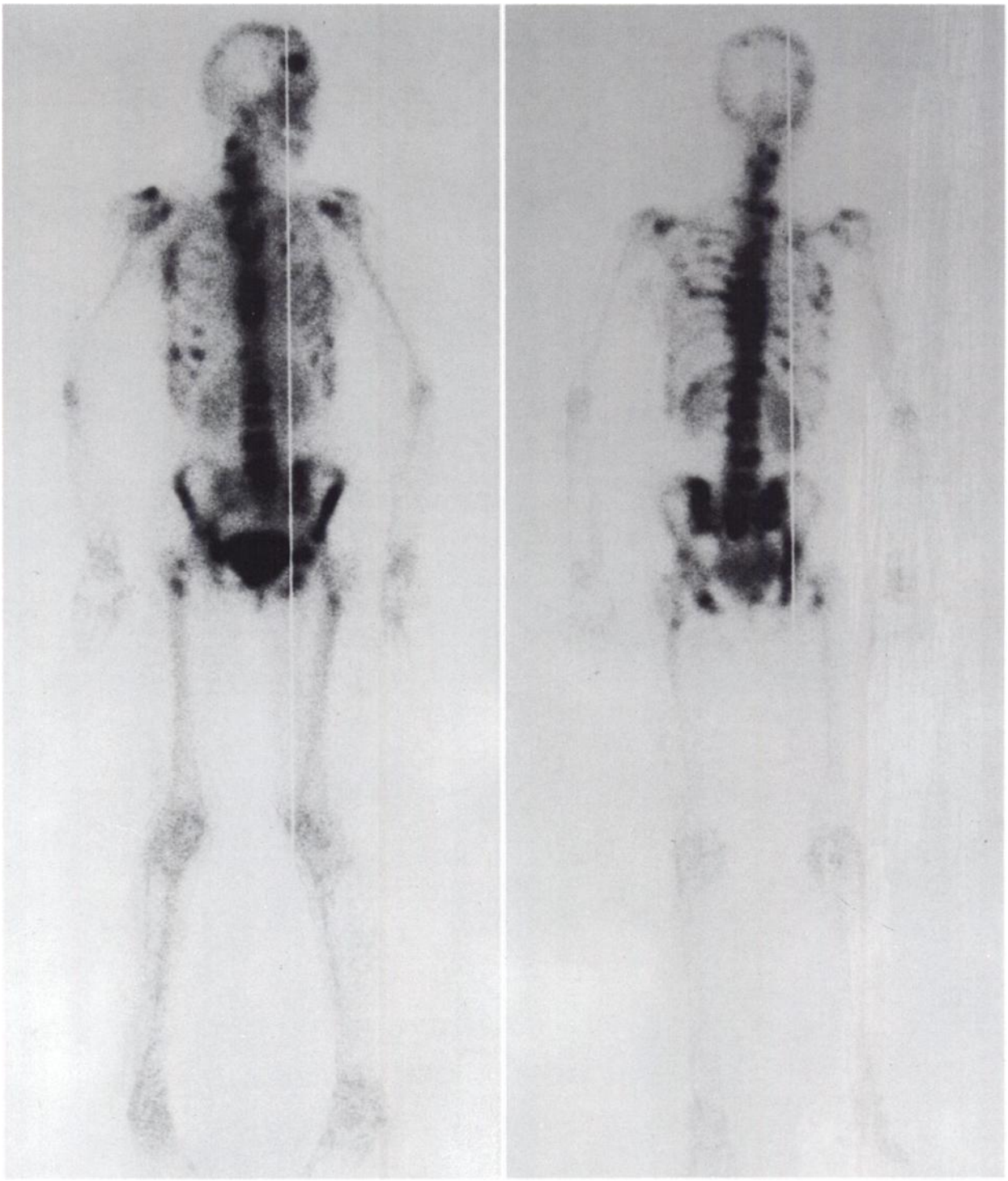

Anterior
R. L.

Posterior
L. R.

# lesion detection

PROCTER & GAMBLE

# OSTEOSCAN®

(5.9 MG DISODIUM ETIDRONATE, 0.16 MG STANNOUS CHLORIDE)

SKELETAL IMAGING AGENT

## 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.

# lesion detection

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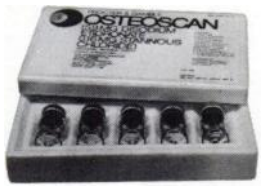
(5.9 MG DISODIUM ETIDRONATE, 0.16 MG STANNOUS CHLORIDE)

SKELETAL IMAGING AGENT




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 $^{99m}$Tc-pertechnetate, these ingredients combine with $^{99m}$Tc to form a stable soluble complex.

**ACTIONS (CLINICAL PHARMACOLOGY)**

When injected intravenously, $^{99m}$Tc-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 $^{99m}$Tc-labeled OSTEOSCAN.

Three hours after intravenous injection of 1 ml $^{99m}$Tc-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 $^{99m}$Tc-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 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.

The $^{99m}$Tc-generator should be tested routinely for molybdenum breakthrough and aluminum. If either is detected, the eluate should not be used.

**PRECAUTIONS**

Both prior to and following $^{99m}$Tc-labeled OSTEOSCAN administration, patients should be encouraged to drink fluids. Patients should void as often as possible after the $^{99m}$Tc-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.

**DOSAGE AND ADMINISTRATION**

The recommended adult dose of $^{99m}$Tc-labeled OSTEOSCAN is 1 ml with a total activity range of 10-15 mCi. $^{99m}$Tc-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.

# SETHOTOPE®

## Selenomethionine Se 75 Injection

Sethotope (Selenomethionine Se 75 Injection) is a sterile, nonpyrogenic, aqueous solution of L-selenomethionine providing a specific activity of not less than 25 microcuries per mcg. of selenium at the time of manufacture. The product also contains, in each ml., not more than 3 mg. L-methionine as a carrier, not more than 1.5 mg. 2-aminoethanethiol as an antioxidant, sodium chloride for isotonicity, and 0.9% (w/v) benzyl alcohol as a preservative.

**CONTRAINDICATIONS:** At present, there are no known contraindications to the use of Selenomethionine Se 75 Injection.

**WARNINGS:** Radiopharmaceuticals should not be administered to patients who are pregnant or to nursing mothers unless the information to be gained outweighs the potential hazards.

The transplacental transport and long biologic half-time of this agent may result in significant radiation exposure to the fetus. Since selenomethionine $^{75}$Se is excreted in human milk during lactation, formula-feedings should be substituted for breast-feedings.

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 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.

**PRECAUTIONS:** In the use of any radioactive material, care should be taken to insure minimum radiation exposure to the patient and occupational workers consistent with proper patient management.

Fasting prior to administration may enhance the hepatic uptake of the agent which may result in degradation of pancreatic image quality.

**ADVERSE REACTIONS:** At present, adverse reactions have not been reported following administration of Selenomethionine Se 75 Injection.

For full prescribing information, consult package insert.

**HOW SUPPLIED:** Sethotope (Selenomethionine Se 75 Injection) is available in multiple dose vials in potencies of 0.25 millicurie, 0.5 millicurie, and 1 millicurie. Complete assay data for each vial are provided on the container.

Medotopes®

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P.O. Box 4000
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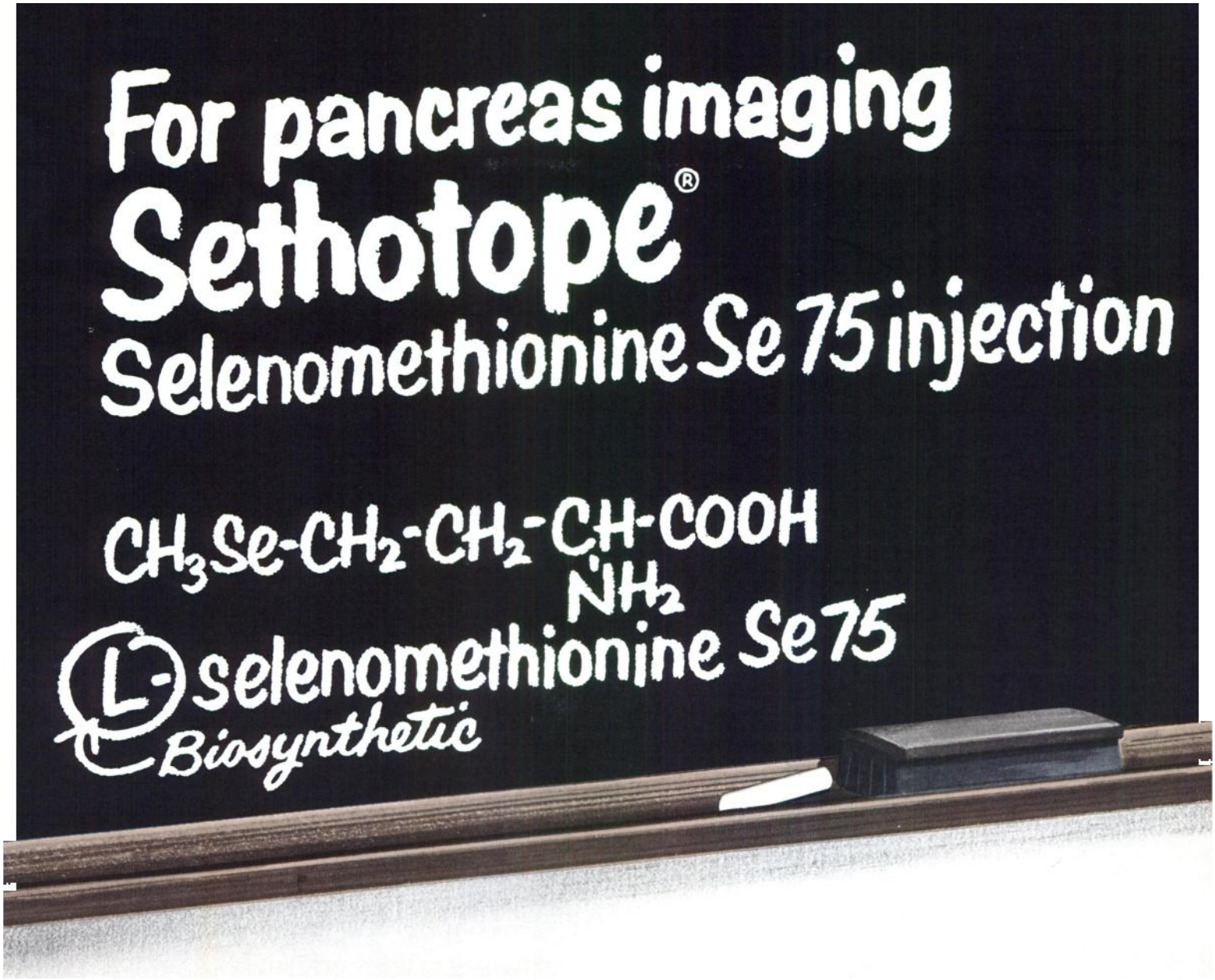


## High pancreas specificity

Selenomethionine is a structural analog of the amino acid, methionine, in which the selenium has been substituted for the sulfur atom. Chemically and biologically, they behave alike, including a relatively high degree of uptake in the pancreas during protein synthesis.

## Levorotatory compound

Radioactive selenomethionine can be produced in racemic form by chemical synthesis from $^{75}$Se. At Squibb, however, selenomethionine is prepared *biosynthetically* by extracting it from the protein product of yeast grown on a low sulfur medium containing $^{75}$Se of high specific activity. This compound is levorotatory.

## Specific activity

Squibb L-selenomethionine $^{75}$Se provides a specific activity of not less than 25 microcuries per microgram of selenium at the time of manufacture.

**Sethotope®**
**Selenomethionine Se 75 Injection**

See opposite page for brief summary.

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**Nuclear Pacific, Inc.**

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Seattle, WA 98108

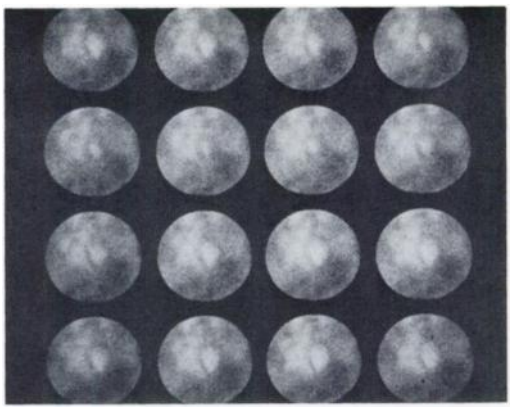
Squibb Elution vial shield, model 75-S, $225.00, F.O.B., Seattle, WA.
*Hi-D® 6.2 gm/cm³ Registered U.S. patent office.

# Now you can compute without an expensive

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

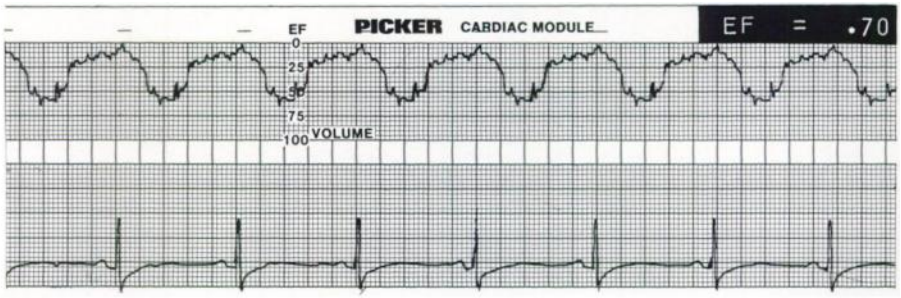
**Complex cardiac assignments, simply performed.** Picker's new Cardiac Module, the first of its kind in the marketplace, is an easy, uncomplicated way to produce meaningful left ventricular function data. Now, without the services of a computer-trained technologist, you can obtain instant on-line, 30-second sequential ejection fraction, indicated on an LED display, with corroborative hard copy strip chart recordings. The Picker Cardiac Module, used with our Dyna® Camera, will

# cardiac ejection fraction nuclear computer.



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

In less than one minute after patient input has been completed, the Picker Cardiac Module will interrogate its own memory and calculate and display the on-line ejection fraction. It will print the left ventricular gated time ejection cycle images on 8 x 10" (20 x 25 cm) film, showing 12, 24, or 48-time integrated frames and print the left ventricle integrated time activity curve and its associated ECG on a strip chart at the same time. Not only will it perform these tasks in less than a minute, but it will take up a fraction of the space required for a nuclear medicine computer, without the complexities that call for elaborate training.




**Opening a new world for nuclear medicine.** Our new Cardiac Module means the radiologist can now provide prophylactic nuclear medicine. He can screen patients prior to surgery with real-time results in 30 seconds, at a reasonable cost to hospital and patient. He can help forestall problems arising from insufficient pre-operative input and provide significant postoperative patient management. He can begin to minimize the need for cardiac catheterization. The Picker Cardiac Module: another indication of Picker's leadership in supplying state-of-art equipment for Nuclear Cardiology. For additional information, contact your Picker representative, write Picker Corporation, 12 Clintonville Road, Northford, CT 06472 (203/484-2711), or Picker International, 595 Miner Road, Cleveland, OH 44143.

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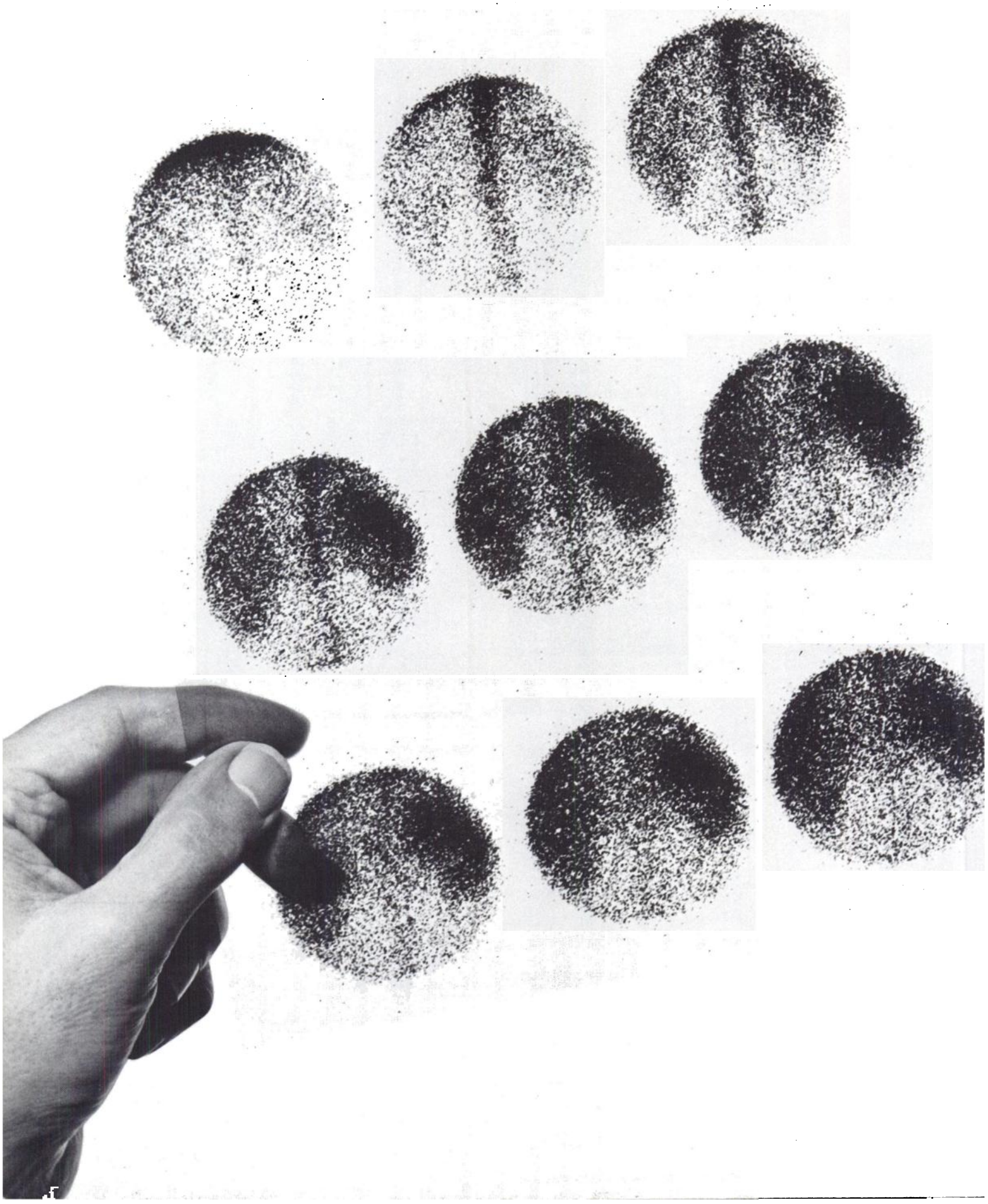


# Your Scintigraphy Kit

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

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

## Agent for Bone Scintigraphy

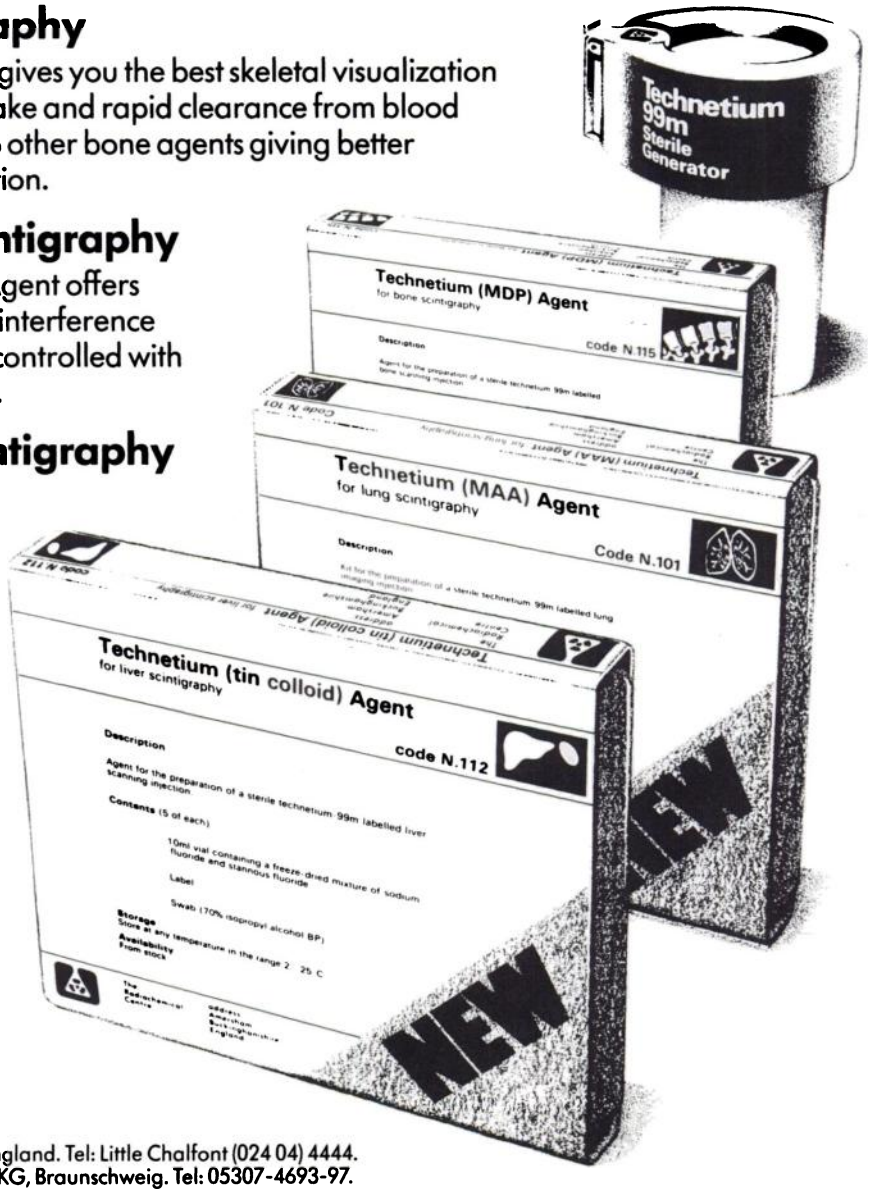
Our Technetium (MDP) Agent gives you the best skeletal visualization available today. The high bone uptake and rapid clearance from blood and soft tissue makes this superior to other bone agents giving better definition and improved discrimination.

## New Agent for Lung Scintigraphy

Our new Technetium (MAA) Agent offers detailed lung visualization, with no interference from the liver. Particle size is strictly controlled with the majority in the range of 10–80$\mu$.

## New Agent for Liver Scintigraphy

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




**The Radiochemical Centre Amersham**

The Radiochemical Centre Limited, Amersham, England. Tel: Little Chalfont (024 04) 4444.
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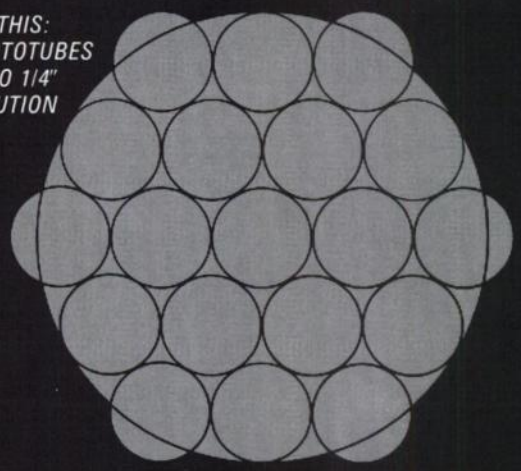
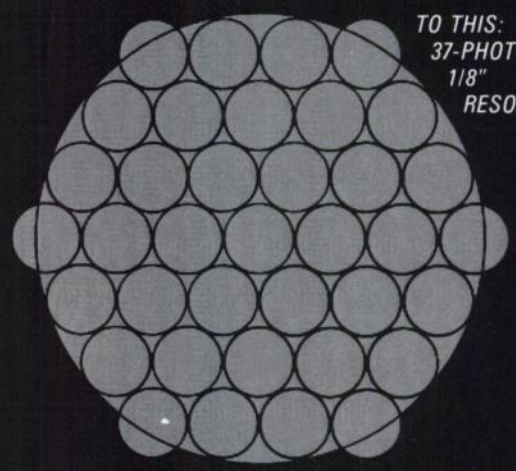
*19-PHOTOTUBES*
*3/16" TO 1/4"*
*RESOLUTION*



*TO THIS:*
*37-PHOTOTUBES*
*1/8"*
*RESOLUTION*



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# ONE 5-MINUTE BOIL. AND COOL IT.


Cool rapidly in ice water or refrigerator while observing proper radiation safety measures. Refer to package insert for full preparation instructions.

# New! TSC preparation now takes less time.

The CINTICHEM® TSC reagent kit for imaging of functioning reticuloendothelial cells in the liver, spleen and bone marrow requires less of your time to prepare than any other sulfur colloid kit available.

- Needs boiling only once for 5 minutes. Other kits can demand 2 boilings plus cooling period.
- Buffer is injected into the reaction vial immediately after removal from the boiling water bath.
- Dose vial is then rapidly cooled in an ice-water bath or similar cold environment.

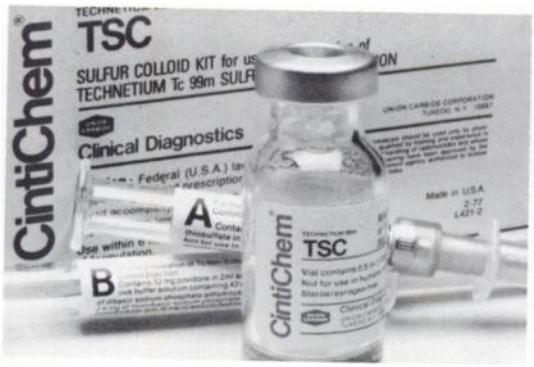
## Take advantage of our other CINTICHEM products for nuclear medicine:

- Technetium 99m HEDSPA (Etidronate Disodium[1] Tin Kit for use in preparation of Technetium Tc 99m Etidronate Tin Complex)
- Technetium 99m DTPA (DTPA Tin Kit for use in preparation of Technetium Tc 99m DTPA Tin Chelate)
- Technetium 99m MAA (Technetium Tc 99m Aggregated Albumin)
- Technetium 99m HSA (Technetium Tc 99m Human Serum Albumin)

All of the above are available in multidose and unit dose kits.

- Technetium Tc 99m Generator for the production of Sodium Pertechnetate Tc 99m, available in 500, 1000, 1500, or 2000 millicuries.

For ordering or additional information
Call toll-free: (800) 431-1146
In New York State call: (914) 351-2131




[1]USAN designation for 1-hydroxy-ethylidene-1,1-disodium phosphonate HEDSPA.

**indications and usage**
Technetium Tc 99m Sulfur Colloid Injection is used as an agent for imaging areas of functioning reticuloendothelial cells in the liver, spleen, and bone marrow.

**contraindications**
None known.

**warnings**
The contents of the two syringes, one syringe containing the sodium thiosulfate solution and the second syringe containing the appropriate buffer solution, are intended ***only*** for use in the preparation of the Technetium Tc 99m Sulfur Colloid Injection and ***are not to be directly administered to the patient.***

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 during lactation unless the expected 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.

**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 colloid.

The stability of the colloidal preparation may be decreased in the presence of polyvalent cations, thus resulting in the agglomeration of the individual colloidal particles. These larger particles are likely to be trapped by the pulmonary capillary bed following intravenous injection.

It is recommended that Sodium Pertechnetate Tc 99m solutions containing more than 10 micrograms/ml of aluminum ion not be used for formation of the Technetium Tc 99m Sulfur Colloid Injection. The Sodium Pertechnetate Tc 99m solution must also be free of any traces of oxidizing agents such as peroxides and hypochlorites.

Technetium Tc 99m Sulfur Colloid Injection 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 Sulfur Colloid Injection not be used after six 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 Sulfur Colloid 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.

Technetium Tc 99m Sulfur Colloid Injection, 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.

**adverse reactions**
Hypersensitivity reactions, including anaphylaxis, have been reported in patients receiving sulfur colloid preparations.

**dosage and administration**
The suggested intravenous dose range used in the average patient (70 kg) is 1 to 8 millicuries of Technetium Tc 99m Sulfur Colloid Injection.

When orally administered, the Technetium Tc 99m Sulfur Colloid Injection is not absorbed from the G.I. tract.

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

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

**how supplied** kit contents

5 STERILE REACTION VIALS, each containing 0.5 ml 1.0 N hydrochloric acid in water.
5 STERILE SYRINGES, (labeled "A"), each containing 1.7 mg anhydrous sodium thiosulfate in 1 ml aqueous solution.
5 STERILE SYRINGES, (labeled "B"), each containing 12 mg povidone in 2 ml aqueous buffer solution containing 43 mg of dibasic sodium phosphate anhydrous, 2.6 mg of monobasic sodium phosphate monohydrate, and 16 mg of sodium hydroxide.
5 RADIOACTIVE SYMBOL LABELS.
10 PRESSURE-SENSITIVE LABELS for final Technetium Tc 99m Sulfur Colloid Injection preparation.
1 PACKAGE INSERT.

storage

Store kit contents at room temperature (18-25° C).

preparation

The following directions must be carefully followed for optimum preparation of the Technetium Tc 99m Sulfur Colloid Injection.

1. Affix radioactive symbol label to reaction vial.
2. Aseptically inject 0.1-5.0 ml of sterile Sodium Pertechnetate Tc 99m, up to 75 millicuries which must contain less than 10 micrograms of aluminum, into the reaction vial. Relieve the excess pressure in the vial by withdrawing an equal volume of air. Mix the solution.
3. Assemble the thiosulfate syringe (labeled "A") and inject the total contents into the reaction vial with gentle agitation. Relieve the excess pressure by withdrawing an equal volume of air and remove the needle.
4. Immediately immerse the reaction vial in a vigorously boiling water bath, deep enough to cover the entire liquid contents of the vial. Keep the vial in the water bath for 5 minutes plus or minus 30 seconds.
5. During heating step, assemble buffer syringe cartridge (labeled "B").
6. Remove vial from water bath, place in lead shield, and vent using 20 gauge, disposable needle.
7. Immediately inject contents of syringe B into reaction vial.
8. Remove vent and shake gently for a few seconds.
9. Rapidly cool to room temperature (note: rapid cooling in an ice bath is preferable) before use and then affix the descriptive label to the dose vial shield. Maintain adequate shielding of the radioactive colloid preparation. Do not use the preparation after six hours from the time of formulation.

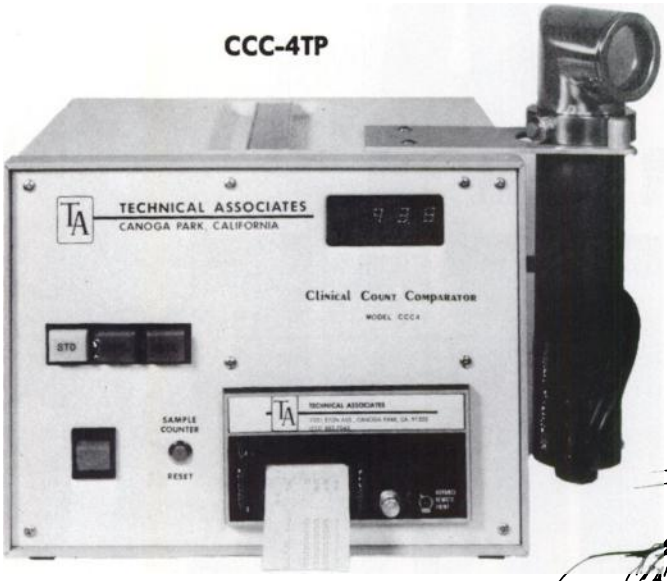
UNION CARBIDE **CintiChem®**

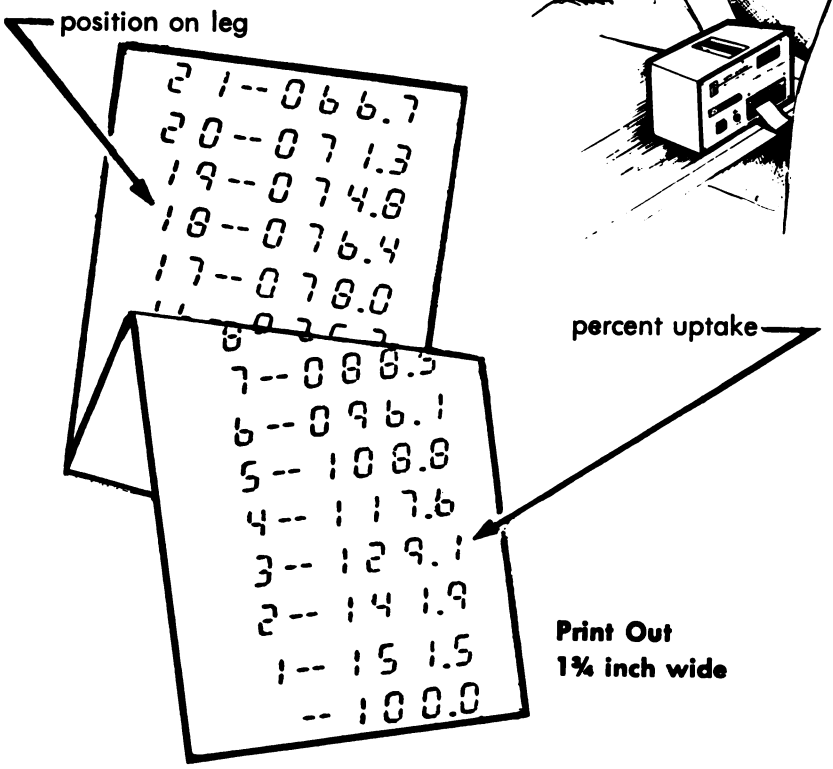
Technetium 99m
**TSC** Sulfur Colloid Kit for Use in Preparation of Technetium Tc 99m Sulfur Colloid Injection

Union Carbide Corporation • Clinical Diagnostics
Nuclear Medicine Products • Tuxedo, New York 10987

# thrombosis

**detection of DVT using I-125 fibrinogen**

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**3.** If you prefer, you can have one additional MAA kit - FREE - instead of the syringe shield or the L-Selenomethionine.

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# Seeing Is Perceiving!

(with these new Saunders radiology texts)

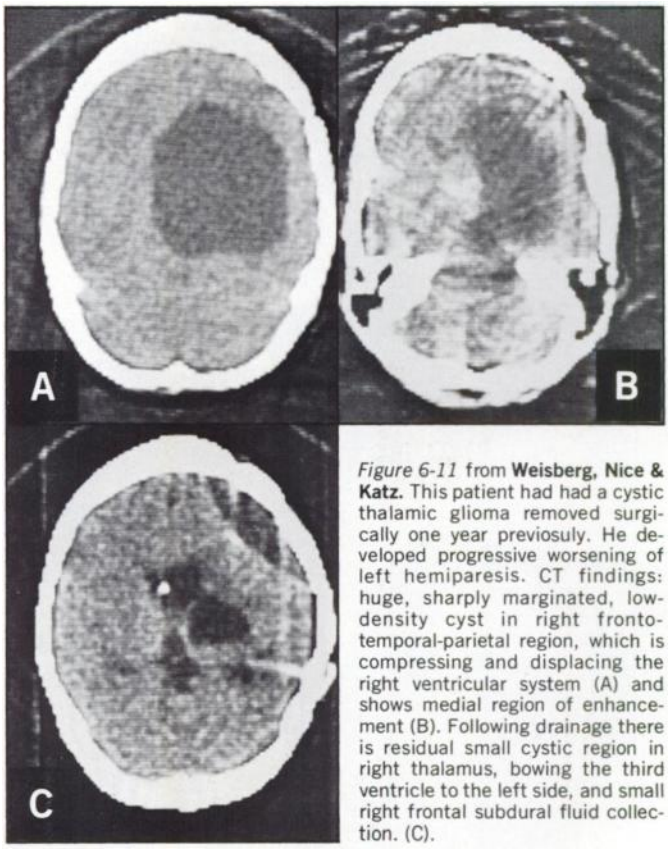


*Figure 6-11* from **Weisberg, Nice & Katz.** This patient had had a cystic thalamic glioma removed surgically one year previosuly. He developed progressive worsening of left hemiparesis. CT findings: huge, sharply marginated, low-density cyst in right fronto-temporal-parietal region, which is compressing and displacing the right ventricular system (A) and shows medial region of enhancement (B). Following drainage there is residual small cystic region in right thalamus, bowing the third ventricle to the left side, and small right frontal subdural fluid collection. (C).

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This is a ready graphic reference at the interface of otolaryngology and radiology. It covers the entire range of otolaryngologic pathology and anatomy while demonstrating the full spectrum of abnormal radiographic signs. Brief legends give clear descriptions of the important clinical information. All abnormal signs are clearly marked.

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By **Leon A. Weisberg,** MD, Dept. of Psychiatry and Neurology; **Charles Nice,** MD, Dept. of Radiology; both of Tulane Medical Center; and **Myron Katz,** PhD; Dept. of Mathematics, Arizona State Univ. About 370 pp., 325 ill. About $23.00. Ready April 1978. **Order#9167-6.**

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By **Royal J. Bartrum, Jr.,** MD; and **Harte C. Crow,** MD; both of the Dept. of Diagnostic Radiology, Hitchcock Clinic, Hanover, N.H. 216 pp. 167 ill. $14.00. July 1977. **Order#1548-1.**

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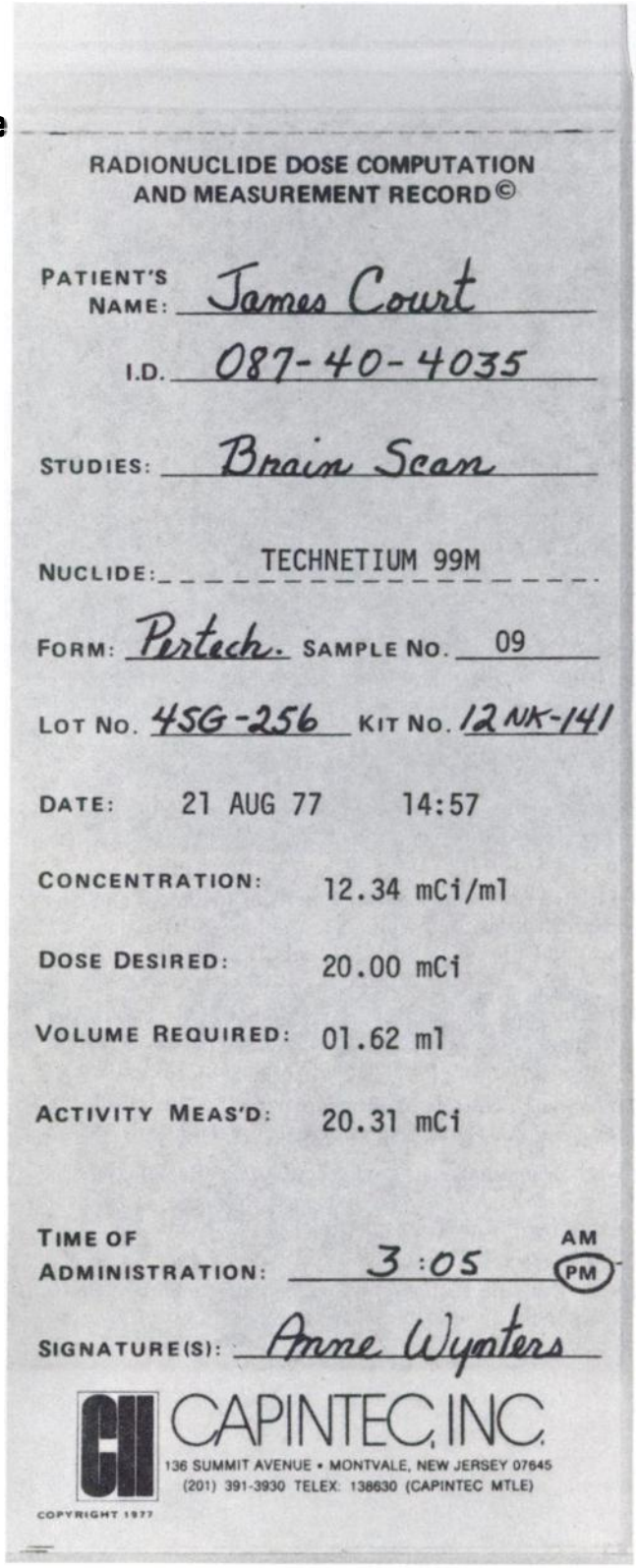

RADIONUCLIDE DOSE COMPUTATION AND MEASUREMENT RECORD ©

PATIENT'S NAME: James Court

I.D. 087-40-4035

STUDIES: Brain Scan

NUCLIDE: TECHNETIUM 99M

FORM: Pertech. SAMPLE NO. 09

LOT NO. 45G-256 KIT NO. 12NK-141

DATE: 21 AUG 77 14:57

CONCENTRATION: 12.34 mCi/ml

DOSE DESIRED: 20.00 mCi

VOLUME REQUIRED: 01.62 ml

ACTIVITY MEAS'D: 20.31 mCi

TIME OF ADMINISTRATION: 3:05 AM PM

SIGNATURE(S): Anne Wynters

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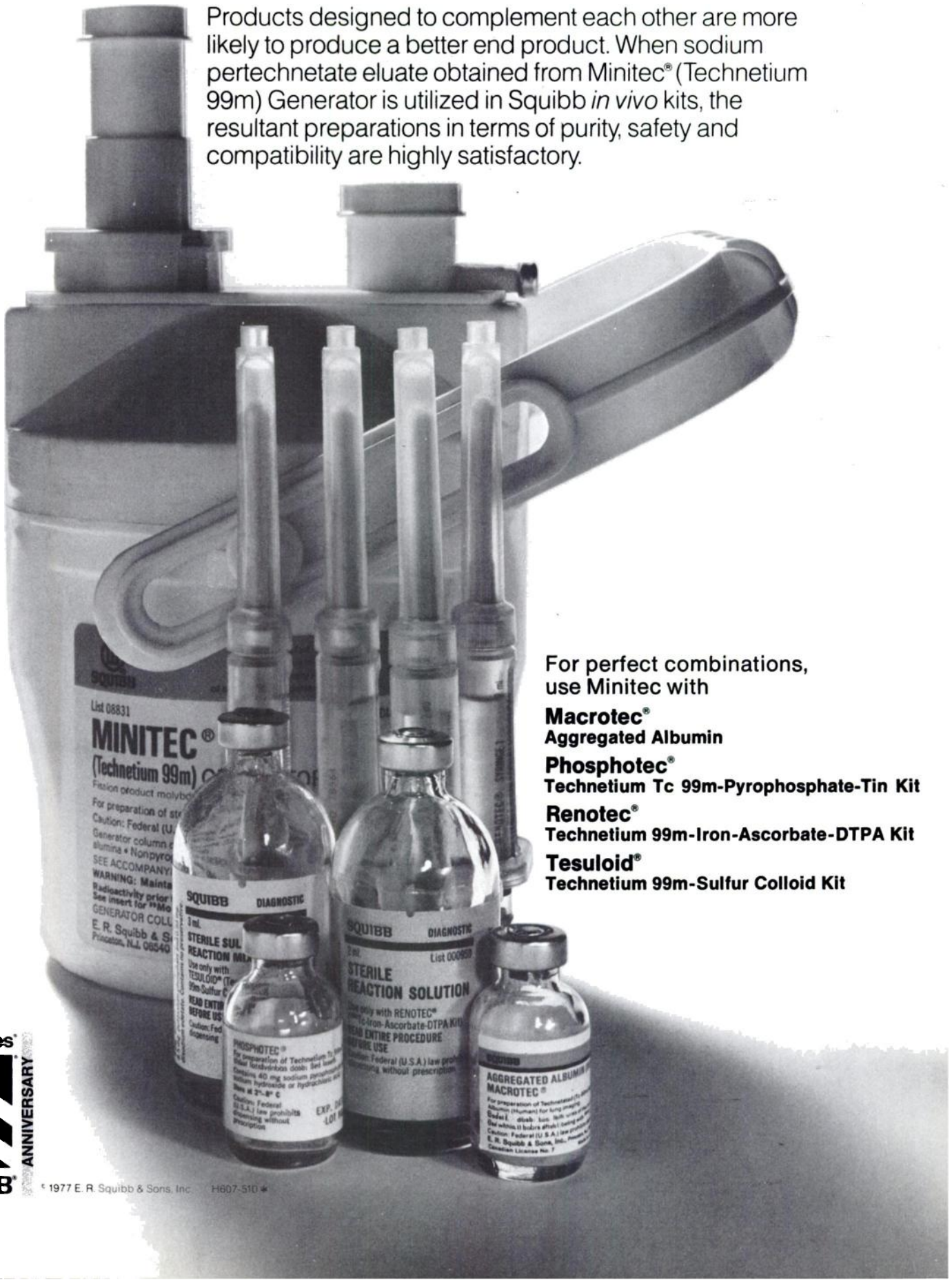


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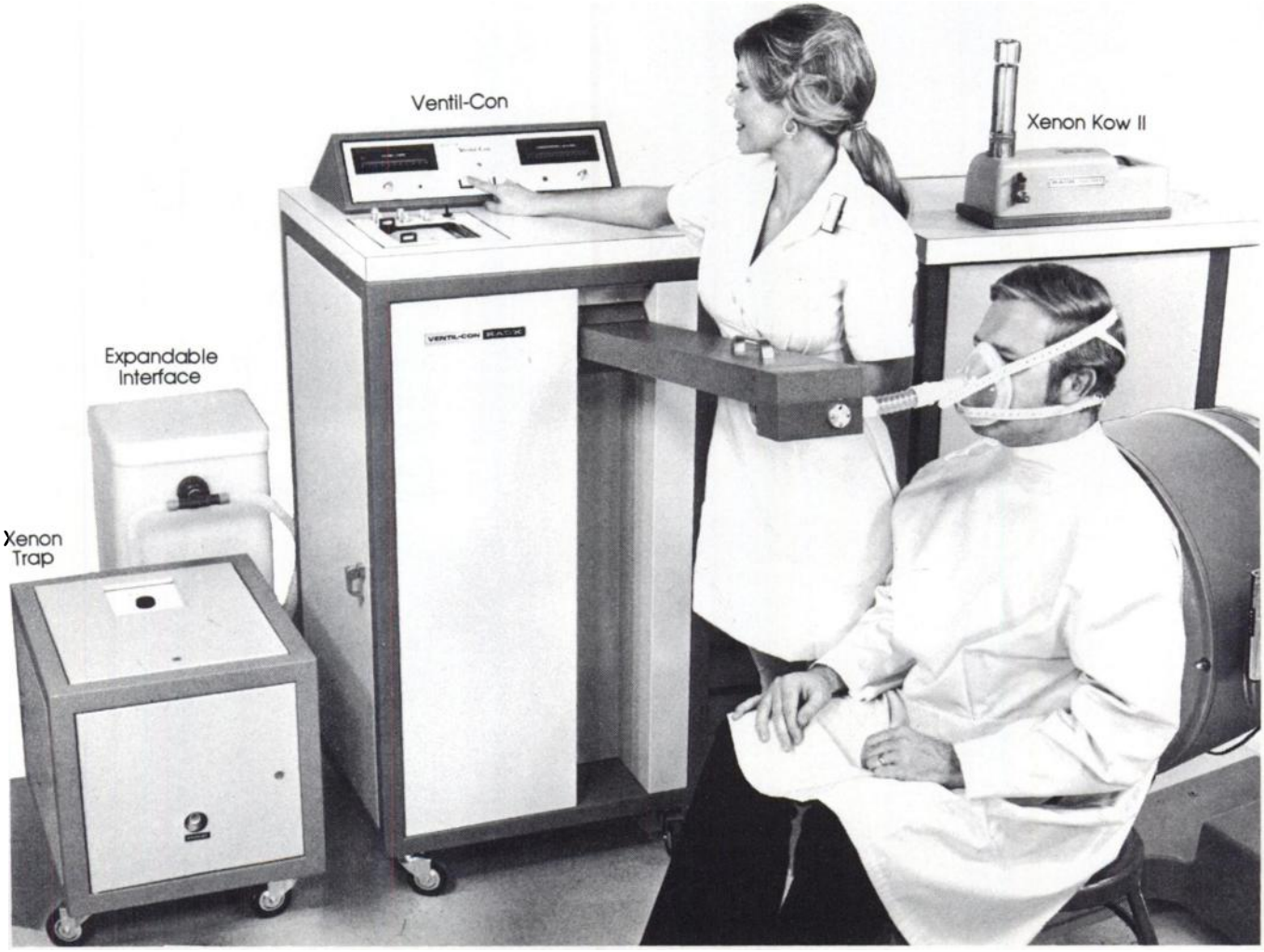

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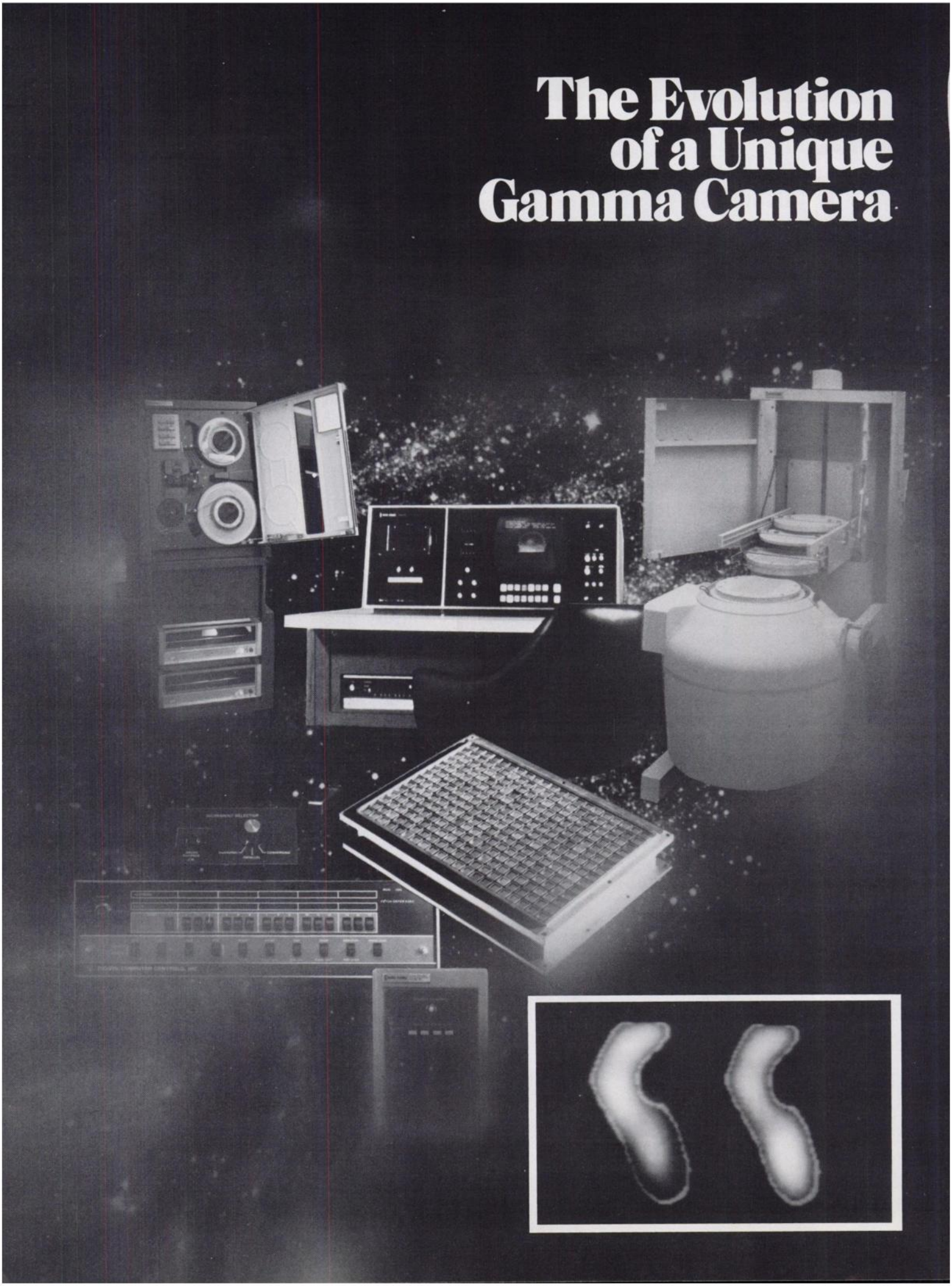

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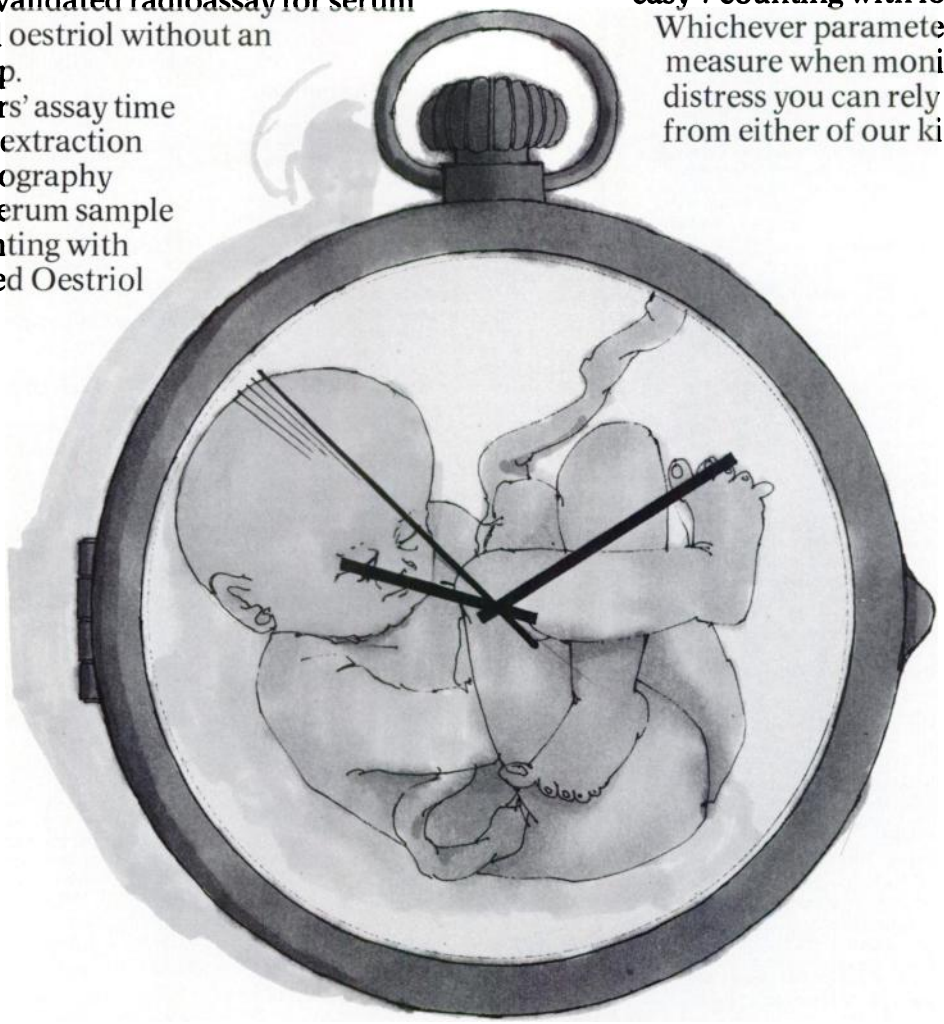

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THE DEPARTMENT OF RADIOLOGICAL Sciences, Sunnybrook Medical Centre, University of Toronto, requires a Division Head for Nuclear Medicine. Last year the department did 102,000 examinations in Diagnostic Radiology, Ultrasound and Isotopes; 6,000 examinations were Nuclear Medicine. A radiopharmacist and physicist are both full time in the division and the radiopharmacy for the entire hospital is in the division. Besides experience in Nuclear Medicine, the applicant should have academic and research interest. Ultrasound experience would be an added feature. Interested parties should address their inquiries, accompanied by their curriculum vitate to Dr. John E. Campbell, Head, Department of Radiological Sciences, Sunnybrook Medical Centre, 2075 Bayview Avenue, Toronto, Ontario, M4N 3M5.

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STAFF NUCLEAR MEDICINE TECHNOLOGIST. St. Thomas Hospital, a modern, 410-bed, acute care facility, located in Nashville, Tennessee, is seeking applicants for an immediate staff vacancy in our expanding Nuclear Medicine Department. Must be ARRT registered or registry eligible with experience in imaging procedures. Two other nuclear medicine technologists on staff. Competitive salary and excellent benefits. Please send resume and salary requirements to: Personnel Director, St. Thomas Hospital, 4220 Harding Road, Nashville, Tennessee, 37202. An equal opportunity employer M/F.

ASSOCIATE PHYSICIAN FOR PRIVATE practice of Internal and Nuclear Medicine, Board eligibility minimum requirement. Academic appointment available. Please contact: William J. Fayen, M.D., 1392 Warren Rd., Cleveland, Ohio 44107.

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## POSITIONS WANTED

NUCLEAR PHYSICIAN, ULTRASONOGRAPHER 34, ABIM, ABNM, desires relocation to a service oriented practice involving non-invasive imaging. Reply Box 302, Society of Nuclear Medicine, 475 Park Avenue So., New York, N.Y. 10016.

CHIEF NUCLEAR MEDICINE TECHNOLOGIST, ARRT registered, 10 years experience. Capabilities include in vivo and in vitro applications. Expert with most equipment and procedures. Interested in supervising, organizing and planning established or new facilities. Reply to Box 301, Society of Nuclear Medicine, 475 Park Ave. South, New York, N.Y. 10016.

NUCLEAR MEDICINE PHYSICIAN, certified in both nuclear medicine and internal medicine, experienced in teaching and practicing of both specialties, desires a full time position in nuclear medicine or combined nuclear medicine and internal medicine. Contact: Prayad Chayapruks, M.D., 189 E. High Street, Waynesburg, PA 15370.

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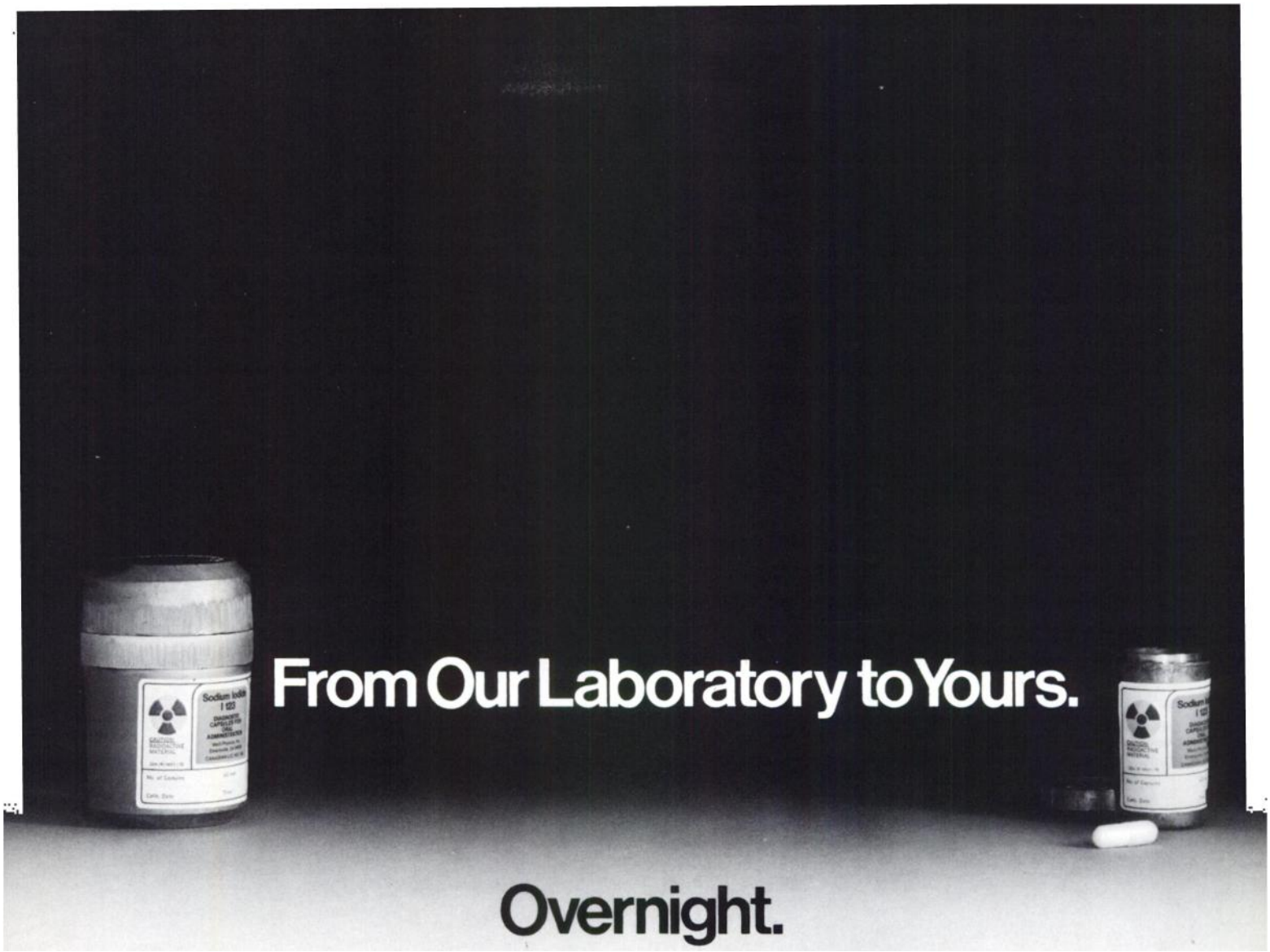


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*Davis, A. and Jones, A.G., Seminars in Nuclear Medicine, Vol 6, No 1 (Jan 1976)
**Subramanian, G et al., Journal of Nuclear Medicine, Vol 16, No 8 (Aug 1975)


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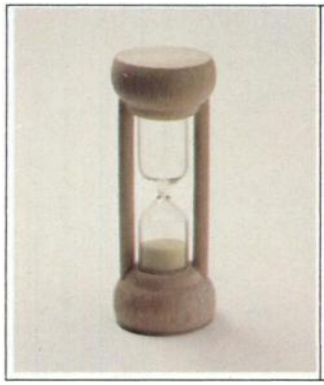

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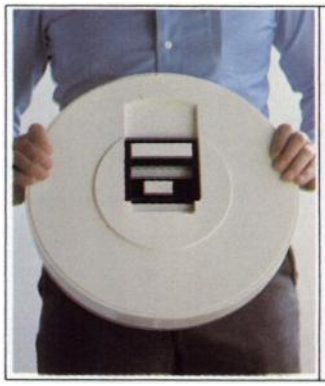

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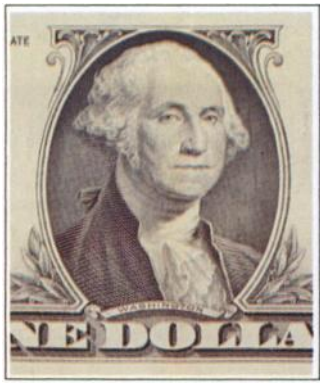

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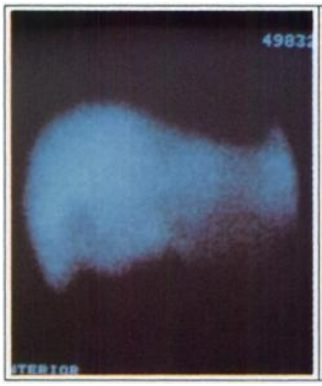

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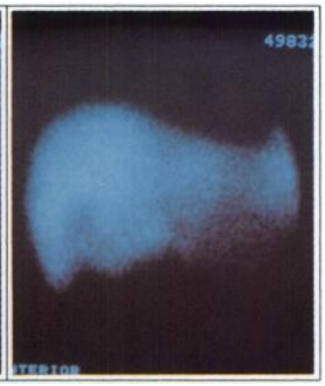

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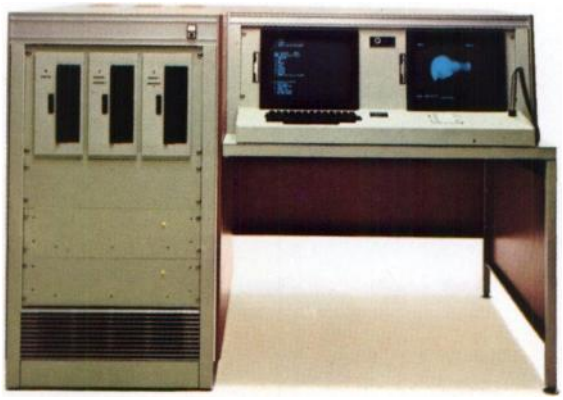


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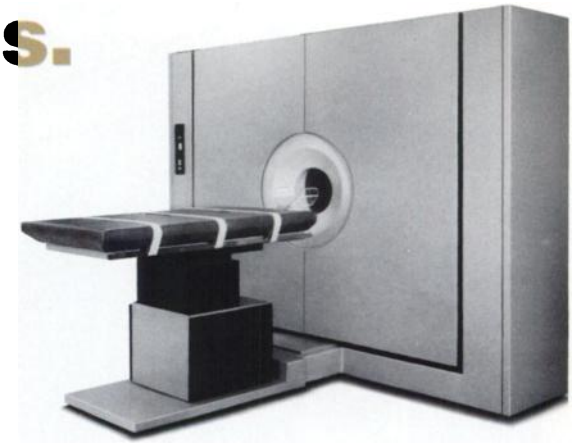
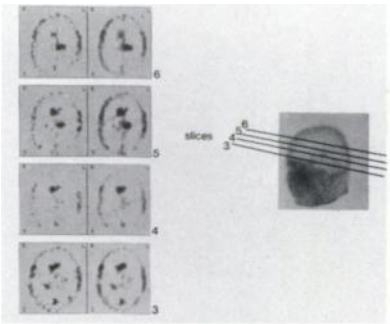


A unique diagnostic instrument, the CLEON 710 Radionuclide Brain Imager from Union Carbide provides accurate functional images of brain tissue – through the use of standard radiopharmaceuticals – and at accepted levels of administered activity.




The CLEON 710 can automatically acquire, process and display up to eight images representing transaxial slices of the brain. The unique method of acquiring and computer processing of the scan data provides target-to-background images at a ratio of approximately 1.5 to 1 with excellent functional detail. This ultrahigh sensitivity for quantitating very small changes in the regional distribution of radiopharmaceuticals enables early detection and treatment of brain abnormalities.

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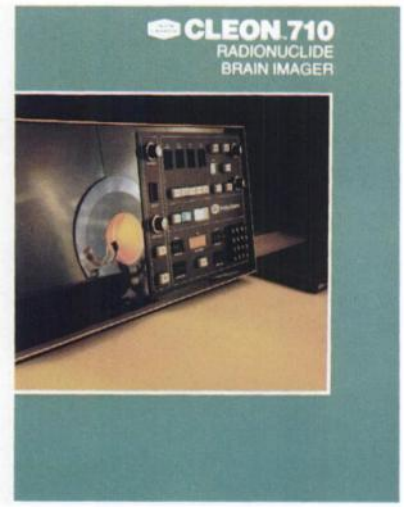


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## Kit for the Preparation of Technetium Tc-99m Sulfur Colloid

### DESCRIPTION

The kit contains all of the non-radioactive reagents required to prepare a sterile, non-pyrogenic preparation of Technetium Tc 99m Sulfur Colloid suitable for direct intravenous injection. When sterile, pyrogen-free Sodium Pertechnetate Tc 99m is added to the reaction vial, Technetium Tc 99m Sulfur Colloid is formed with the non-radioactive reagents.

### ACTIONS

Following intravenous administration, Technetium Tc 99m Sulfur Colloid is rapidly cleared by the reticuloendothelial system from the blood with a nominal clearance half-time of approximately 2½ minutes. Uptake of the radioactive colloid by organs of the reticuloendothelial system is dependent upon both their relative blood flow rates and the functional capacity of the phagocytic cells. In the average normal patient 80 to 90% of the injected colloidal particles are phagocytized by the Kupffer cells of the liver, 5 to 10% by the spleen and the balance by the bone marrow.

### INDICATIONS

Technetium Tc 99m Sulfur Colloid is used as an agent for imaging areas of functioning reticuloendothelial cells in the liver, spleen, and bone marrow.

### CONTRAINDICATIONS

None.

### WARNINGS

The contents of the double-compartment dose syringes are intended **only** for use in the preparation of Technetium Tc 99m Sulfur Colloid and **are not to be directly administered to the patient.**

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.

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.

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

### PRECAUTIONS

The components of the kit 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 colloid.

The stability of the colloidal preparation may be decreased in the presence of polyvalent cations, thus resulting in the agglomeration of the individual colloidal particles. These larger particles are likely to be trapped by the pulmonary capillary bed following intravenous injection.

It is recommended that pertechnetate solutions containing more than 10 micrograms/ml of aluminum ion not be used for formation of the Technetium Tc 99m Sulfur Colloid.

Technetium Tc 99m Sulfur Colloid 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 Sulfur Colloid not be used after six hours from the time of formulation.

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

### ADVERSE REACTIONS

Hypersensitivity reactions, including anaphylaxis, have been reported in patients receiving sulfur colloid preparation. Although rare, pyrogen reactions have been reported following the administration of the drug stabilized with gelatin. Arm pain following injection has been reported.

### DIRECTIONS FOR PREPARATION

**Note: Read complete directions thoroughly before starting preparation procedure.**

### PROCEDURAL PRECAUTIONS

1. All transfer and vial stopper entries must be done using aseptic technique.
2. The **TechneColl** Kit should be stored at room temperature (approximately 25°C).
3. All **TechneColl** Kit reagents must be at room temperature before use. At lower temperatures, there may be evidence of undissolved gelatin in the double-compartment syringes. The syringes should be allowed to stand at room temperature (approximately 25°C) until the gelatin returns to solution. **Do not warm the syringes in water bath or incubator.**
4. The water bath used for heating the contents of the Reaction Vial must be at a continuous **rolling** boil during the two heating steps of the preparation procedure. The Reaction Vial should be in direct contact with the rolling boil water of the bath, and the level of the bath must be at least even with the level of the contents of the Reaction Vial.
5. If the Reaction Vial is incubated in a lead safe, the temperature of the safe should be allowed to reach the temperature of the water bath before incubating the Reaction Vial.
6. **As a result of heating the contents of the closed Reaction Vial, internal pressure will be created causing some resistance when injecting the contents of Syringe II into the Reaction Vial. The resistance may be minimized either by employing a syringe to evacuate approximately 20 ml of air from the Reaction Vial before the addition of the generator eluate (Step 3) or by venting the Reaction Vial with a sterile needle prior to injecting the contents of Syringe II into the Reaction Vial (Step 7). If venting is used, remove vent needle before returning Reaction Vial to water bath.**
7. When attaching the disposable needles to the double-compartment syringes, care must be taken to insure that the needles are firmly attached to the syringes.

### PROCEDURE: for preparing Technetium Tc 99m Sulfur Colloid

**Note: The radioactive material should be shielded at all times during preparation.**

1. Prepare a **rolling** boil water bath.
2. Fill in the necessary information on the "Caution: Radioactive Material" label and place directly over the yellow area provided on the Reaction Vial label. Attach the string tag to the neck of the Reaction Vial. **Place the Reaction Vial in a lead Dispensing Shield fitted with a lid and with a minimum wall thickness of ⅛ inch.**
3. After swabbing the rubber stopper of the Reaction Vial with an appropriate antiseptic, aseptically inject a calculated volume of technetium-99m generator eluate or prepackaged sodium pertechnetate Tc-99m into the Reaction Vial. The volume of pertechnetate solution used must be between 0.1 and 5.0 ml. (Withdraw a 5 ml or greater volume of air to relieve pressure.)
4. Aseptically assemble Syringe I* and aseptically inject the contents into the Reaction Vial.
5. Invert the Reaction Vial several times to obtain complete mixing.

*Place the disposable needle on the syringe by pressing on firmly with a slight twisting motion.

6. Immediately transfer the Reaction Vial to a lead (minimum wall thickness of ⅛ inch) Boiling Shield which has been equilibrated to the temperature of the **rolling** boil water bath. This may be accomplished by placing the shield in the rolling boil bath a few minutes prior to transferring the Reaction Vial. The level of the water bath must be even with or above the contents of the Reaction Vial. Allow the Reaction Vial to incubate for 8 minutes.
7. Aseptically assemble Syringe II.* Immediately after the incubation period (Step 6) remove the Reaction Vial from the Boiling Shield and place in the Dispensing Shield. Swab the vial stopper with an appropriate antiseptic and aseptically inject the contents of the Syringe II into the Reaction Vial.
8. **Immediately** return the Reaction Vial to the Boiling Shield and incubate for 2 minutes.
9. Remove the Reaction Vial from the Boiling Shield and place in the Dispensing Shield. Allow the contents of the Reaction Vial to cool for approximately 15 minutes to reach body temperature. The final Technetium Tc 99m Sulfur Colloid preparation should be clear to slightly hazy in appearance, but there should be no flocculent present. If a precipitate is visible, the preparation should not be used.
10. Calculate the radioactivity concentration of the Technetium Tc 99m Sulfur Colloid and fill in the appropriate information on the string tag. **Do not use this material after 6 hours from time of preparation.**

Calculation of Radioactivity Concentration

$$\text{mCi/ml of colloid} = \frac{\text{mCi of Tc99m added}}{\text{ml of Tc99m added} + 5\ \text{ml}^{**}}$$

**The total delivered non-radioactive reagent volume employed in the preparation is 5 ml.

### DOSAGE AND ADMINISTRATION

The suggested intravenous dose range used in the average patient (70 kg) is 1 to 8 millicuries of Technetium Tc 99m Sulfur Colloid.

When orally administered, the Technetium Tc 99m Sulfur Colloid is not absorbed from the G.I. tract.

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

### HOW SUPPLIED

| Catalog Number | TechneColl Kit |
|---|---|
| 090 | Package contains—5 Preparation Units for the preparation of Technetium Tc 99m Sulfur Colloid. |

Each Preparation Unit Contains:

1—Reaction Vial. Contents 2.0 ml; each ml contains 50 mg phosphoric acid.

1—Syringe I (2-compartment disposable syringe) —Compartment A, 1.1 ml. Each ml contains 12 mg gelatin and 9 mg sodium chloride. Compartment B, 0.55 ml. Each ml contains 12 mg sodium thiosulfate.

1—Syringe II (2-compartment disposable syringe) —Compartment A, 0.6 ml. Each ml contains 36 mg gelatin and 9 mg sodium chloride. Compartment B, 1.0 ml. Each ml contains 544 mg sodium acetate and 4 mg disodium edetate.

2—Disposable needles.

1—Pressure-sensitive "Caution—Radioactive Material" label.

1—Radioassay information string tag.

Mallinckrodt NUCLEAR

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

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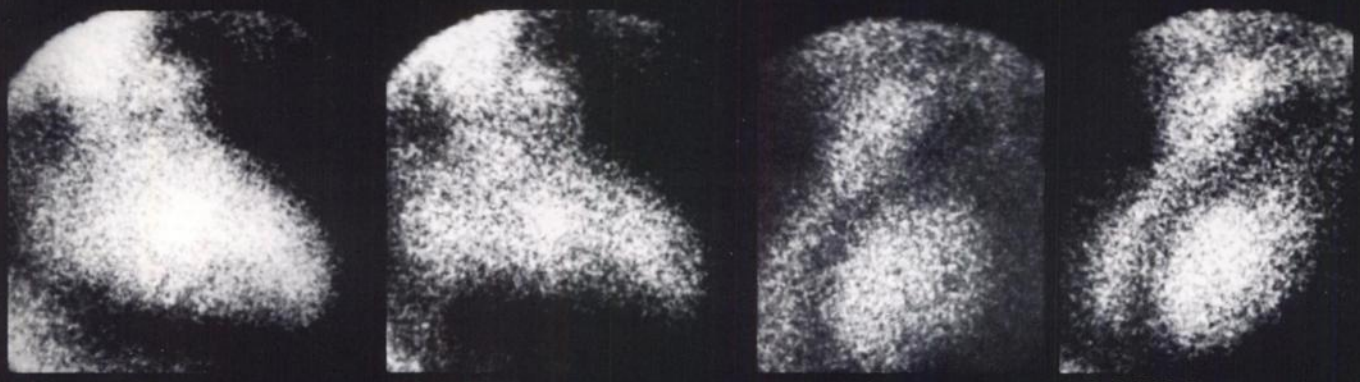
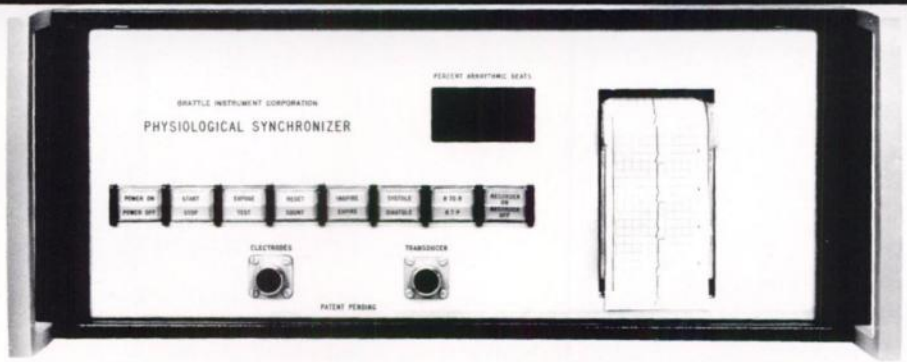


RAO, DIASTOLE RAO, SYSTOLE LAO, DIASTOLE LAO, SYSTOLE

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

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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.

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