Confidence
-For you and for them

Just as your referring physicians demand the very best for their patients, we demand the best for you. That's why we build all Varian medical equipment with an enduring trademark: inventive superior design. It's this design that will keep your CT Scanner as efficient and modern tomorrow as it is today — with an ability to incorporate the advances in CT technology we all know will be coming along.

That's Varian.
If you get an odd result when using one of our thyroid testing kits, there's something wrong with the patient.

Because when you use one of our kits you can depend on the accuracy and reproducibility of the test. You can depend, too, upon the simplicity and reliability of every kit, T3 RIA, T4 RIA and Thyopac®-3, 4 and 5, the result of extensive research and development.

When it comes to performance you can rely on the highest standards of Production and Quality Control. So whatever your needs in thyroid function testing, don't hesitate, rely on us.
This is a lousy picture.
We expected a great one. Because the image delivered by the ADAC Clinical Data System has the highest resolution available today—nearly identical to original analog scintiphotos.

But when we asked a top photographer to take a good picture of it, he didn’t even come close.

Not his fault. It can’t be done.

So an actual demonstration is the only way we can show you the absolute superiority of our exclusive 512 x 512 display matrix and 64 shades of gray.

Then you’ll see exactly what we mean.

On top of that, ADAC gives you an exclusive software “refocus” capability that increases scintillation camera resolution by 30% or more to delineate hard-to-detect abnormalities.

And no other system is as easy to operate. There is no computer language to learn. It speaks plain English. It even tells you what steps to take to get the data you want.

The ADAC Clinical Data System provides every feature you’d expect in the finest diagnostic instrument of its kind.

And the cost is surprisingly low.

To arrange for an actual demonstration of the ADAC Clinical Data System at a convenient location near you, please write or phone collect.

ADAC. Analytical Development Associates Corporation.
255 San Geronimo Way, Sunnyvale, California 94086.
Phone: (408) 736-1101.
You are entering a remarkable era of diagnostic advancement. Instead of being limited to a single imaging method, you will take advantage of many techniques, choosing them to meet your specific diagnostic criteria and the condition of your patient.

Searle is helping shape this era of advancement. Over the past decade, guided by your needs, we have developed sophisticated nuclear imaging instruments to a high degree of performance. Now, the knowledge gained during that time is being applied to the creation of instrumentation in the fields of ultrasound and CT scanning.

What Searle developed yesterday in nuclear imaging, the medical community relies on today. And today we are planning significant advances in ultrasonic, CT, and nuclear imaging. Tomorrow is in view.
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.

Patent 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.

The Raytheon XL-91...the 91-tube image maker.
A distinguished family.

New England Nuclear
Radiopharmaceutical Division

Atomlight Place, North Billerica, Mass. 01862
Telephone 617-867-9531
Los Angeles: 213-321-3311

EUROPE: NEN Chemicals GmbH, D-6072 Dreieich, W. Germany, Dammstrasse 23, Postfach 401240, Telephone: (06103) 85934. Telex: 4-17903 NEN D
3M Brand INSTANT MICROSPHERES
Profile of the
Predictable Particle

Consistent Lung Imaging. Uniform particle size (10-35μ) means consistent images from day to day and patient to patient with 3M Brand INSTANT MICROSPHERES. Stable spherical particles minimize disintegration or aggregation.

Controlled number of particles per vial (approximately 900,000) allows you to minimize the number injected and still attain accurate images.

High Labeling Efficiency. Technetium 99m uptake is normally higher than 99% throughout the day for superior perfusion information without interference from background activity.

See and compare for yourself. Our new brochure offers you a comparative look at lung imaging agents—side by side. Plus more information on 3M Brand INSTANT MICROSPHERES. Write for it today.

A BRIEF SUMMARY OF PRODUCT INFORMATION
ALBUMIN MICROSPHERES (HUMAN) (10-35μ, DRIED)
INSTANT MICROSPHERES FOR LABELING WITH
TECHNETIUM 99m.

INDICATIONS Scintillation imaging of the lungs with 99mTc-labeled albumin microspheres is recommended as adjunct to other diagnostic procedures whenever information about pulmonary circulation is desired. The most useful clinical applications of lung imaging are in the diagnosis of 1) pulmonary embolism, 2) chronic obstructive pulmonary diseases such as emphysema and chronic bronchitis, 3) pathological conditions which impede pulmonary absorptions, and 4) other pulmonary diseases such as pneumonia and tuberculosis. CONTRAINDICATIONS The safety of albumin microspheres in patients with a known right-to-left cardiac shunt has not been established and its use in such patients is contraindicated. WARNINGS The possibility that hypersensitivity reactions may occur should be considered whenever protein-containing materials such as 3M Brand Instant Albumin Microspheres are administered. Administration of epinephrine, antihistamines and corticosteroid drugs should be considered whenever a hypersensitivity reaction occurs. Since 99mTc is excreted in milk during lactation, formula-feedings should be substituted for breast-feedings. Radiopharmaceuticals should be used only by physicians who are qualified by specific training in the safe use and handling of radio-nuclides 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.

ADVERSE REACTIONS The most frequently reported adverse reactions associated with the use of Albumin Microspheres 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 one report of an alleged anaphylactoid reaction to Albumin Microspheres.

Administration of epinephrine, antihistamines and corticosteroid drugs should be considered whenever a hypersensitivity reaction occurs.

For more information, write or call toll free: 1-800-328-1671.

DIAGNOSTIC PRODUCTS

Medical Products Division
SERVING HEALTH CARE WITH PEOPLE, PRODUCTS AND IDEAS
3M CENTER • SAINT PAUL, MINNESOTA 55101

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Large Field Gamma Camera
...the one you need to get your hands on.

- **LARGE FIELD OF VIEW** — 15-3/4 inch diameter.
- **UNIQUE CONTROL SYSTEM** — Hand-held controller lets you position detector head and pre-set operating parameters and display modes without stepping away from the camera.
- **STAND-ALONE CAPABILITY** — All essential controls are at the camera. No need for a separate console; camera can interface directly with a computer system. (Mini-console with data scope and photo capability also available.)
- **P-SCOPE/DIGITAL “SCOREBOARD”** — Persistence scope with digital “scoreboard” mounts directly on the camera stand — gives continuous indication of COUNT-TIME-RATE in large, easy-to-read numerals.
- **CLINICAL DATA SYSTEM** — Powerful microprocessor-based Data Display and Processing System available with proven software for cardiology and other clinical applications.
- **LOW COST** — A complete camera system with computerized data processing for less than you might expect to pay for the camera alone in a conventional system.

Specifications and data on request.

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Norwood, Massachusetts 02062

Makers of the Cleon Whole Body Imager and Tomographic Brain Imager
THE NEW CT-SCAN GEOMETRY IS A CONTINUOUSLY ROTATING SYSTEM WITH A CONCENTRIC X-RAY SOURCE AND AN ECCENTRIC DETECTOR RING TRANSLATING AROUND THE PATIENT.

SIMPLE, RELIABLE AND VERY FAST. EXCELLENT CLINICAL SENSITIVITY AT A LOW COST.

TAKE THE ADVANTAGES OF THE:

- CONTINUOUS ROTATING FAN BEAM
- ROTATE/TRANSLATE GEOMETRY
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COMBINED, THEY REPRESENT THE OPTIMAL GEOMETRY FOR VERY FAST, WHOLE BODY CT IMAGING.

For more information on this unique system, visit Artronix at the Radiological Society of North America Meeting in Chicago (Booth 3213), or contact:

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After one million doses, TechneColl keeps boiling along.

A time-tested formula. An outstanding performance record. Have your Mallinckrodt Representative demonstrate the difference!

TechneColl
Sulfur Colloid Kit
for the preparation of Technetium Tc99m Sulfur Colloid

*Based on an estimated average of two patients dosed per viial.

See next page for brief summary.
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.

DIRECTIONS

Technetium Tc 99m Sulfur Colloid is rapidly cleared by the reticuloendothelial system from the blood with a nominal half-life of approximately 2½ hours. 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 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 are not radioactive. However, after the sodium pertechnetate Tc-99m is added, adequate shielding of the final preparation must be maintained.

Radiochemicals should be used only by physicians who are qualified by specific training in the safe use and handling of radiochemicals 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 radiochemicals.

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 polyanion 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 minimal radiation exposure to occupational workers.

HYPERSENSITIVITY 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 also 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 undisolved gelatin in the double-compartment syringes. The syringes should be allowed to stand at room temperature (approximately 25 °C) until the gelatin is reconstituted. 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 50 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 leaded Disposal Shielded Fitted with a lid and with a minimum wall thickness of ½ 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. Pour the Reaction Vial several times to obtain complete mixing.

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

6. Immediately transfer the Reaction Vial to a lead (minimum wall thickness of ¾" thick) 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 for 5 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 15 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 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 radioactive calibration 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

mCi/ml of colloid = mCi of Tc99m added

ml of Tc99m added + 5 mCi

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

DOSEAGE 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) — Compartments A, 1.1 ml. Each ml contains 19 mg gelatin and 9 mg sodium chloride. Compartments B, 0.55 ml. Each ml contains 12 mg sodium thiosulfate.
1 — Syringe II (2-compartment disposable syringe) — Compartments A, 0.6 ml. Each ml contains 36 mg gelatin and 9 mg sodium chloride. Compartments 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 — Radioisay information string tag.
Something is missing from this image. And it’s about time.
Now, single-pass whole body scanning from Ohio-Nuclear. With no artifact.

A gap or zipper often results from double-pass scanning. Also additional artifacts are caused by patient head or body motion.

With single pass, artifacts are eliminated. Fast whole body scanning minimizes patient movement and improves diagnostic data.
For the first time, Ohio-Nuclear Sigma 410 or Series 110 gamma cameras scan the whole body with one pass—in 3 to 10 minutes.

One pass obtains one complete image. Artifacts are eliminated. No zipper. No gap. Based on that single-pass image, you can conduct immediate static studies, without patient repositioning or collimator changes. Result: enhanced image quality and increased diagnostic confidence through a whole body/single-pass camera system.

Fast whole body scans.
The key to Ohio-Nuclear AreaScan single-pass capability is a single-axis diverging collimator and integral electronics. This design allows you to move the camera longitudinally above or below the patient, to get a whole body scan in a single pass and in a fraction of the time needed for a double pass. Thus, study time is reduced and technologist/physician time is saved. Result: Increased patient throughput, better camera utilization.

Minimal space requirement.
A 10 x 10-foot room is the minimum room you need for single-pass AreaScan, because Ohio-Nuclear moves the camera—not the table. This design permits area scan operations in very small areas that might not otherwise allow the use of this valuable diagnostic tool. You set scan speed by positioning the detector, selecting data density, and pressing the Automatic Speed Computer button. Correct scan speed is implemented without further calculations. Your AreaScan controls enable the camera to pause, restart, or scan manually. Result: Simplified operation in a small space.

New or retrofit—AreaScan is cost effective.
Considering its scanning capabilities, Single-Pass AreaScan represents the most efficient and economical method of whole-body scanning available today.

AreaScan is easily field installable on your existing Ohio-Nuclear Sigma 410 or Series 110 camera through modular upgrade. In addition to collimator and electronic package additions, an AreaScan couch is also included. The couch is quickly removable for conventional camera use.

Have a 410 camera on order? Just call or write to get AreaScan factory-installed on your new equipment. Of course, AreaScan benefits in the multi-pass mode can be furnished on all Sigma stationary cameras—new or retrofit.

AreaScan single-pass scans the whole body in 3-10 minutes, dramatically increasing patient throughput.
Smart gamma cameras: The Sigma Series from Ohio-Nuclear.

<table>
<thead>
<tr>
<th>Sigma 400 Standard Field Camera</th>
<th>Sigma 410 Wide Field Camera</th>
<th>Sigma 420 Mobile Camera</th>
</tr>
</thead>
<tbody>
<tr>
<td>AreaScan multipass option.</td>
<td>AreaScan single-pass option.</td>
<td>Field of View: 24.8cm minimum.</td>
</tr>
<tr>
<td>Field of View: 24.8 cm.</td>
<td>Field of View: 36.8 cm.</td>
<td>Transport: Motor-driven, variable speed.</td>
</tr>
<tr>
<td>Resolution: 4.5 mm FWHM (99mTc)</td>
<td>Resolution: 5.5 mm FWHM (99mTc)</td>
<td>Resolution: 4.5 mm FWHM (99mTc)</td>
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Three gamma cameras, each with optimal uniformity and resolution. One will meet your precise imaging needs.

These scintillation cameras from Ohio-Nuclear are redefining the standard of excellence in image quality. The Dynamic Uniform Field Control (DUFC) with Microprocessor Control (MPC) and precise electronic balance gives the diagnostician guaranteed uniformity with high resolution.

MPC analyzes the flood data coming from the memory and determines the correction parameters necessary to assure ±5% uniformity. Thus, field uniformity and resolution are both optimized — with no trade-off.

Result: Increased diagnostic confidence, faster patient throughput, and higher camera utilization.

Sigma means smart. Each Sigma camera is an intelligent instrument for many reasons. Fast analog, nonlinear circuitry provides consistently superior image quality and high count rate data collection. A Sigma camera is pre-eminently stable. Because DUFC is continually monitoring the flood, retuning is minimized. Precalibrated isotope pushbuttons, Auto Peak Track, and redesigned remote hand controls combine to offer you maximum operational efficiency and patient throughput.

A Sigma camera from Ohio-Nuclear. Simply stated, it is the only confident alternative.

For immediate response concerning AreaScan and the Sigma Series cameras, call or write Ohio-Nuclear.
Take Up Our New Faster Acting T-3 Uptake.

Why wait, when Meloy gives you these clear advantages:

1. Save time! Quick counting time and Meloy's "Seprastat™" liquid adsorbent combine to provide results in the least total time of any T-3 Uptake test available today. Simple procedures save lab time as well: no caps to place or remove, no tablets to handle, and both reagents can be added with a standard 1.0 ml bottle top dispenser.

2. Get dependable, repeatable results. Meloy's T-3 Uptake provides excellent separation in all thyroid status ranges. Tested against tablet and polyurethane sponge adsorbents, our T-3 Uptake with liquid "Seprastat™" showed the greatest separation with the lowest overall CV's. (Copies of test results are on file and available on request.)

3. Save money! Meloy Immuno-stat™ T-3 Uptake combined with our Immuno-stat™ T-4 RIA enables you to calculate an all-Meloy FTI. You get three tests from two. And, of course, you save money right up front on orders of T-3 Uptake in combination with T-4 RIA. Our Immuno-stat™ T-4 has long been known for unparalleled accuracy and precision, while requiring only a 20-minute room temperature incubation.

You can't afford to wait for the others...and you don't need to. To order any of Meloy's technically advanced quality thyroid test products, including T-3 Uptake, T-4 RIA, and T-3 RIA test kits (or to get more information) simply call (800) 336-4555 toll-free. You'll save time and money.

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Dependable bone

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R. L.

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

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

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

For further information about Osteoscan, please contact: Arnold Austin, Technical Manager, Professional Services Division, Procter & Gamble (513) 977-8547.

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

See following page for a brief summary of package insert.
Yes, if everything goes well. Even so, it needs all the skills of the gynaecologist and obstetrician to monitor progress and take action when complications arise. To support clinical judgment we offer three simple quantitative tests.

Each test, requiring only a small serum sample, is a highly specific radioimmunoassay giving excellent reproducibility with simple gamma counting. All are backed by extensive clinical trials.

**New FSH Kit**
Our latest kit measures this valuable parameter for the study of infertility in both sexes.
Not only is it a highly reproducible test with a coefficient of variation of less than 6%, it also provides the gynaecologist with results within 24 hours.

**HPL Kit**
Used in the assessment of threatened abortion during the first trimester or for identifying foetal distress during the third trimester.
Only 2-3 hours are required to complete the test giving the obstetrician rapid results in emergencies.

**Oestriol Kit**
For measuring circulating oestriol levels in the third trimester.
A simple 3-4 hour test using serum or plasma eliminating the need for urine collection.

**FSH, HPL & OESTRIOL RIA KITS**
A VALUABLE SERVICE TO OBSTetrics AND GYNAECOLOGY
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
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For further information about Osteoscan, please contact: Arnold Austin, Technical Manager, Professional Services Division, Procter & Gamble (513) 977-8547.

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

See following page for a brief summary of package insert.
Brief summary of Package Insert. Before using, please consult the full Package Insert included in each kit.

DESCRIPTION
Each vial of OSTEOSCAN contains 5.9 mg disodium etidronate and 0.16 mg stannous chloride as active ingredients. Upon addition of ADDITIVE-FREE 99mTc-pertechnetate, these ingredients combine with 99mTc to form a stable soluble complex.

ACTIONS (CLINICAL PHARMACOLOGY)
When injected intravenously, 99mTc-labeled OSTEOSCAN has a specific affinity for areas of altered osteogenesis. Areas of bone which are undergoing neoplastic invasion often have an unusually high turnover rate which may be imaged with 99mTc-labeled OSTEOSCAN.

Three hours after intravenous injection of 1 mCi 99mTc-labeled OSTEOSCAN, an estimated 40-50% of the injected dose has been taken up by the skeleton. At this time approximately 50% has been excreted in the urine and 6% remains in the blood. A small amount is retained by the soft tissue. The level of 99mTc-labeled OSTEOSCAN excreted in the feces is below the level detectable by routine laboratory techniques.

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

CONTRAINDICATIONS
None.

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

Ideally, examinations using radiopharmaceuticals, especially those 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 99mTc-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 99mTc-labeled OSTEOSCAN administration, patients should be encouraged to drink fluids. Patients should void as often as possible after the 99mTc-labeled OSTEOSCAN injection to minimize background interference from accumulation in the bladder and unnecessary exposure to radiation.

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

ADVERSE REACTIONS
None.

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

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

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 not more than 3 mg. L-methionine as a carrier, not more than 12 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: This radiopharmaceutical should not be administered to patients who are pregnant or who may become pregnant or during lactation unless the information to be gained outweighs the possible potential risks from the radiation exposure involved.

The transplacental transport and long biologic halftime of this agent may result in significant radiation exposure to the fetus. Since selenomethionine 75Se is excreted in 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 specific training in the safe use and handling of radionuclides, produced by nuclear reactor or cyclotron, and whose experience and training have been approved by the appropriate federal or state 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.

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.

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.
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.
Yes, if everything goes well. Even so, it needs all the skills of the gynaecologist and obstetrician to monitor progress and take action when complications arise. To support clinical judgment we offer three simple quantitative tests.

Each test, requiring only a small serum sample, is a highly specific radioimmunoassay giving excellent reproducibility with simple gamma counting. All are backed by extensive clinical trials.

**New FSH Kit**
- Our latest kit measures this valuable parameter for the study of infertility in both sexes.
- Not only is it a highly reproducible test with a coefficient of variation of less than 6%, it also provides the gynaecologist with results within 24 hours.

**HPL Kit**
- Used in the assessment of threatened abortion during the first trimester or for identifying foetal distress during the third trimester.
- Only 2-3 hours are required to complete the test giving the obstetrician rapid results in emergencies.

**Oestriol Kit**
- For measuring circulating oestriol levels in the third trimester.
- A simple 3-4 hour test using serum or plasma eliminating the need for urine collection.

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The Radiochemical Centre Limited, Amersham, England. Telephone: 0244-4444
In the Americas: Amersham Searle Corp., Illinois 60005. Telephone: 312-593-6300
In W. Germany: Amersham Buchler GmbH & Co KG, Braunschweig. Telephone: 05307-4693-97

26A
Radx has now programmed its new Meletron to read its own calibration factors. The Meletron programmable microprocessor allows you to check each of the Isotope Selector Keys for proper multiplication factors.

Radx employs direct mathematical manipulation for the various radionuclides (other dosecalibrators vary the resistance to alter the signal from the ionization chamber to the digital meter) and these factors can now be recalled from memory and displayed on the digital readout. Since each radionuclide has a finite and discrete mathematical factor, the ability to recall and display this factor (as triggered by the Isotope Selector Key) will remove any doubt concerning this aspect of dosecalibration.

Area radiation can also be monitored by the new Meletron. With the key out, “Background — Error” will flash when the radiation level exceeds approximately 2.0 mR/hr (with an unshielded unit).

Area monitoring is standard on Meletron; an extra cost option on other dosecalibrators.

Hard copy data of your radionuclide calibrations is another RADX first. The Melecord prints time, date, volume, calibration, patient dose, radionuclide — plus it calculates and then prints the volume to administer. Easy compliance with NRC requirements is also assured by Melefile, the RADX record keeping system which provides data cards, tab cards and a compact file to keep them in.

Obsolescence is eliminated. The Meletron employs the latest in microprocessor technology. The highly reliable microprocessor is readily programmable to perform a wide variety of functions. Further program modifications may be added to your unit in the field, as they are developed.

For a permanent solution to your dosecalibration and record-keeping problems, call RADX — the innovators in nuclear medicine. RADX, P. O. Box 19164, Houston, Texas 77024, 713/468-9628.

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Meletron & Melécord . . . your key to accurate dosecalibration and error-free records.
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131I Sodium Iodide Oral Therapeutic
131I Sodium Iodide Capsule
Oral Iodine Administration Kit

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From Nuclear Pacific, Inc.

1. Total visibility syringe shields. 360 degrees of visibility. Amazing light weight, visibility and convenience. Hi-D lead glass reduces exposure of 99mTc by a factor of 70. Positive syringe lock. Anti-roll design. Models for 1cc, 3cc and 5cc syringes. From $94.00.
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Lead equivalent, .75 mm. Tempered per FDA regulations. Anti-reflection coated. $155.00, non-prescription. $215.00, prescription. Clip-ons, non-prescription, $155.00.
5. Lo-, Hi- and Ultra Hi-Energy Vial Shields. Designed to eliminate shielding leakage and to accommodate all vials up to and including 30ml. Easy access. 360 degrees of visibility. Hi-D lead glass. Assured safety. From $225.00.
6. X-ray Protection Glass. Six levels of lead equivalence from 4 pounds/FT² to 23 pounds/FT². Twenty standard sizes from 8" x 10" to 36" x 60". Laminating, sizing, edging and framing to order.
7. Lead Glass Bricks. Razor sharp, non-fogging visibility plus remarkable shielding quality. Made of Hi-D (6.2 gm/cm²) lead glass mounted in steel frames. 4" x 8" x 2"; 4" x 8" x 4"; 8" x 8" x 2"; 8" x 8" x 4"; 12" x 12" x 4". From $380.00.

For nearly 30 years — the standard for visibility and protection in the radiation shielding industry.

For product specifications and other information contact Nuclear Pacific, Inc., (206) 763-2170.
Picker has proven its leadership in Cassetteless Radiography — and saved space in the process.

Consider our Rapido M-7A* System: Requires less space, increases productivity, cuts costs, minimizes patient radiation. And, it provides even higher quality work than conventional systems.

Additionally the Automatic Exposure Control (A.E.C.) system designed for the Rapido provides optimal radiographic film densities—consistently.

To increase throughput and reduce operator fatigue, the Rapido incorporates four 75-film-capacity load magazines (14x17", 17x14", 11x14", 10x12"). This translates into a saving of 2,000 pounds (907 kg) of cassettes that don't have to be loaded, transported or unloaded.

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This is another example of Picker's unique human resources benefiting you. It's a result of our expertise in the diagnostic modalities of x-ray, ultrasound, nuclear, computed tomography, clinical laboratory, therapy, film systems and supplies. Only Picker has all these resources.

Consult your Picker representative or write Picker Corporation, 595 Miner Road, Cleveland, OH 44143.

Discover the human resources in Picker's synergy

Picker
ONE OF THE C.I.T. COMPANIES

*Used in union with the Kodak® RP X-Omat® M-7A processor which are registered trademarks of Eastman Kodak Co., Rochester, N.Y.
Modern diagnostic procedures in nuclear medicine are presenting more challenging situations which tax the capabilities of commercial instrumentation. Here is one way in which Ortec is helping to solve these problems:

Dr. Robert E. Polcyn, Director of Nuclear Medicine at the University of Wisconsin Medical School, says: "Most commercial nuclear medicine instruments tend to perform a single clinical task. The result is a large inventory of little-used systems. "Our approach at the University, on the other hand, is to emphasize instrument function, stocking a number of research-grade NIM modules to configure the system we need for any particular requirement. This modular approach has resulted in improved energy resolution and count-rate capability, cost savings, and increased reliability. In addition, we now have the flexibility to adapt our systems to our changing clinical needs."

For complete information on Ortec instruments for nuclear medicine, write or call Life Sciences Division, Ortec Incorporated, 100 Midland Road, Oak Ridge, TN 37830; (615) 482-4411.
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• Special shielding material is 40% to 60% lighter than lead, yet offers maximum protection.
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For Technetium-99m

• Designed specifically for $^{99m}$Tc or any gamma emitter <140 keV.
• 30% lighter than standard lead shields. Slimmer, easy-to-hold shape.

<table>
<thead>
<tr>
<th>Syringe Shield</th>
<th>Model</th>
<th>Capacity</th>
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<td></td>
<td>56-292</td>
<td>2½ to 3 cc</td>
<td>1.4 oz</td>
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<td>56-293</td>
<td>5 to 6 cc</td>
<td>1.7 oz</td>
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<tr>
<td>$^{99m}$Tc THIN-WALL</td>
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<td>56-273</td>
<td>5 to 6 cc</td>
<td>4.6 oz</td>
<td>47.00</td>
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FREE
With every Syringe Shield order over $190.00, a $^{99m}$Tc DECAY CLOCK (which simplifies the calculation of individual patient doses) will be included WITHOUT CHARGE . . . while the supply lasts. Get yours now!

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ASC* allows operator to enlarge image full-screen for photo or computer acquisition. Useful with all large-diameter scintillation cameras (compatible with signals that go to the display scope) or as input to a digital computer system. Of special importance for Thallium 201 images, gated blood pool images, and small organs. Includes 10-position selector, vertical and horizontal sliding potentiometers and "zoom" for optimum image recording. $795.00. (Other nuclear medical modules also available for various diagnostic needs.)

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ADDRESS ______________________

CITY ____________ STATE ______ ZIP ____

放射免疫分析法（Radioimmunoassay）

从"The Innovators"

<table>
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<th>TEST SETS</th>
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NEW TEST SETS

- Dehydroepiandrosterone (DHEA)
- 17-Hydroxyprogesterone (17-OHP)

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Division of Searle Diagnostics
2000 Nuclear Drive
Des Plaines, IL 60018
Attn: Film Badge Manager
Ungated image of cardiac blood pool in patient with aortic stenosis and left ventricular hypertrophy. Both straight-bore, parallel-hole collimator and straight-bore, 30° slant-hole collimator were positioned in LAO projection. In both images camera head was positioned flat against chest. Due to slope of chest this provided about a 15° caudal angulation.

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Other applications include: ejection fraction on first pass data; oblique views of spine and kidneys; RPO views of spleen, LAO views of liver, images of fossa, all images with a caudal or cephalad angulation, etc.

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image intensifier scintillation camera

the new generation in full operation

The awareness that image intensifiers would allow decisive improvements in the performance of scintillation cameras has been shared, for a long time, by most leading experts in the field. Roughly fifteen years of constant technological advance have been needed to reach this long-sought goal. C.G.R. Médecine Nucléaire is proud to announce the first fully successful device based upon this principle: the OPTICAMERA. Ample proof of the OPTICAMERA achievement: fifteen instruments are actually installed, some for over one year, and are operating in day-to-day routine hospital work with the highest degree of performance and reliability presently to be available.

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? Lymphoma
? Hodgkin's disease
? Bronchogenic carcinoma

Gallium Ga 67:
Now available for routine use as a non-invasive adjunct in diagnosis.
Indications and Usage: Gallium Citrate Ga 67 may be useful to demonstrate the presence and extent of certain malignancies such as Hodgkin's disease, lymphomas, and bronchogenic carcinoma. Positive Ga 67 uptake in the absence of prior symptoms warrants follow-up as an indication of a potential disease state.

Contraindications: None known.

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

Precautions:

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

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

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

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

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

Pregnancy Category C
Adequate reproduction studies have not been performed in animals to determine whether this drug affects fertility in males or females, has a negative affect when used in pregnancy, or has any adverse effects on the fetus. Gallium Citrate Ga 67 should be used in pregnant women only when clearly needed.

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

Pediatric Use
Safety and effectiveness in children have not been established.

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

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

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

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

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

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

How Supplied: Gallium Citrate Ga 67 is supplied sterile and non-pyrogenic for intravenous use. Each ml contains 2mCi of Gallium Ga 67 on the calibration date, as a complex formed from 9mg gallium chloride Ga 67, 2mg of sodium citrate, 8mg sodium chloride, and 0.9% benzyl alcohol w/v as preservative. The pH is adjusted to between 4.5-7.5 with hydrochloric acid and/or sodium hydroxide solution.

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

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

CAUTION: Federal (U.S.A.) law prohibits dispensing without prescription.
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NUCLEAR ASSOCIATES' Xenon Delivery System is for YOU

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

"LFU" FULLY AUTOMATIC LUNG FUNCTION UNIT
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 1/3 the cost.

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Compatible with any radio-xenon gas handling system.
UL-approved vacuum pump.
Only 15" x 15" x 15¼" high.

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- Six [6] Month Shelf Life
- Six [6] Vials Per Kit
- Room Temperature Storage
- Freeze Dried
- Nitrogen Covered Inert Atmosphere

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Indianapolis, Indiana 46250
Technetium Tc 99m Pyrophosphate Kit

For Diagnostic Use

Description
Each vial contains 15.0 mg Sodium Pyrophosphate and 0.30 mg Stannous Chloride; the product does not contain a preservative. The pH of the product is adjusted with Sodium Hydroxide or Hydrochloric Acid prior to lyophilization. At the time of manufacture, the air in the vial is replaced with a Nitrogen gas atmosphere. When sterile, Pyrogen-free Sodium Pentactenate Tc 99m is added to the vial, a Technetium Tc 99m Pyrophosphate Tin Complex is formed.

The precise structure of the Technetium Tc 99m Pyrophosphate Tin Complex is unknown at this time.

Administration is by intravenous injection for diagnostic use. The product as supplied is sterile and Pyrogen-free.

Physical Characteristics
Technetium Tc 99m decays by beta decay to tin-99 with a physical half-life of 6.02 hours. The principal photon that is useful for detection and imaging studies is listed in Table I.

<table>
<thead>
<tr>
<th>Radiation</th>
<th>Mean % Disintegration</th>
<th>Mean Energy (keV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gamma-2</td>
<td>87.9</td>
<td>140.5</td>
</tr>
</tbody>
</table>


External Radiation
The specific gamma ray constant for Tc 99m is 0.8 R/mCi·hr at 1 cm. The first half value layer is 0.2 mm of Pb. To facilitate control of the radiation exposure from milliCuries amounts of this radionuclide, the use of a 2.7 mm thickness of Pb will attenuate the radiation emitted by a factor of 1,000.

Table II. Radiation Attenuation by Lead Shielding

<table>
<thead>
<tr>
<th>Shield Thickness (Pb) mm</th>
<th>Coefficient of Attenuation</th>
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<tbody>
<tr>
<td>0.2</td>
<td>0.5</td>
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<tr>
<td>0.95</td>
<td>10</td>
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<tr>
<td>1.8</td>
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<td>3.6</td>
<td>3.6</td>
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<tr>
<td>4.5</td>
<td>4.5</td>
</tr>
</tbody>
</table>

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

Table III. Physical Decay Chart: Tc 99m, half-life 6.02 hours

<table>
<thead>
<tr>
<th>Hours</th>
<th>Fraction Remaining</th>
<th>Hours</th>
<th>Fraction Remaining</th>
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<td>0.317</td>
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<tr>
<td>4</td>
<td>0.631</td>
<td>24</td>
<td>0.083</td>
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</table>

*Calibration Time

Clinical Pharmacology
Following intravenous administration of Technetium Tc 99m Pyrophosphate Tin solution, skeletal uptake occurs as a function of blood flow to bone and bone efficiency in extracting the complex. Bone mineral crystals are generally considered to be hydroxyapatite, and the complex appears to have an affinity for the hydroxyapatite crystals in bone.

Clearance of the radioactivity from the blood is quite rapid with skeletal uptake and urinary excretion being the principal mechanisms of clearance. At two hours following intravenous injection, approximately 55 percent of the injected dose was localized in bone; at four hours approximately 10 percent of the dose remains in the vascular system, decreasing to about 7 percent at 24 hours. The average urinary excretion was observed to be about 38 percent of the administered dose after eight hours, increasing to an average of about 44 percent at 24 hours. A minimum amount of uptake has been observed in soft-tissue organs, most notably the kidneys.

Indications and Usage
Technetium Tc 99m Pyrophosphate Tin Complex may be used as a bone imaging agent to delineate areas of altered osteochemistries.

Contraindications
None known.

Warnings
Technetium Tc 99m Pyrophosphate Tin should not be administered to patients who are pregnant, or to nursing mothers unless the benefits to be gained outweigh the potential hazards. Ideally, examinations using radiopharmaceuticals, especially those electively in nature, of a woman of child-bearing capability should be performed during the first few (approximately 10) days following the onset of menstes. It is reported that false-positive or false-negative brain scans may result when brain scans using Sodium Pentactenate Tc 99m are performed after a bone scan has been done using an agent containing Stannous Ions, e.g., a Pyrophosphate bone agent. This is thought to be due to the interaction of Tc 99m with Stannous Ions inside red blood cells. Therefore, in those cases where both brain and bone scans are indicated, the brain scan should be performed first, if feasible. Alternatively, another brain imaging agent, such as Tc 99m DTPA, may be employed.

The contents of the reaction vial are intended only for use in the preparation of Technetium Tc 99m Pyrophosphate Tin solution and are not to be directly administered to the patient.

Any Sodium Pentactenate Tc 99m solution which contains an oxidizing agent is not suitable for use with the Technetium Tc 99m Pyrophosphate Tin Kit.

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

Precautions
Technetium Tc 99m Pyrophosphate Tin solution, as well as other radioactive drugs, must be handled with care and appropriate safety measures should be used to minimize radiation exposure to clinical personnel. Also, care should be taken to minimize radiation exposure to the patient consistent with proper patient management.

Both prior to and following administration of Technetium Tc 99m Pyrophosphate Tin solution, the patient should be encouraged to drink fluids and to void as often as possible thereafter to minimize radioactive exposure to the bladder and background interference during imaging.

Technetium Tc 99m Pyrophosphate Tin solution must be used within 3 hours of reconstitution.

Adequate 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 Pyrophosphate Tin 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 on the drug since male and female are excreted in human milk. Safety and effectiveness in children have not been established.

Adverse Reactions
No adverse reactions specifically attributable to the use of Technetium Tc 99m Pyrophosphate Tin have been reported.

Dosage and Administration
The suggested dose range for intravenous administration to be employed in the average patient (70 kg) is 10 to 15 milliliter of the Technetium Tc 99m labeled Pyrophosphate Tin.

Technetium Tc 99m Pyrophosphate Tin solution is injected intravenously over a 10- to 20-second period. Imaging may be started at one hour after administration; however, for optimal results, bone imaging should be performed two to four hours following administration.

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

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

Technetium Tc 99m Pyrophosphate Tin is prepared by adding 1 ml of Sodium Pentactenate Tc 99m solution to the vital and shaking gently. Shielding should be utilized when preparing the Tc 99m Pyrophosphate Tin.

Radiation Dosimetry
The effective half-life was assumed to equal the physical half-life for all calculated values. The estimated absorbed radiation dose to an average patient (70 kg) from an intravenous injection of a maximum dose of 15 milliliters of Tc 99m Pyrophosphate Tin are shown in Table IV.

Table IV. Absorbed Radiation Dose

<table>
<thead>
<tr>
<th>Tissue</th>
<th>Tc 99m Pyrophosphate Tin [rad/18 milliCi]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skeleton*</td>
<td>0.52</td>
</tr>
<tr>
<td>Bone Marrow</td>
<td>0.54</td>
</tr>
<tr>
<td>Kidneys</td>
<td>0.42</td>
</tr>
<tr>
<td>Liver</td>
<td>0.16</td>
</tr>
<tr>
<td>Total Body†</td>
<td>0.14</td>
</tr>
<tr>
<td>Bladder</td>
<td>0.87</td>
</tr>
<tr>
<td>Testes</td>
<td>1.05</td>
</tr>
<tr>
<td>Ovaries</td>
<td>0.10</td>
</tr>
<tr>
<td>Spleen</td>
<td>0.08</td>
</tr>
<tr>
<td>*Dose at point of highest uptake may be a factor of 10 higher.</td>
<td></td>
</tr>
</tbody>
</table>

†If patient voids frequently after radiopharmaceutical is administered, this dose will be reduced slightly.


How Supplied
A. 6 sterile immediate drug containers each containing: (lyophilized)

- 15.0 mg Sodium Pyrophosphate
- 0.30 mg Stannous Chloride
- HCI or NaOH to adjust pH
- Nitrogen Gas

B. 6 radioactivity string labels for the immediate drug container.
C. 6 radioactivity labels for the lead shield.
D. 1 package insert.
E. 1 instruction card.

Storage
Store the Technetium Tc 99m Pyrophosphate Tin solution between 2° and 8° C. Use the radioactive complex within 3 hours after reconstitution.

Preparation
Do not use if there is a vacuum in the immediate drug container or if air is injected into the container. Mix the drug, withdraw the drug from the vial, and reconstitute the solution. A minimum of three hours prior to intravenous use.

1. Mix the string radioactivity label to the neck of the immediate drug container.
2. Remove the flip-cap from the container and place the container in the lead shield.
3. Aseptically inject the immediate drug container 1 ml of sterile, pyrogen-free 0.9% Sodium Chloride solution containing radioactive Sodium Pentactenate Tc 99m and withdraw an equal volume of Nitrogen Gas. Do not allow air to enter the container. Do not use the Technetium Tc 99m solution if it contains foreign matter.
4. Disposs and mix well by gently shaking the container in the shield for 30 seconds to one minute.

Measure and record the Tc 99m radioactivity and calibration data on the string radioactivity label and on the shield radioactivity label. Enter the time of expiration in the space provided and fix the label to the shield.
5. Maintain adequate shielding of the Technetium Tc 99m Pyrophosphate at all times.

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Aggregated Albumin (Human) Kit

DESCRIPTION - The kit contains 5 sterile vials containing 9.11g of pyrogen-free aggregated albumin (human), 0.67 - 0.83 mg stannous chloride, and 16 mg sodium chloride. When shaken, pyrogen-free sodium perchlorate 0.08% is added to the radiopharmaceutical labeled macroaggregates (Technetium MAA To Technetium Macroaggregates) is formed. The particles of aggregated albumin in the kit are formed by the denaturation of Normal Serum Albumin (USA) fixing them in a proper adjustment. Sodium hydroxide and hydrochloric acid may be present in variable amounts. At least 95% of the macroaggregates particles are between 10 and 100 microns in size, the great bulk, (as seen on a microscope side) being an average of 10 to 70 microns. None are larger than 150 microns. Vial counts indicate that each vial contains ≥ 6.0 million particles per ml. The labeling efficiency is essentially quantitative and the bound Tc-99m MAA remains stable in vitro throughout the useful period after preparation.

Application has been filed with the U. S. Nuclear Regulatory Commission for distribution of the reagent kit to persons licensed pursuant to §35 14 and §35 100, Group 11 of CFR Part 32, or under equivalent licenses of agreement states, and is still pending.

ACTIONS - Following intravenous injection, Technetium MAA Tc-99m is rapidly transported by the blood stream to the lungs. The aggregates do not enter the tissues of the lungs, but remain in the pulmonary vasculature. When pulmonary blood flow is normal, the material is carried throughout the entire lung field, whereas pulmonary blood flow is diminished or obstructed by a disease process, the particles are correspondingly prevented from in part in whole from passage through the affected portion of the pulmonary vasculature.

Technetium Macroaggregates remain in the lungs for variable amounts of time depending on particle size. The particles disappear from the lungs in exponential fashion with the larger sized aggregates having the longer half-life. Pulmonary clearance factors range from 10 to 60 microns in diameter usually have a half-life of 2 to 6 hours. Apparently the aggregates are temporarily trapped by the narrow pulmonary capillaries where the particles are broken down until they are still enough to pass. In rare 4% of the Tc 99m remains in the lungs up to 24 hours.

Although the particles of macroaggregates remain for a period of time in the pulmonary capillaries, they do not appear to remain even temporarily with pulmonary blood flow or ventilation in the dosage required for lung scanning. This is evidenced by fact that this does not produce any respiratory distress nor any tachycardia, even in patients severely ill with pulmonary and cardio disorders.

Once the albumin particles leave the lungs, they are carried to the liver, where they are removed from the blood stream primarily by the Kuffer cells. There, the particles are phagocytosed and rapidly metabolized.

INDICATIONS - Scintillation scanning of the lungs with Technetium Macroaggregates, is indicated as an adjunct to other diagnostic procedures wherever information about pulmonary vasculature is desired. The most useful clinical applications of lung scanning have been outlined by one investigator. 1) The diagnosis of pulmonary embolism. 2) Differentiation of local conditions such as but not of diffuse pulmonary disease. 3) Determination of the degree of pulmonary vascular obliteraton in parenchymal disease, and 4) Evaluation of the patient's ability to withstand pulmonary surgery.

Perhaps the most frequent useful indication for the lung scan has been the early detection of pulmonary embolism. The lung scan is uniquely able to demonstrate the evidence of an embolism before radiological signs become apparent. Although in area of increased radioactivity on the chest film may suggest an embolism, it may not become apparent until the embolism has produced such signs of scarring or infarction. Once an embolism has been diagnosed, information obtained from the scan is of value in determining the desirability of surgical embolization, while subsequent scans provide information on the effectiveness of surgical or ancillary therapy.

Lung scanning is similarly helpful in the diagnosis of various types of malignancies affecting the lungs. Again, scanning is of value in locating the affected area, in determining the need for and probable effectiveness of surgery or of radiation therapy, and in following up the benefits of treatment.

Useful information is also provided by the scan in the diagnosis and evaluation of other pulmonary problems, such as pneumonia, infections, pleural effusion, pulmonary tuberculosis, parenchymal diseases, emphysema and chronic obstructive bronchitis.

CONTRAINDICATIONS - The presence of right to left shunts which would allow Technetium Tc 99m injected into a systemic artery to reach the lungs contraindicates use of the material. Particulate material such as Technetium MAA 159m should not be administered to patients with evidence of severe restriction to pulmonary blood flow such as may be present in pulmonary hypertension.

WARNINGS - Technetium MAA Tc-99m should not be administered to patients who are pregnant, or during lactation unless the benefits to be greater outweigh the potential hazards.

Validity, examinations using radiopharmaceuticals, especially those effective in a number of women of childbearing capacity should be performed during the first two (10) days following the onset of menopause.

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

PRECAUTIONS - As in the use of any other radiopharmaceutical material should be taken to avoid maximum radiation exposure to the patient, consistent with proper patient management, and to reduce minimum radiation exposure to staff and occupational workers.

To ensure the integrity of this product use needles in gauge sizes 18 to 21

ADVERSE REACTIONS - No adverse reactions have been observed with this product. However, Vincent et al. (3) have recorded the only immediate and late reaction following injection of 10mg macroaggregates (technetium labeled macroaggregates). This was in a seven-year-old child, and had baven hemorrhagic vascular disease. The exact size of the particles used was not disclosed, and in the summaries of the literature it is suggested that this type of reaction will continue to be rare and that it will be a rare basis of clinical laboratory evidence of severe pulmonary hypertension. Such a patient might be scanned safely by strict control of macroaggregates dose, use range and mean particle size.

The literature has recorded two adverse reactions to lung scanning with 131I labeled macroaggregates. Wagner et al. (4) observed that uricemia developed in a young girl several hours after lung scanning procedure with iodine-131 macroaggregates when radiopharmaceuticals were given a time in the pulmonary vessels. The subject had a history of anemia-entalo. The reaction may have been caused by either natural or abnormal esignopathy should be performed during the first few days. Patients following the onset of menopause. Radiopharmaceuticals should be used only by physicians who are qualified by specific training in the safe use and handling of radiopharmaceuticals 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 radiopharmaceuticals.

REFERENCES - No adverse reactions have been observed with this product. However, Vincent et al. (3) have recorded the only immediate and late reaction following injection of 10mg macroaggregates (technetium labeled macroaggregates). This was in a seven-year-old child, and had baven hemorrhagic vascular disease. The exact size of the particles used was not disclosed, and in the summaries of the literature it is suggested that this type of reaction will continue to be rare and that it will be a rare basis of clinical laboratory evidence of severe pulmonary hypertension. Such a patient might be scanned safely by strict control of macroaggregates dose, use range and mean particle size.

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The dual gating operation mode allows recording of both end-systole and end-diastole simultaneously in a split screen two image format.

The cardiac cycle can even be divided into nine equal time segments and the image corresponding to each displayed simultaneously in a nine image format.

The Cardiac Gate includes a complete electrocardiograph module. The built-in heated stylus strip chart recorder records both the ECG trace and the gating intervals.

The Cardiac Gate provides both ECG and gating outputs for computer interface.

Opti-Imager

Opti-Imager is designed to provide an organ image with effects due to respiratory motion minimized. Opti-Imager has two distinct modes of operation: continuous motion correction and respiratory gating. In the continuous motion correction mode, the motion of the organ is tracked and corrected electronically without the need to attach any sensors to the patient. The distribution of counts within the organ image is monitored and corrections are applied to continuously shift the image before it is displayed to compensate for organ motion. Correction is made for motion in both the X and Y direction. Thus, the gamma camera is not gated and all the counts provided by the detector are recorded. The time required to attain a statistically satisfactory image is the same for both a motion corrected and an uncorrected image. In the gating mode, inspiration plateau and expiration plateau images are recorded. The dual gating operation mode allows recording of both inspiration and expiration plateau images simultaneously in a split screen two frame format. Dual scalers record the number of counts in each image.

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INDICATIONS AND USAGE: Technetium Tc 99m Pyrophosphate/Trimetaphosphate-Tin may be used as a bone imaging agent to delineate areas of altered osteogenesis.

CONTRAINDICATIONS: None known.

WARNINGS: Technetium Tc 99m Pyrophosphate/Trimetaphosphate-Tin should not be administered to patients who are pregnant or lactating 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. It has been reported that false-positive or false-negative brain scans may result when brain scans using sodium pertechnetate Tc 99m are performed after a bone scan has been done using an agent containing stannous chloride, e.g., a pyrophosphate or polyporphosphate bone agent. This is thought to be due to the interaction of Tc 99m with stannous ions inside red blood cells. Therefore, in those cases where both brain and bone scans are indicated, the brain scan should be performed first, if feasible. Alternatively, another brain imaging agent, such as Tc 99m-DTPA, may be employed.

PRECAUTIONS: Tc 99m Pyrophosphate/Trimetaphosphate-Tin, 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.

To minimize radiation dose to the bladder, the patient should be encouraged to void when the examination is completed and as often thereafter as possible for the next 4-6 hours.

Technetium Tc 99m Pyrophosphate/Trimetaphosphate-Tin should be used within six hours of preparation.

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

DOSAGE AND ADMINISTRATION: The suggested dose range for i.v. administration to be employed in the average patient (70kg) is:

Bone imaging: 5-15mCi Technetium Tc 99m labeled Pyrophosphate/Trimetaphosphate-Tin. Scanning post-injection is optimal at about 3-4 hours.

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

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

The components of the New England Nuclear Technetium Tc 99m Pyrophosphate/Trimetaphosphate-Tin Kit are supplied sterile and non-pyrogenic. Aseptic procedures normally employed in making additions and withdrawals from sterile, non-pyrogenic containers should be used during addition of pertechnetate solution and the withdrawal of doses for patient administration.

Technetium Tc 99m Pyrophosphate/Trimetaphosphate-Tin is prepared by simply adding 3-7ml of sodium pertechnetate Tc 99m solution to the vial and swirling for about one minute. Shielding should be utilized when preparing the Tc 99m Pyrophosphate/Trimetaphosphate-Tin.

HOW SUPPLIED: NEN's PYROLITE™ Technetium Tc 99m Pyrophosphate/Trimetaphosphate-Tin Kit is supplied as a set of five or thirty vials, sterile and non-pyrogenic. Each vial contains in lyophilized form:

- Sodium Pyrophosphate - 10mg
- Sodium Trimetaphosphate - 30mg
- Stannous Chloride - 1mg

Prior to lyophilization the pH is adjusted to between 4.5-5.5 with hydrochloric acid and/or sodium hydroxide solution. The contents of the vial are lyophilized and stored under nitrogen. Store at room temperature (15°-30°C). Included in each five (5) vial kit is one (1) package insert and twelve (12) radiation labels. Included in each thirty (30) vial kit is one (1) package insert and seventy-two (72) radiation labels.
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Reliable Consistency...
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Technetium Tc 99m aggregated albumin should be used in pregnant women only when clearly needed.

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

Safety and effectiveness in children have not been established.

As in the use of any radioactive material, care should be taken to minimize radiation exposure to the patient, consistent with proper management of the patient's medical condition. Properly trained personnel should handle Technetium Tc 99m preparations since a measure of radioactivity is associated with the product at all times from preparation to use.

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.

DOSE AND ADMINISTRATION

The recommended intravenous dose range for the average patient (70 kg) is 1 to 4 millcuries. The volume of the dose may vary from 0.4 to 1.0 ml.

The recommended number of millcuries of Technetium Tc 99m-labeled aggregated albumin to be administered per dose is 200,000-1,200,000 with the suggested number being approximately 600,000.

HOW SUPPLIED

Catalog Number 093 TechnetScan MAA Kit (Lyophilized)

Kit Contains:

5—Aggregated Albumin (Human) Reaction Vials
(1 ml each)—for the preparation of Technetium TC-99m Aggregated Albumin (Human)

Reaction Vial Contains (in lyophilized form):

2.0 mg Aggregated Albumin (Human) (8 ± 2 x 10^6 particles)
120 µg Stannous Chloride Dihydrate
80 mg Lactose
24 mg Succinic Acid
1.4 mg Sodium Acetate
Hydrochloric Acid or Sodium Hydroxide is added for pH adjustment.

Each vial contains 8 ± 2 x 10^6 aggregated albumin particles.

TechnetScan MAA contains no preservatives; after reconstitution, the shielded vials should be stored at 2°C to 8°C.

Included in each package is one (1) package insert, 5 radiation labels and 5 radioassay information string tags.
SOLID PHASE SEPARATION
Precision antibody-coated tubes provide a rapid, convenient method to separate bound from free fractions. Simply decant, no centrifugation required. The GammaCoat system eliminates the potential pitfalls of charcoal as a separating agent.

CHOICE OF GENERATION pH
Color-coded buffers are provided for the generation of angiotensin I at either pH 6.0 or 7.4. Antibacterial agents, neomycin and sodium azide, are included in the buffers to retard bacterial growth during extended incubations.

MINIMAL DILUTION OF PLASMA SAMPLE
Only 0.1 ml of buffer is added to a 1.0 ml plasma sample for adjustment and maintenance of pH during generation. Since excessive dilution of renin and renin substrate are avoided, angiotensin I generation proceeds at a maximal rate.

The complications of interpreting data obtained from procedures using higher dilutions are avoided in the GammaCoat Plasma Renin Activity System.

3-HOUR ROOM TEMPERATURE RIA INCUBATION
Use of a 3-hour incubation provides a significantly shortened radioimmunoassay. Results, from start to finish, are available on the same working day.

UNIQUE PROTECTION OF GENERATED ANGIOTENSIN I
The GammaCoat Plasma Renin Activity Kit is the first commercial kit to employ the unique proteolytic enzyme inhibiting activity of phenylmethylsulfonyl fluoride (PMSF), which has been shown to be equally effective at both pH 6.0 and 7.4. A single pipetting of this preferred inhibitor, PMSF, is used to block the enzymatic conversion of angiotensin I to angiotensin II.

RENNIN ACTIVITY CONTROL PLASMA
Variations in PRA have been observed upon repeated assay of frozen plasma after various periods of storage. Thus, the use of stored frozen plasma as a control in PRA determinations may lead to erroneous results. The GammaCoat system includes lyophilized renin activity controls at two levels. Routine use of these controls during generation, as well as radioimmunoassay, provides a reliable quality control index for the entire assay.

Please write for complete technical data or call, toll free 1-800-225-1241 (in Massachusetts call collect 617-492-2526).

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- Add 2nd antibody and let stand for 10 minutes
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The RAO view shows akinesis of the lower antero-lateral wall and apex; and contraction of the inferior wall and high up the antero-lateral wall. The LAO view shows good contraction posteriorly and akinesis of the septal aspect of the chamber. Patient was injected IV with 20mCi of 99mTc-labelled Human Serum Albumin. The agent was prepared using the New England Nuclear Electrolysis Kit for labelling HSA. Write or call for a portfolio of Brattle-gated lung, liver and heart studies.

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

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

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

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

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