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In myocardial perfusion imaging, his form may produce images that are considered technically inadequate because of soft-tissue attenuation.

That’s where Cardiolite comes through, especially for female and large-chested or obese male patients. The higher photon energy (140 keV) provides greater anatomical detail that can enhance interpretive confidence—and may reduce false-positives and equivocal cases.

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Cardiolite®
Kit for the preparation of Technetium Tc99m Sestamibi

To reduce soft-tissue attenuation
Cardiolite comes through

Stress testing should be performed only under the supervision of a qualified physician in a laboratory equipped with appropriate resuscitation and support apparatus. There have been infrequent reports of signs and symptoms consistent with seizure and severe hypersensitivity after administration of Tc99m Sestamibi.

Please see brief summary of prescribing information on adjacent page. © 1994, DuPont Pharma
Cardiolite®
Kit for the preparation of Technetium Tc99m Sestamibi

F O R  D I A G N O S T I C  U S E

DESCRIPTION: Each 5ml vial contains a sterile, non-pyrogenic, lyophilized mixture of: Tetrakis (β-methoxy isobutyl isonitrile) Copper (II) tetrachloroacetate - 1.0mg Sodium Citrate Dihydrate - 2.65mg L-Cysteine Hydrachloride Monohydrate - 1.0mg Mannitol - 20mg Stannous Chloride, Dihydrate, minimum (SnCl2·2H2O) - 0.025mg Stannous Chloride, (SnCl2·2HCl) - 0.075mg Tin Chloride (Stannous and Stannic) Dihydrate, maximum (as SnCl2·2H2O) - 0.006mg

Prior to lyophilisation the pH is 5.3-5.9. The contents of the vial are lyophilized and stored under nitrogen.

This drug is administered by intravenous injection for diagnostic use after reconstitution with sterile, non-pyrogenic, oxidant-free Sodium Pertechnetate Tc99m Injection. The pH of the reconstituted product is 3.5-4.6. No bacteriostatic preservative is present.

The precise structure of the technetium complex is Tc99m(MIBI)4, where MIBI is 2-methoxy isobutyl isonitrile.

INDICATIONS AND USAGE: CARDIOLITE®, Kit for the Preparation of Technetium Tc99m Sestamibi is a myocardial perfusion agent that is useful in the evaluation of ischemic heart disease. CARDIOLITE®, Kit for the Preparation of Technetium Tc99m Sestamibi is useful in distinguishing normal from abnormal myocardium and in the localization of the abnormality, in patients with suspected myocardial infarction, ischemic heart disease or coronary artery disease. Evaluation of ischemic heart disease or coronary artery disease is accomplished using rest and stress techniques.

CARDIOLITE®, Kit for the Preparation of Technetium Tc99m Sestamibi is also useful in the evaluation of myocardial function: using the first pass technique, rest-exercise imaging with Tc99m Sestamibi in conjunction with other diagnostic information may be used to evaluate ischemic heart disease and its localization. In clinical trials, using a template consisting of the anterior wall, inferior-posterior wall and isolated apex, localization in the anterior or inferior-posterior wall in patients with suspected angina pectoris or coronary artery disease was shown. Disease localization isolated to the apex has not been established. Tc99m Sestamibi has not been studied or evaluated in other cardiac diseases. It is usually not possible to differentiate recent from old myocardial infarction or to differentiate recent myocardial infarction from ischemia.

CONTRAINDICATIONS: None known.

WARNINGS: In studying patients in whom cardiac disease is known or suspected, care should be taken to assure continuous monitoring and treatment in accordance with safe, accepted clinical procedure. Infrrequently, death has occurred 4 to 24 hours after Tc99m Sestamibi use and is usually associated with exercise stress testing (See Precautions).

PRECAUTIONS:

GENERAL

The contents of the vial are intended only for use in the preparation of Technetium Tc99m Sestamibi and are not to be administered directly to the patient without first undergoing the preparatory procedure.

Radioactive drugs must be handled with care and appropriate safety measures should be used to minimize radiation exposure to clinical personnel. Also, care should be taken to minimize radiation exposure to the patients consistent with proper patient management.

Contents of the kit before preparation are not radioactive. However, after the Sodium Pertechnetate Tc99m Injection is added, the administration of the final product must be monitored.

The components of the kit are sterile and non-pyrogenic. It is essential to follow directions carefully and to adhere to strict aseptic procedures during preparation.

Technetium Tc99m labeling reactions involved depend on maintaining the stannous ion in the reduced state. Hence, Sodium Pertechnetate Tc99m Injection containing aprotinin oxides should not be used.

Technetium Tc99m Sestamibi should not be used more than six hours after preparation.

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

Stress testing should be performed only under the supervision of a qualified physician and in a laboratory equipped with appropriate resuscitation and support apparatus.

The most frequent exercise stress test endpoints, which resulted in termination of the test and in a controlled Tc99m Sestamibi studies (two-two were cardiac patients) were:

- Fatigue 35%
- Dyspnea 17%
- Chest Pain 16%
- ST-depression 7%
- Arrhythmia 1%

Cardiogenic, Matutagenic, Impairment of Fertility

In comparison with most other diagnostic technetium labeled radiopharmaceuticals, the radiation dose to the ovaries (1.5 rad/30mCi at rest, 1.2 rad/30mCi at exercise) is high. Minimal exposure (ALARA) is necessary in women of childbearing capability. (See Dosimetry subsection in DOSAGE AND ADMINISTRATION section.)

The active intermediate, (CuMIBI)2BF4, was found to be genotoxic potential in a battery of five tests. No genotoxic activity was observed in the Ames, CHO/HFR and sister chromatid exchange tests at concentrations (2-20mM). At cytotoxic concentrations (0.2-2mg/ml), an increase in cell death with chromosome aberrations was observed in the in vitro human lymphocyte assay. (CuMIBI)2BF4, did not show genotoxic effects in in vivo mouse macrophage test at a dose which caused systemic and bone marrow toxicity (90mg/kg, > 80 fold human dose).

Pregnancy Category C

Animal reproduction and teratogenicity studies have not been conducted with Technetium Tc99m Sestamibi. It is also not known whether Technetium Tc99m Sestamibi can cause fetal harm when administered to a pregnant woman or can affect reproductive capacity. There have been no studies in pregnant women. Technetium Tc99m Sestamibi should be given to a pregnant woman only if clearly needed.

Nursing Mothers

Technetium Tc99m Pertechnetate is excreted in human milk during lactation. It is not known whether Technetium Tc99m Sestamibi is excreted in human milk. Therefore, formula feedings should be substituted for breast feedings.

Pediatric Use

Safety and effectiveness in children below the age of 18 have not been established.

ADVERSE REACTIONS: During clinical trials, approximately 8% of patients experienced a transient periorbital and/or taste perversions (metallic or bitter taste) immediately after the injection of Technetium Tc99m Sestamibi. This transient headache, flushing, edema, injection site inflammation, dyspepsia, nausea, vomiting, pruritus, rash, urticaria, dry mouth, fever, diziness, fatigue, dyspnea, and hypertension also have been attributed to administration of the agent. Cases of angina, chest pain, and death have occurred (see Warnings and Precautions). The following adverse reactions have been rarely reported: signs and symptoms consistent with seizure occurring shortly after administration of the agent; transient atria in a wire-jaw; and severe hyperextensiveness, which was characterized by dyspnea, hypotension, bradycardia, asthma and vomiting within two hours after a second injection of Technetium Tc99m Sestamibi.

DOSEAGE AND ADMINISTRATION: The suggested dose range for T.V. administration in a single dose to be employed in the average patient (70kg) is:

- 370-1110MBq (10-30mCi)

The dose administered should be the lowest required to provide an adequate study consistent with ALARA principles (see also PRECAUTIONS).

When used in the diagnosis of myocardial infarction, imaging should be completed within four hours after administration.

The patient should be monitored by a suitable radioactivity calibration system immediately prior to patient administration. Radiochemical purity should be checked prior to patient administration.

Parenteral drug products should be inspected visually for particulate matter and discoloration prior to administration whenever solution and container are clear and transparent.

Store at 15-25°C before and after reconstitution.

RADIATION DOSIMETRY: The radiation dose to organs and tissues of an average patient (70kg) per 110MBq (30mCi) of Technetium Tc99m Sestamibi injected intravenously are shown in Table 4.

Table 4. Radiation Absorbed Doses from Tc99m Sestamibi

<table>
<thead>
<tr>
<th>Organ</th>
<th>Radiation Absorbed Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0 hour void</td>
<td>4.8 hour void</td>
</tr>
<tr>
<td>Rad/30mCi</td>
<td>mgCy/110MBq</td>
</tr>
<tr>
<td>---------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>Breasts</td>
<td>0.2</td>
</tr>
<tr>
<td>Gallbladder Wall</td>
<td>2.0</td>
</tr>
<tr>
<td>Small Intestine</td>
<td>3.0</td>
</tr>
<tr>
<td>Upper Large Intestine Wall</td>
<td>5.4</td>
</tr>
<tr>
<td>Lower Large Intestine Wall</td>
<td>3.4</td>
</tr>
<tr>
<td>Stomach Wall</td>
<td>0.6</td>
</tr>
<tr>
<td>Heart Wall</td>
<td>0.6</td>
</tr>
<tr>
<td>Kidneys</td>
<td>2.0</td>
</tr>
<tr>
<td>Liver</td>
<td>0.6</td>
</tr>
<tr>
<td>Lung</td>
<td>0.6</td>
</tr>
<tr>
<td>Bone Surfaces</td>
<td>0.7</td>
</tr>
<tr>
<td>Thyroid</td>
<td>0.7</td>
</tr>
<tr>
<td>Ovaries</td>
<td>1.5</td>
</tr>
<tr>
<td>Testes</td>
<td>0.3</td>
</tr>
<tr>
<td>Red Marrow</td>
<td>0.5</td>
</tr>
<tr>
<td>Urinary Bladder Wall</td>
<td>2.0</td>
</tr>
<tr>
<td>Total Body</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Radiopharmaceutical Internal Dose Information Center, July, 1990, Oak Ridge Associated Universities, P.O. Box 117, Oak Ridge, TN 37831, (855) 376-3489

HOW SUPPLIED: Du Pont Radiopharmaceuticals' CARDIOLITE®, Kit for the Preparation of Technetium Tc99m Sestamibi is supplied as a 5ml vial in kits of (2), (5) and (30) vials, sterile, non-pyrogenic.

Prior to lyophilisation the pH is between 5.3-5.9. The contents of the vials are lyophilized and stored under nitrogen. Store at 15-25°C before and after reconstitution. Technetium Tc99m Sestamibi contains no pyrogenic contaminants. A few cases of transient one (1) package insert, six (6) vial shield labels and six (6) radiation warning labels. Included in each of five (5) vial kit are one (1) package insert, six (6) vial shield labels and six (6) radiation warning labels. Included in each of thirty (30) vial kit are one (1) package insert, thirty (30) vial shield labels and thirty (30) radiation warning labels.

The U.S. Nuclear Regulatory Commission has approved this reagent kit for distribution to persons licensed to use byproduct material pursuant to section 35.11 and section 35.200 of Title 10 CFR Part 35, to persons who hold an equivalent license issued by an Agreement State, and, outside the United States, to persons authorized by the appropriate authority.

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The DST-XL is a true variable-angle, open-gantry system, with all the applicability of the DST. But the DST-XL's jumbo detectors provide unique benefits for whole-body and spine studies. For example, angled at 90° along their 21.2" length, the DST-XL's detectors can capture a spine SPECT study in one 90° orbit. That's efficiency both you and your patient will appreciate.

DST-XL operation is exceptionally easy. The system features sophisticated auto-contouring for both whole-body and tomography, simultaneous dual-collimator changing, simultaneous dual-detector quality assurance, and motorized detector angulation.

So with the introduction of a second Sopha variable-angle system, choosing a nuclear camera has never been easier. You can select the DST for general and cardiac imaging. Or you can select the DST-XL for general and whole-body. Either way, you'll be making the responsible choice. Either way, you'll be choosing Sopha Medical.
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Kai Lee, PhD

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- Mass storage devices
- Input and output devices
- Computer software
- Nuclear Medicine image acquisition methods
- Methods of qualitative image analysis
- Quantitative image analysis
- Nuclear cardiology
- Quantitative data analysis
- Single-photon emission computed tomography
- Selecting a computer for nuclear medicine

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*References:

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10 DeAngelo Drive, Bedford, MA 01730

Distributed by:
Syncor

**Table 4. Estimated Absorbed Radiation Doses: Iobenguane Sulfate I-131**

<table>
<thead>
<tr>
<th>Organ</th>
<th>Adult</th>
<th>15 Years</th>
<th>16 Years</th>
<th>5 Years</th>
<th>1 Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dose (mCi)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thyroid</td>
<td>29.6</td>
<td>29.6</td>
<td>28.8</td>
<td>27.8</td>
<td>26.9</td>
</tr>
<tr>
<td>Liver</td>
<td>2.9</td>
<td>2.9</td>
<td>2.9</td>
<td>2.9</td>
<td>2.9</td>
</tr>
<tr>
<td>Spleen</td>
<td>21.8</td>
<td>21.8</td>
<td>21.8</td>
<td>21.8</td>
<td>21.8</td>
</tr>
<tr>
<td>Heart</td>
<td>14.1</td>
<td>14.1</td>
<td>14.1</td>
<td>14.1</td>
<td>14.1</td>
</tr>
<tr>
<td>Adrenal gland</td>
<td>0.79</td>
<td>0.79</td>
<td>0.79</td>
<td>0.79</td>
<td>0.79</td>
</tr>
<tr>
<td>Sulfate</td>
<td>0.52</td>
<td>0.52</td>
<td>0.52</td>
<td>0.52</td>
<td>0.52</td>
</tr>
<tr>
<td>Paracrine</td>
<td>4.1</td>
<td>4.1</td>
<td>4.1</td>
<td>4.1</td>
<td>4.1</td>
</tr>
<tr>
<td>Thyroid gland</td>
<td>3.4</td>
<td>3.4</td>
<td>3.4</td>
<td>3.4</td>
<td>3.4</td>
</tr>
<tr>
<td>Intestine</td>
<td>3.3</td>
<td>3.3</td>
<td>3.3</td>
<td>3.3</td>
<td>3.3</td>
</tr>
<tr>
<td>Urinary tract</td>
<td>3.3</td>
<td>3.3</td>
<td>3.3</td>
<td>3.3</td>
<td>3.3</td>
</tr>
<tr>
<td>Ovary</td>
<td>2.7</td>
<td>2.7</td>
<td>2.7</td>
<td>2.7</td>
<td>2.7</td>
</tr>
<tr>
<td>Total Body</td>
<td>2.3</td>
<td>2.3</td>
<td>2.3</td>
<td>2.3</td>
<td>2.3</td>
</tr>
<tr>
<td>Testes</td>
<td>2.3</td>
<td>2.3</td>
<td>2.3</td>
<td>2.3</td>
<td>2.3</td>
</tr>
<tr>
<td>Brain</td>
<td>1.8</td>
<td>1.8</td>
<td>1.8</td>
<td>1.8</td>
<td>1.8</td>
</tr>
</tbody>
</table>

**RADIATION DOSIMETRY**

The estimated absorbed radiation doses to adults and children from an intravenous dose of Iobenguane Sulfate I-131 are shown in Table 4.

**DRUG DIGESTS**

The following organs each receive less than 1 mrad per procedure: breasts, LLI wall, small intestine, stomach, ULI wall, lungs, muscles, red marrow, bone surfaces, skin and thymus.

If 0.5 mCi of Iobenguane Sulfate I-131 is used, the organ burden would be half of the doses listed above. The thyroid gland estimated burden is in the unblocked state. When the thyroid gland is blocked with Lugol's solution, uptake is minimal.

Peak scans were generally noted at 48 hours post-injection. However, serial scans at 24, 48 and 72 hours post-injection may be needed to optimally define the tumor.

**HOW SUPPLIED:**
Iobenguane Sulfate I-131 injection is supplied in a 2 ml glass vial as a sterile, nonpyrogenic solution containing, at calibration time, 85.1 mg Iobenguane Sulfate (2.3 mCi/mg) of Iobenguane Sulfate I-131 Injection. Store the drug at freezer temperature (-20 to -10°C).

**NOTE:**
Two to three hours prior to use, thaw the vial in the2.0°C container, at room temperature. Discard the unused portion of drug 4-6 hours if kept at room temperature.

In conformance with USP recommendations, iodine 131 preparations should not be used after the expiration date stated on the label.

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Space contributed by the publisher as a public service.
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Our dedication to service and commitment to provide you with a reliable product have built the reputation of our gates.

With a complete line of models available, you are able to choose the gate which best corresponds to your specific requirements.

The AccuSync 5L, our top model (featured at left) includes CRT monitor (visual) and Strip Chart Recorder (hard copy).

Model Specifications:
- Auto/Manual trigger control
- No delay
- ECG output
- Audio indicator
- Trigger pulse LED
- Isolation amplifier for patient safety
- Compatible with all computers

AccuSync models 5L, 6L and 1L are CSA and ETL (UL544) approved

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Accessory and optional products available:
The AccuAmp 5, the 5 lead system available for AccuSync 5L, 6L, and 1L, transmits information through fiber optic link. Patient cables, lead wires, and BNC cables available for AccuSync models.
Each description of the products below was condensed from information supplied by the manufacturer. The reviews are published as a service to the professionals working in the field of nuclear medicine and their inclusion herein does not in any way imply an endorsement by the Editorial Board of The Journal of Nuclear Medicine or by The Society of Nuclear Medicine.

Syringe Shield with Safety-Lock Design

The Pro-Tec III Syringe Shield features a unique safety-lock design that immediately grips and secures the syringe in position. As an extra safety precaution, this new design releases the used, contaminated syringe without additional handling. Syringe Shields are available for 1-cc, 3-cc, 5-cc and 10-cc syringes and will accommodate most brands of disposable syringes.

The Pro-Tec III® minimizes any exposure to the technologist with a special 2.0 mm thick tungsten alloy barrel. A lead glass viewing panel provides additional protection and clear visibility enhanced by an interior white coating to better read the syringe and its contents.

Biodex Medical Systems, Inc., Brookhaven R&D Plaza, Box 702, Shirley, NY 11967. (800) 224-6339, fax: 516-924-9241.

Physicians’ Online™ Launches Online Medical Information Service

Physicians’ Online, Inc. has launched a national online information service created by physicians for physicians, providing the most current medical information and analytic tools physicians need for timely clinical decision making.

Through the support of sponsors, including professional societies, pharmaceutical manufacturers and managed care organizations, the new service provides physicians unlimited free use of care reference services including MEDLINE®, AIDSLINE®, Physicians GenRx™, QMR® and the Prescribing Decision Support Module™. Physicians’ Online is available in both Windows and Macintosh versions and can be accessed by almost any computer equipped with a modem.

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For further information, please call Physicians’ Online member services at (800) 332-0009.

Redesigned Vacuum Pump

The Nalgene™ hand-operated vacuum pump has been redesigned to quickly and easily attain and hold vacuum of 25 in (635 mm) Hg. These lightweight units are sealed and self-lubricating and are ideal for siphoning, filtration, liquid transfer, bleeding fluid lines, checking for equipment leaks and adjusting vacuum-operated apparatus.

The bodies are made of polyvinyl chloride (PVC) and are available with or without a vacuum gauge. The pumps without gauges are ideal for lab use or in the field as a backup to your lab vacuum system. A vacuum trigger release requires only one hand to operate and releases vacuum with the touch of an index finger. Units have a removable cover on the exhaust port and trigger to release vacuum without disconnecting the pump from the line. The nozzle fits standard 1/4" ID tubing.

Pumps are available in two sizes. The smaller size has a pumping rate of 15 cc/stroke and 3 psig (0.21 bar) positive pressure at the exhaust port. The larger size has a rate of 36 cc/stroke and 7 psig (0.48 bar) positive pressure at the exhaust port. For both pumps, full blank port pressure is obtained with only two strokes.

Nalge Company, a subsidiary of Sybron Corp., P.O. Box 20365, Rochester, NY, 14602. (716) 264-3985, fax: (716) 586-8431.

Agfa Matrix LR3300 P Laser Imager

The Matrix LR3300 P laser imager provides outstanding performance in a compact size. The Matrix LR3300 P can produce more than 200 light-box-ready film per hour, with access to the first film in about one minute. This is the first imager with a 16-bit modulation system that produces sixteen times as many graduations as other imagers. It offers black borders and the highest spatial resolution (4256 x 5174 pixels) on a 14" x 17" film.

The Matrix LR3300 P processor is integrated on top of the imager, resulting in a footprint of only 28" x 35". The imager is also available with the processor docked in parallel or serial modes.

The Matrix LR3300 P can be used for nuclear medicine imaging in many ways. For maximum flexibility it is used with Agfa MG medical gateways to form an Agfa IMPAX™ image management and distribution network. Up to three scanners can be connected to each gateway. To meet the needs of a large department, several departments or an entire hospital, multiple gateways can be networked to each other as well as to one or more LR3300 laser imagers. Miles Inc., 100 Challenger Road, Ridgefield Park, NJ 07660. (201) 440-2500, fax: (201) 342-4742.

Shielding for Metastron®

Shielding accessories for Metastron® (strontium-89-chloride injection), consisting of a protective syringe shield and dispensing dome, minimize health care worker exposure to radiation.

Unlike currently available lead, bismuth or acrylic shields, this syringe shield utilizes a unique combination of lead encased in acrylic, which dramatically reduces exposure to beta, gamma and Bremsstrahlung radiation. The syringe shield accommodates both 5-cc and 10-cc syringes, eliminating the need for multiple shield sizes. A clear acrylic dome facilitates dispensing while minimizing radiation exposure to the person preparing the dose. Med-Physics, Inc., Amersham Healthcare, (800) 633-4123.
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Residency Program
GEORGETOWN UNIVERSITY HOSPITAL. Unexpected opening—July 1994—Nuclear Medicine Residency/PhD Fellowship. Contact: Harvey A. Ziesman, M.D., Director, Division of Nuclear Medicine, 3800 Reservoir Rd., NW Washington, DC 20007. (202) 784-3360.

Positions Wanted

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(see full page ad and order form on pages 16A-17A)
We are a national research center jointly financed by the Federal Republic of Germany and the federal state of North Rhine-Westphalia with a staff of approx. 4500. The five major research priorities comprising structure of matter/materials research, information technology, energy technology, environmental research and life sciences are part of a broad spectrum of basic research ranging from medicine through biotechnology to solid-state research and medium-energy physics.

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Director (C4)

(successor to Prof. Stocklin)

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