ROCHE

MEDI-PHYSICS, INC., RICHMOND, CALIF. 94806
SUBSIDIARY OF HOFFMANN-LA ROCHE INC.

Technetium Tc 99m Generator
Secondary shield to further reduce radiation

5cc and 10cc elution vials

Elution vial shield

Adaptors for various elution vials

Sterile needle pack and labels furnished with each generator

20ml elution vials available on request
TECHNETIUM 99m GENERATORS

Technetium Tc 99m Generators for the Production of Sodium Pertechnetate Tc 99m

DESCRIPTION: The Technetium Tc 99m Generator is prepared with fission produced Molybdenum Mo 99 absorbed on alumina in a lead-shielded column and provides a means for obtaining sterile oxygen-free solutions of Sodium Pertechnetate Tc 99m in sodium chloride injection. The eluate should be crystal clear. With a pH of 4.5-7.5, hydrochloric acid and/or sodium hydroxide may be used for pH adjustment. Over the life of the generator, an elution will contain a yield of 80% to 100% of the theoretical amount of Technetium Tc 99m available from the Molybdenum Mo 99 on the generator column.

Each eluate of the generator should not contain more than 0.15 microcurie of the Molybdenum Mo 99 per millicurie Technetium Tc 99m per administered dose at the time of administration, and not more than 10 micrograms of aluminum per milliliter of the generator eluate, both of which must be determined by the user before administration.

INDICATIONS AND USAGE: Sodium Pertechnetate Tc 99m is used in ADULTS as an agent for brain imaging including central radionuclide angiography, thyroid imaging, salivary gland imaging, placenta localization, blood pool imaging, including radionuclide angiography, and urinary bladder imaging (direct isotopic cystography) for detection of vesico-ureteral reflux.

Sodium Pertechnetate Tc 99m is used in CHILDREN as an agent for brain imaging including central radionuclide angiography, thyroid imaging, blood pool imaging including radionuclide angiography, and urinary bladder imaging (direct isotopic cystography) for the detection of vesico-ureteral reflux.

CONTRAINDICATIONS: None known.

WARNINGS: Radiation risks associated with the use of Sodium Pertechnetate Tc 99m are greater in children than in adults. In general, the younger the child the greater the risk owing to greater absorbed radiation doses and longer life expectancy. These greater risks should be taken firmly into account in all benefit-risk assessments involving children.

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

CARCINOGENESIS, MUTAGENESIS, IMPAIRMENT OF FERTILITY
No long-term animal studies have been performed to evaluate carcinogenic potential or whether Technetium Tc 99m may affect fertility in males or females.

Pregnancy Category C

Animal reproductive studies have not been conducted with Technetium Tc 99m. It is also not known whether Technetium Tc 99m can cause fetal harm when administered to a pregnant woman or can affect reproductive capacity. Technetium Tc 99m should be given to a pregnant woman only if the expected benefits to be gained clearly outweigh the potential hazards to the fetus. When administered to pregnant women, this product should only be administered by physicians who are qualified by training and experience in the safe use and handling of radionuclides, and whose experience and training have been approved by the appropriate government agency authorized to license the use of radionuclides.

MOTHER'S MILK: Technetium Tc 99m is excreted in human milk during lactation, and therefore formula feedings should be substituted for breast feedings.

Pediatric Use

See Indications and Usage, dosage and administration. See also description of additional risk under warnings.

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

The generator should not be used after 15 days from the date and time of calibration. At time of administration, the solution should be crystal clear.

ADVERSE REACTIONS: Allergic reactions including anaphylaxis have been reported infrequently following the administration of Sodium Pertechnetate Tc 99m.

HOW SUPPLIED: Sodium Pertechnetate Tc 99m is supplied as a Molybdenum Mo 99/Technetium Tc 99m generator in sizes from 500 millicuries to 16,000 millicuries (in approximately 635 millicurie increments) of Molybdenum Mo 99 as of 10:00 P.M. Eastern Time of the day of calibration. The TECHNETIUM Tc 99m GENERATOR consists of 1) sterile generator; 2) Sodium Chloride Injection source; 3) 10 or sterile evacuated vials; 4) sterile needles; 5) elution vial seals; 6) Informed drug labels. Elution vials in 5 cc and 20 cc sizes are available upon request.

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*initial order only

The TECHNETIUM Tc 99m GENERATOR should not be used after 15 days from the date and time of calibration.

Jointly manufactured by:
CINTCHEN, INC.
Tuxedo, N.Y. 10987

and
UNION CARBIDE CORPORATION
Tuxedo, N.Y. 10987

June, 1983

TECHNETIUM 99m GENERATORS
MEDI-PHYSICS, INC., RICHMOND, CALIF 94806 SUBSIDIARY OF HOFFMANN-LA ROCHE INC.
Nuclear Data is pleased to announce the formation of the ND Medical Products Group. Staffed by experienced nuclear medicine specialists, who are solely dedicated to providing products and services for your nuclear medicine facility.

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*CAP Basic Ligand Survey Set K-C, 1982

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Prospective Payment is changing the practice of nuclear medicine.

In many hospitals, the advent of diagnosis related groups (DRGs) is already reducing the number of referrals, changing the mix of studies performed and putting off the purchase of requested instrumentation.

Helping our customers respond

What will be the outcome of these changes? That depends a lot on how the nuclear medicine department responds. At New England Nuclear/Du Pont we believe the challenges of Prospective Payment can be turned into opportunities for nuclear medicine. And we'd like to show you how.

As a service to our customers, NEN/Du Pont has developed a series of programs designed to help nuclear medicine departments, referring physicians and hospital administrators learn about the probable impact of the new reimbursement system—and the ways they can respond to ensure continued excellence in medical care consistent with cost-effective management.

The first program, called “Prospective Payment and Nuclear Medicine: Concept, Impact and Action,” will be presented in symposia throughout the country by NEN/Du Pont representatives trained in understanding the contributions nuclear medicine can make to cost-conscious medical practice. Each symposium covers a wide variety of topics—from “What are DRGs?” and “How can hospitals control costs?” to “How will Prospective Payment affect nuclear medicine studies?” and, most important, “How can nuclear medicine respond?”

Ask your representative for a presentation of this program at your hospital.

And ask about our other services to help NEN customers build referrals, increase operating and financial efficiency and ensure the quality of their studies. Our goal is Imaging Excellence: enhancing the image of your department while improving the images in your department.
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Images courtesy of Jason S. Zielonka, M.D.; Chief, Nuclear Medicine Services; V.A. Medical Center; Wood, WI.

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- ECG Output.
- Playback Mode.
- Event Marker

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Advanced Medical Research Corp./301 Brewster Road/P.O. Box 3094
Milford, CT 06460/Telephone: (203) 877-1610
Measurements of Regional Cerebral Blood Flow (rCBF) by 2-D noninvasive 133-Xe clearance techniques provide a reliable method for the functional assessment of brain pathophysiology. The method is being increasingly used within the fields of neurology, neurosurgery, intensive care, psychiatry and anesthesiology.

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An evident advantage of the 133-Xe inhalation technique is the possibility of measuring noninvasively a physiological parameter of brain function before, during and after therapeutic intervention. The noninvasive tracer administration – combined with the low radiation dosage and easy procedure – makes this low cost technique ideal for serial follow-up CBF determinations.

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- evaluation of surgically amenable functional pathology,
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- monitoring time course and extent of vasospasm for optimization of timing of aneurysm surgery.

Neurology
- monitoring vasodilator responsiveness, autoregulation and cerebrovascular functional capacity in patients with CVD.

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- evaluation of functional status in head injured, comatose or anesthetized patients.

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- differential diagnosis of dementia and depression.

The Novo Cerebrograph® 32c
A sophisticated system for rCBF measurements with a choice of three 133-Xe administration techniques: Inhalation, IV or IA injection.

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Thallous chloride, Tl201 is supplied in sterile nonpyrogenic solution for intravenous injection and used for myocardial scintigraphy, coronary deficiency and nonischemic myocardial diseases.

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When patient conditions are needed, the Vanderbilt Cardiac Phantom is the simple solution to Cardiac Simulation.

The Cardiac Phantom has been designed to evaluate systems used for gated cardiac studies. The Phantom is mechanically simple and easy to use, yet provides an assessment of the three major parameters of gate acquisition: heart rate, ejection fraction, and wall motion. Thus it is ideally suited for quality assurance programs and comparative evaluations of gated acquisition systems.

The Cardiac Phantom design uses rotating ellipsoids to simulate the beating left atrium and ventricle at variable heart beats. A static background, representing the right heart, aorta and general background tissue is situated adjacent to the rotating ellipsoids. By varying the concentration of Tc99m in the ellipsoids, adjusting the rate of rotation (variable pulse rate) and attenuator thickness, a wide variety of controlled patient conditions may be simulated in terms of background level, heart rate (20 to 200 beats per minute), ejection fraction (25%, 50%, 75%) and wall motion (mm displacement from end diastole to end systole). An ECG pulse is generated for each simulated heart beat.

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Simulated cardiac cycle ejection fraction 0.50
Fundamentals of Nuclear Medicine

Edited by
Naomi P. Alazraki, MD,
and Fred S. Mishkin, MD

Other Contributors: Manuel L. Brown, MD, Frederick L. Datz, MD,
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James A. Sorenson, PhD, Leroy A. Sugarman, MD, Andrew T.
Taylor, Jr., MD, Heidi S. Weissmann, MD, Henry N. Wellman, MD

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Add $2.50 postage and handling for each book ordered. Prepayment required in US funds drawn on US banks only. Check or purchase order must accompany all orders. Make checks payable to: The Society of Nuclear Medicine. Prices are subject to change without notice.

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475 Park Avenue South, New York, NY 10016, (212)889-0717
Now you can perform a ventilation study immediately after a perfusion study with no interference from technetium Tc 99m radiation.

**XENON 127**

Xenon Xe 127 Gas—Exclusively from Mallinckrodt

Photon energies higher than technetium Tc 99m permit perfusion/ventilation study sequence not practical with Xenon Xe 133. "The 140-keV gamma photon from $^{99m}$Tc has a Compton scatter peak at about 80 keV [which] cannot be distinguished from the [81 keV] photopeak of $^{133}$Xe." Xenon 127's higher photon energies (172 and 203-keV) give you optimal visualization without potential image degradation from technetium Tc 99m. You can perform the perfusion study first and select the best view for the ventilation study.

Higher usable photon yield than Xenon Xe 133 gives you diagnostic information you need with substantially lower millicurie dosage administered to the patient.

The lung radiation dose from Xenon Xe 127 is approximately 1/3 that of Xenon Xe 133 for equal information densities. Studies report excellent images with Xenon Xe 127 gas. "The clearer washout images... are probably due to better penetration through the chest wall with an improved lung-to-background ratio."

Longer shelf-life than Xenon Xe 133 Gas and Krypton Kr 81m Gas means Xenon Xe 127 Gas can always be at hand when you need it. Krypton Kr 81m Gas generators must be ordered for the day needed; Xenon Xe 133 Gas must be ordered weekly. Xenon Xe 127 Gas, however, can be ordered monthly. It is available for delivery the first of each month, calibrated for the fifteenth day of the month.

Lung Perfusion Study with Technetium Tc 99m Albumin Aggregated (MAA) and Ventilation Study with Xenon Xe 127 Gas

**Patient:**
A 26-year old male paraplegic with recent history of chest pain.

**Perfusion Study:**
3.0 mCi Technetium Tc 99m MAA.

**Interpretation:**
Perfusion defect in superior segment of lower right lobe; smaller perfusion defects noted in left mid-lung and left upper lung field.

**Ventilation Study:**
5.0 mCi Xenon Xe 127 Gas. Performed immediately after perfusion study with patient in right posterior oblique position.

**Interpretation:**
Xenon Xe 127 Gas uniformly distributed in both lungs; normal clearance and washout (Scintophotos A-F). Specifically, the area of the perfusion defect demonstrates normal ventilation.

**Conclusion:**
Probable pulmonary embolism.

Mallinckrodt's XENOMATIC II™

Xenon Gas Dispenser

- **Dual-Purpose**—Accommodates all dosage vials of Mallinckrodt Xenon Xe 127 Gas and Xenon Xe 133 Gas.
- **One-Squeeze Administration**—No pumping. One squeeze dispenses more than 99% of the vial's contents into the delivery system.
- **Less Handling, More Protection**—Designed for quick setup and convenient administration with minimal radiation exposure to the user.

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**For Technical Assistance, call**
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Diagnostic Products Division
Mallinckrodt, Inc.
Post Office Box 5840
St. Louis, MO 63134

Please see next page for Xenon 127 prescribing information.
XENON Xe 127 GAS

Diagnostic

DESCRIPTION

Xenon Xe 127 Gas is for diagnostic inhalation use only. It is supplied in a sterile, non-diffusible gas mixture of 80% xenon Xe 127 and 20% nitrogen. The mixture contains less than 0.1% xenon Xe 239.

Physical Characteristics

Xenon Xe 127 is a colorless, odorless, non-radioactive gas. It has a very low specific gravity (0.0023).

Table 1. Principal Radiation Emission Data of Xenon Xe 127

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</tr>
<tr>
<td>Gamma-4</td>
<td>68.1</td>
</tr>
<tr>
<td>K x-rays</td>
<td>78.9</td>
</tr>
</tbody>
</table>

Table 2. Principal Radiation Emission Data of Xenon Xe 129m.

<table>
<thead>
<tr>
<th>Radiation</th>
<th>Mean Per Disintegration Energy (keV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gamma-1</td>
<td>2.1</td>
</tr>
<tr>
<td>Gamma-2</td>
<td>47</td>
</tr>
<tr>
<td>Gamma-4</td>
<td>126.9</td>
</tr>
</tbody>
</table>

Table 3. Principal Radiation Emission Data of Xenon Xe 131m.

<table>
<thead>
<tr>
<th>Radiation</th>
<th>Mean Per Disintegration Energy (keV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gamma-1</td>
<td>2.0</td>
</tr>
<tr>
<td>Gamma-2</td>
<td>54.4</td>
</tr>
</tbody>
</table>

External Radiation

The specific gamma ray constant for Xenon Xe 127 is 25.3 R/hr/ml at 1 cm. The first half-value layer of lead is 0.023 cm.

INDICATIONS AND USAGE

Xenon Xe 127 gas has been shown to be valuable for diagnostic inhalation studies for the evaluation of pulmonary function and for imaging the lungs.

CONTRAINdications

None known.

WARNINGs

Xenon Xe 127 gas delivery systems, i.e., respirators or spironmeters, and associated tubing assemblies must be tested to confirm that they are leak-proof and to avoid exposure of the handling personnel to radioactive xenon Xe 127.

PRECAUTIONS

General

Xenon Xe 127 gas as well as other radioactive drugs, must be handled with care and appropriate safety measures should be used to minimize radiation exposure to personnel. Also, care should be taken to minimize radiation exposure to the patient consistent with proper patient management.

Carcinogenesis, Mutagenesis, Impairment of Fertility

No long-term animal studies have been performed to evaluate carcinogenic potential of xenon Xe 127 gas or its potential to impair fertility.

Pediatric Use

Safety and effectiveness in children have not been established.

ADVERSE REACTIONS

None known.

DOSEAGE AND ADMINISTRATION

Xenon Xe 127 Gas is administered by inhalation from a closed respiration system or spirometer. The final dose should be measured by a suitable radiocactivity calibration system prior to administration.

Radiation Dosimetry

The estimated absorbed radiation doses to the patient's lungs is based on the size of the sphere of activity and the distance of the patient from the source.

Directions for Dispensing

Transferred the appropriate Xenon Xe 127 Gas dose from the Xenon Xe 127 Gas unit dose vials to the breathing device or spirometer using an adequately shielded gas transfer device. The Mallinckrodt, Inc. Xeomicon* II Gas Dispenser, Catalog No. 801B, is recommended. Directions for use of this gas dispenser are as follows:

1. Connect the Xeomicon II Gas Dispenser to the breathing device or spirometer.
2. Squeeze the trigger firmly and completely one or more times to transfer the gas from the dose vial into the breathing device.
3. After transfer, press shield release latch to the handle and remove the shielding.
4. Place an empty shield into the end of the Xeomicon X Gas Dispenser, impounding the vial on the needles and engaging the latch holding the shield and vial in position.
5. Connect the Xeon Xe 127 Gas to the breathing device or spirometer.
6. Squeeze the trigger firmly and completely one or more times to transfer the gas from the dose vial into the breathing device.
7. After transfer, press shield release latch to the handle and remove the shielding.
8. Place an empty shield into the end of the Xeomicon X Gas Dispenser, impounding the vial on the needles and engaging the latch holding the shield and vial in position.
9. Place the Xeon Xe 127 Gas to the breathing device or spirometer.
10. Squeeze the trigger firmly and completely one or more times to transfer the gas from the dose vial into the breathing device.

Radioactivity Measurements

Calibrate a suitable commercial ionization chamber dose calibrator according to the manufacturer's instructions for that particular instrument. An instrument that gives direct radionuclide readings is recommended.

 HOW SUPPLIED

Xenon Xe 127 Gas is available in 2ml vials with color-coded labels in 5 milliequivalents (130 in size 1 and 130 in size 2). Both sizes are packaged in individual lead shields.

Storage

Xenon Xe 127 Gas should be stored at 15°C to 30°C.

Additional Information

1ST IN MR

Who's really first in MR imaging? Examine the record. Of all the companies involved in MR research, Technicare was the first to receive FDA permission to market whole-body magnetic resonance imaging systems at field strengths up to and including 0.6 tesla. Teslacron™ imaging systems.

Who's really first in MR imaging? The facts speak for themselves. Technicare.

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a Johnson & Johnson company

Now it's convenient, accurate. Introducing SynteVent™ Aerosol Delivery System

New SynteVent is a unique aerosol system designed to deliver uniform submicronic (0.5 micron mass median diameter) droplets to the lung for ventilation scanning.

A complete, closed system, SynteVent is easily assembled, lightweight and portable. Normal tidal breathing for 3 to 5 minutes allows up to six views of the lung.

For more complete information, call 415-856-2422, or write Synaco, Inc. at the address below.
Who has the highest field strength available for routine clinical imaging? Look at the numbers. Technicare’s Teslacon™ is the only magnetic resonance imaging system with FDA marketing permission for 0.6 tesla field strength use, the most powerful field strength the FDA has allowed any manufacturer to offer.

Who has the highest field strength available for routine clinical imaging? The facts speak for themselves. Technicare.
### IMPORTANT TITLES

<table>
<thead>
<tr>
<th>Title</th>
<th>Author(s)</th>
<th>ISBN</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computerized Tomography of the Lung: Normal Anatomy and Most Common Disorders</td>
<td>Miriam Sperber, M.D.</td>
<td>0-87993-209-0</td>
<td>$32.50</td>
</tr>
<tr>
<td>Advanced Reproduction of the Heart, Thoracic and Abdominal CT Sections</td>
<td>Harold L. Israel, M.D., Emeritus Professor of Medicine</td>
<td>0-87993-131-0</td>
<td>$68.00</td>
</tr>
<tr>
<td>Bone Scintigraphy</td>
<td>Edward B. Silberstein</td>
<td>0-87993-203-1</td>
<td>$67.50</td>
</tr>
<tr>
<td>CT of the Heart and the Great Vessels—Experimental Evaluation and Clinical Evaluation</td>
<td>Charles B. Higgins, M.D. associate editors: Erik Carlsson, M.D., PhD. Martin J. Lipton, M.D.</td>
<td>0-87993-180-9</td>
<td>$68.00</td>
</tr>
<tr>
<td>Nuclear Cardiology for Clinicians</td>
<td>Jagmeet S. Soin, M.D., and Harold L. Brooks, M.D.</td>
<td>0-87993-130-1</td>
<td>$34.50</td>
</tr>
</tbody>
</table>

*This book is the most complete and definitive work on radionuclide skeletal imaging to date. It aptly condenses the important information on this subject which has grown explosively during the last decade. It emphasizes the need to individualize the radionuclide techniques for specific diagnostic problems and the dependence of image interpretation on the correlation with clinical and radiographic findings. My compliments to the editor and the authors for their new book. It will remain a valuable addition to the literature, even though the field of nuclear medicine is still changing.*

*—from the foreword by John G. McAfee, M.D., Professor & Director, Nuclear Medicine, Department of Radiology, SUNY Upstate Medical Center, Syracuse, NY*

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28A
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Judge for yourself. Technicare Teslacon™ MR imaging systems are currently in operation at 38 clinical sites worldwide, more than any other manufacturer. That means more practical experience in all aspects of MR – from site planning to installation to service to imaging itself.

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Anzai’s CARDIAC II (AZ-630)

is designed for the purpose of standardization and quality assurance of nuclear cardiology studies. The phantom consists of cardiac section which simulates a real human heart in respect of shape and motion, the drive unit which sends out solution quantitatively, and the control unit which produces ECG R-waves or other signals to be fed into the computer system simultaneously with the image data.

Some of the outstanding features are:
- Heart Rate: 10 — 160 BPM
- End-Diastolic Volume: 80 — 160 ml
- End-Systolic Volume: 20 — 100 ml
- Left Ventricular Ejection Fraction: 10 — 90 %

The phantom is applied to CT, DSA, US and NMR studies with extended specifications.

We are among the very first manufacturer of Nuclear Medicine Instruments and are supplying scientific treasures to the world.

• Xe-133 Gas Control System
• Cold-Xe Gas System
• Kr-81m Gas System
• Tc-99m Dispensing Total System
• Other related items

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MEDICAL DEPARTMENT

# 711, 2-13, Ohsaki 4-chome, Shinagawa-ku, Tokyo 141, Japan

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Early diagnosis of excessive bone mineral loss is possible by noninvasive determination of bone mineral content (BMC) in the axial skeleton.

Reliable Data from Relevant Areas
Loss of bone mineral, and fractures associated with the axial skeleton, are closely associated with metabolic bone disease. Trabecular bone, predominantly present in the axial skeleton, notably the lumbar vertebrae, is affected to a larger extent than cortical bone present in the peripheral skeleton. BMC measurements in potential fracture sites in the axial skeleton provide the most reliable indication of fracture risk.

The Novo BMC-LAB 22a measures BMC in the lumbar spine, the femoral neck and other parts of the skeleton.

Improved Patient Management
A large number of drugs and regimens influence the calcium balance. BMC measurement is a cost-effective and direct means of monitoring patients in haemodialysis, during nutrient supplementation, exercise and drug administration programs.

Ease of operation and low radiation dose make the Novo BMC-LAB 22a ideal for routine monitoring and screening of patients.

Automatic Soft Tissue Compensation
The Novo BMC-LAB 22a is a dual-photon bone densitometer. The technique obviates the need for soft tissue equivalent materials, without sacrificing the excellent precision of the proven single-photon method.

Safety, Flexibility and Ease of Operation
Advanced software guides the user through the measurements and prompts the operator in case of error. Extensive interactive capabilities provide extremely flexible selection of regions of interest.

The Novo BMC-LAB 22a features three dedicated programs: for CO-LUMNA, and for right and left COLLUM FEMORIS. A fourth OPTIONAL program is included to meet individual requirements.

For further information please contact:

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Belgium: Novo Industri S.A., Brussels, t/tph. 32-2-465-2400
USA: Novo Diagnostic Systems, Wilton, t/tph. 1-203-846-8420
UK: Vertec Scientific, Slough, t/tph. 44-6266-4808
Holland: Nuclertron Trading B.V, Leersum, t/tph. 31-3434-5-4224
Switzerland: Nuclertron S.A., Lausanne, t/tph. 41-2125-2423
France: Sema, Boulogne, t/tph. 33-1-621-6666
Italy: Tecnologie Avanzate, Turin, t/tph. 39-11-5500284
Japan: Nissei Sangyo Co. Ltd, Tokyo, t/tph. 3-304-7111
Korea: Sam Woo Medical Co. Ltd., Seoul, t/tph. 568-3166
Australia: Bilex Medical Systems, Berowra Heights, t/tph. 2-456-1245
Who's working harder to give you more? Consider this. Technicare's Teslacon™ is the only MR imaging system, commercially available, to offer proven three-dimensional acquisition with physiological gating. That means greater diagnostic flexibility and higher throughput now and in the future.

Who's working harder to give you more? The facts speak for themselves. Technicare.
The most important instrument in your department may be the telephone. Unless it rings—unless clinicians refer patients for studies—there is no nuclear medicine practice.

Under today’s DRG-based payment systems, obtaining and maintaining referrals has become even more important. Hospitals are encouraging their clinicians to minimize the number of tests they order, selecting those that are most definitive, that answer the diagnostic question in the shortest time, at the lowest cost.

How can clinicians know which tests meet these criteria?

Supporting Nuclear Medicine

At NEN/Du Pont we share your belief in nuclear medicine studies. We understand the contributions these noninvasive studies make to quality medical care. We know which studies can serve as low-cost screens, which can be performed easily on an outpatient basis, which offer physicians the procedure of choice they seek.

And we can help you present the case for nuclear medicine to your administrators and referring clinicians.

For many years, NEN/Du Pont has supported nuclear medicine with teaching programs and exhibits directed to the clinicians who order your studies. Now, we’ve developed a Clinician’s Guide to Nuclear Medicine Procedures... to help you build referrals with key clinicians at your institution.

Helping Clinicians Choose

This easy-to-use manual explains the indications and expected findings of nuclear medicine studies, compares them to other diagnostic modalities, and helps referring clinicians select the most appropriate studies. Unnecessary tests are reduced and the patient’s stay can be shortened.

In addition, the Clinician’s Guide contains information useful to the nursing staff in preparing and managing patients before and after their nuclear medicine studies. Ask your NEN/Du Pont representative how you can obtain copies of the Clinician’s Guide for your hospital. And ask about our other programs to keep the phone ringing in your department. Our goal is Imaging Excellence: enhancing the image of your department while improving the images in your department.
Who's the leader in MR imaging? The results are in. Technicare. With Teslacon™, the first and only 0.6 tesla whole-body MR imaging system to receive FDA marketing permission. With 38 clinical sites worldwide, over 15,000 patient studies, and high throughput 3-D volume and multi-slice acquisition. And the leadership continues through research into better imaging at current field strengths, contrast enhanced magnetopharmaceutical imaging, spectroscopy, and high field imaging.

Who's the leader in MR imaging? The facts speak for themselves. Technicare.

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"Diagnostic Quality..."
Skeletal Images in Two Hours!

Mallinckrodt
OSTEOSCAN-HDP
(Technetium Tc 99m Oxidronate Kit)

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Clinical Studies Verify the Two-Hour Advantage of OSTEOSCAN-HDP Over MDP in Skeletal Imaging

Higher Bone Uptake Than MDP at Two Hours

"Image quality is principally related to the absolute retention of the skeletal imaging agent on bone and the time available to allow the soft-tissue tracer component to be excreted by the kidneys." In clinical comparisons, OSTEOSCAN-HDP averaged 21% higher whole body retention than MDP and 99% higher than HEDP. Another comparative study showed that "HDP had a significantly greater bone/background ratio at 2 hours than MDP."3

Rapid Blood Clearance... Up to 16% Higher Bone to Soft-Tissue Ratios Than MDP

In clinical use of OSTEOSCAN-HDP, approximately 6% of the dose remained in the blood at two hours post-injection (No other bone-imaging agent clears faster.) The resultant low soft-tissue levels permit early imaging and contribute to high-resolution images.

Side-by-Side Comparisons Rated HDP Images "Better" at Two Hours

In a controlled multi-center crossover study, HDP was found to give images of better quality than MDP at a dose-to-image time of two hours.

Diagnostic-quality skeletal images in two hours...an important contribution to department productivity and patient convenience.

To arrange an evaluation of OSTEOSCAN-HDP, contact your Mallinckrodt representative today.

References
1. Pauwels EKJ, Borm J. Aarts JCNM: A comparison between whole body scans made at two hours and three hours after intravenous injection of Tc-99m HDP as to image quality and lesion detectability. Clin Nucl Med 19:79-82, 1994

Please see next page for Osteoscan-HDP prescribing information.


## OSTEOSCAN-HDP

**Technetium Tc99m Oxidronate Kit**

### DESCRIPTION

OSTEOSCAN-HDP (Technetium Tc99m Oxidronate Kit) is supplied as a lyophilized powder, packaged under nitrogen in vials for intravenous administration after reconstitution with ADDITIVE-FREE sodium pertechnetate Tc99m. Each vial contains 2.0 mg oxinate sodium and 0.16 mg stannous chloride as active ingredients, and 0.56 mg geranic acid as a stabilizer. The contents of the vial are sterile and non-pyrogenic.

This radiopharmaceutical diagnostic agent, when reconstituted with ADDITIVE-FREE sodium pertechnetate Tc99m forms a complex of unknown structure.

### Physical Characteristics

Technetium Tc99m decays by isomeric transition with a physical half-life of 6.02 hours. Photons that are useful for detection and imaging studies are 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>88 96</td>
<td>140.5</td>
</tr>
</tbody>
</table>


### External Radiation

The specific gamma-ray constant for Technetium Tc99m is 0.84 Becquerel/hr at 1 cm. The first half-value layer is 0.2 mm of Pb. A range of values for the relative attenuation of the radiation emitted by this radionuclide that results from interaction of various thicknesses of Pb is shown in Table II. To facilitate control of the radiation exposure from millicurie amounts of this radionuclide the use of a 2.5 mm thickness of Pb will attenuate the radiation emitted by a factor of about 1,000.

### Table II. Radiation Attenuation by Lead Shielding

<table>
<thead>
<tr>
<th>Shield Thickness (Pb) mm</th>
<th>Coefficient of Attenuation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2</td>
<td>0.5</td>
</tr>
<tr>
<td>0.8</td>
<td>1.0</td>
</tr>
<tr>
<td>1.6</td>
<td>1.6</td>
</tr>
<tr>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>3.3</td>
<td>3.3</td>
</tr>
</tbody>
</table>

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

### Table III. Physical Decay Chart

<table>
<thead>
<tr>
<th>Hours</th>
<th>Fraction Remaining</th>
<th>Hours</th>
<th>Fraction Remaining</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>1.77</td>
<td>5</td>
<td>562</td>
</tr>
<tr>
<td>4</td>
<td>1.38</td>
<td>6</td>
<td>501</td>
</tr>
<tr>
<td>1</td>
<td>1.41</td>
<td>7</td>
<td>447</td>
</tr>
<tr>
<td>2</td>
<td>1.26</td>
<td>8</td>
<td>396</td>
</tr>
<tr>
<td>1.12</td>
<td>1.00</td>
<td>10</td>
<td>316</td>
</tr>
<tr>
<td>0.98</td>
<td>0.89</td>
<td>11</td>
<td>262</td>
</tr>
<tr>
<td>0.94</td>
<td>0.79</td>
<td>12</td>
<td>251</td>
</tr>
<tr>
<td>0.90</td>
<td>0.70</td>
<td>18</td>
<td>126</td>
</tr>
<tr>
<td>0.63</td>
<td>0.63</td>
<td>24</td>
<td>68</td>
</tr>
</tbody>
</table>

*Calibration Time

### CLINICAL PHARMACOLOGY

During the 24 hours following injection, Technetium Tc99m-labeled OSTEOSCAN-HDP is rapidly cleared from blood and other non-osseous tissues and accumulates in the skeleton and bone. In humans, blood levels are about 10% of the injected dose at one hour post-injection and continue to fall to about 5%, 4%, and 3% at 2, 3, and 4 hours respectively. When measured at 24 hours following its administration, skeletal retention is approximately 50% of the injected dose. OSTEOSCAN-HDP exhibits its greatest affinity for areas of altered osteogenesis and actively metabolizing bone.

### INDICATIONS AND USAGE

OSTEOSCAN-HDP (Technetium Tc99m Oxidronate Kit) is a diagnostic skeletal imaging agent used to demonstrate areas of altered osteogenesis.

### CONTRAINDICATIONS

None known.

**WARNINGS**

This class of compounds is known to complex cations such as calcium. Particular caution should be used with patients who have, or who may be predisposed to hypercalcemia (e.g. alkalosis).

### PRECAUTIONS

**General**

Contents of the vial are intended only for use in the preparation of Technetium Tc99m Oxidronate and NOT to be administered to the patient.

**Technetium Tc99m Oxidronate** should be formulated within eight (8) hours prior to clinical use. Optimal imaging results are obtained by four hours after administration.

### Table IV. Absorbed Radiation Doses

<table>
<thead>
<tr>
<th>Tissues</th>
<th>(rads/20mCi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Body</td>
<td>0.13</td>
</tr>
<tr>
<td>Bone Total</td>
<td>0.07</td>
</tr>
<tr>
<td>Red Marrow</td>
<td>0.06</td>
</tr>
<tr>
<td>Kidneys</td>
<td>0.10</td>
</tr>
<tr>
<td>Liver</td>
<td>0.08</td>
</tr>
<tr>
<td>Bladder Wall</td>
<td>2.60</td>
</tr>
<tr>
<td>2 hr void</td>
<td>4.8</td>
</tr>
<tr>
<td>4.8 hr void</td>
<td>6.20</td>
</tr>
<tr>
<td>Ovaries</td>
<td>0.24</td>
</tr>
<tr>
<td>2 hr void</td>
<td>0.34</td>
</tr>
<tr>
<td>4.8 hr void</td>
<td>0.16</td>
</tr>
</tbody>
</table>

*Method of calculation: "A" Absorbed Dose per Unit Cumulated Activity Selected Radionuclides and Organs, MIRD Pamphlet No. 1, 1975

### Preparations For Use

All procedures should be conducted using waterproof gloves. Use shielded syringe during transport and administration of Tc99m solutions.

1. Remove metal disc from OSTEOSCAN-HDP vial and cleanse top by swabbing with alcohol. Note dose for each patient, see unit dose preparation method below.

2. Place vial in lead shield. Add 3.6 mL sodium pertechnetate Tc99m solution and secure with a foil cover. In choosing the amount of Tc99m activity to be used, the number of doses desired, the activity of each dose (recommended adult dose is 15 mCi with a range of 10-20 mCi) and radioactive decay must be taken into account. The recommended maximum amount of Tc99m radioactivity to be added to the vial is 200 mCi.

   Note: The contents of the vial are not radioactive. Maintain adequate shielding using the lead vial shield and fitted lead cover during the life of the radioactive preparation.

3. Shake the vial for approximately 30 seconds to assure complete dissolution.

4. Record the time, date of preparation and the activity of the Tc99m-labeled OSTEOSCAN-HDP on the label and affix this label to the shield.

5. Use within eight (8) hours of preparation. Refrigeration of the radiolabeled complex is not necessary. Discard excess material in accordance with Nuclear Regulatory Commission or state regulations pertaining to the disposal of radioactive wastes.

### HOW SUPPLIED

OSTEOSCAN-HDP is supplied as a lyophilized powder packaged in vials. Each vial contains 2.0 mg oxinate sodium and 0.16 mg stannous chloride as active ingredients, and 0.56 mg geranic acid as a stabilizer. Kits containing 5 vials (NDC 0001-0997-BO) or 30 vials (NDC 0001-0997-DO) are available. The drug can be stored at room temperature both prior to and following reconstitution with ADDITIVE-FREE sodium pertechnetate Tc99m.

Manufactured for: Mallinckrodt, Inc., St. Louis, MO 63134 by Lypho-Med, Inc., Chicago, IL 60651

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Mallinckrodt, Inc.
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St. Louis, MO 63134

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**In Missouri (except St. Louis),** call 800-392-4779
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3. **Optimizing your processing conditions.**
   DuPont's Video Imaging Specialists analyze processing and establish optimum conditions to assure ongoing consistent image quality.
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Changes that make sense…

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ZLC 7500S SPECT System
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- ZLC 7500S offers ¼” or ½” crystal for optimum sensitivity or resolution
- Convenient push-button set up—reduces scatter and improves image quality
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Siemens ZLC 3700 System
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Volume 25, Number 6
NUCLEAR PHARMACY MANAGER  
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Applications are invited for the position of Manager of the OUHSC Nuclear Pharmacy. Applicants must possess a degree in pharmacy, have adequate experience and be eligible for licensure in the State of Oklahoma. The primary responsibility of this position is management of the OUHSC Nuclear Pharmacy. In addition, the individual must have responsibility for professional graduate and undergraduate instruction in nuclear pharmacy. An advanced degree and/or prior academic experience is desirable for faculty appointment. Salary will be commensurate with experience. The Nuclear Pharmacy is located in the new College of Pharmacy Building on the University of Oklahoma Health Sciences Center Campus.

Interested applicants should send a letter of application accompanied by a curriculum vitae and names and addresses of three references to the following address by July 1, 1984: J. Thomas Panto, Ph.D., Chair, Search Committee, College of Pharmacy, University of Oklahoma HSC, 1110 N. Stonewall Avenue, Oklahoma City, OK 73190.

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NUCLEAR MEDICINE SECTION

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Residency training encompasses the full spectrum of nuclear medicine procedures, both in vivo and in vitro, in pediatric and adult inpatients and outpatients. Instruction includes clinical nuclear medicine, radiopharmacy, radiology, research, and basic sciences, as well as experience with computer applications and tomographic imaging.

Fellowships with emphasis on cardiac and pulmonary disease are available in association with the Texas Heart Institute. With mobile capabilities and a large population of critically ill patients (total hospital beds, 1,260; intensive care beds, 190), there is ample potential for participation in research projects related to cardiovascular, pulmonary, and critical care medicine.

Requests for further information should be directed to:
John A. Burdine, MD, Chief or Paul H. Murphy, PhD, Training Coordinator Nuclear Medicine Section, Department of Radiology Baylor College of Medicine Houston, TX 77030

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This course will provide an intense review of nuclear medicine including the basic science of radiation physics, instrumentation, radiochemistry and pharmacy, in vitro and radioassay, scintigraphic imaging, radionuclide in vivo function tests and radionuclide therapy. It is a supplement to residency training in Nuclear Medicine and Nuclear Radiology and is not designed to substitute for this type of training. The course may serve as a survey of nuclear medicine science for physicians or others seeking an overview of this subject.

The faculty consists of members of the Andre Meyer Department of Physics-Nuclear Medicine and invited guests.

Course Director: Stanley J. Goldsmith, M.D.

For further information contact: Ms. Mary Farrell-Batista—(212)650-7888.

PHYSICIANS
POSITRON EMISSION TOMOGRAPHY
NUCLEAR MEDICINE DEPARTMENT
CLINICAL CENTER
NATIONAL INSTITUTES OF HEALTH

The Clinical Center of the National Institutes of Health is seeking research physicians/clinicians for the Positron Emission Tomography (PET) program managed by the Nuclear Medicine Department. This program, operated jointly with the Institutes, features both "head only" and whole body PET tomographs, "state of the art" computer facilities, and a hospital-based cyclotron.

Various appointments are available, ranging from fellowships to senior staff positions. Candidates should be board eligible in nuclear medicine or radiology and preferably should also evidence training in neurology/psychiatry or neurosurgery. Positions may include some management/program coordination duties, therefore such past experience should be indicated in making application.

Appointment will be made in either the Federal Civil Service or the U.S. Public Health Service Commissioned Corps. Salary and benefits will be commensurate with qualifications and method of appointment.

Applications will be accepted until June 30, 1984. Please address inquiries to:

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Clinical Center Personnel Office
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**DESCRIPTION:** Thalous Chloride Ti 201 is supplied in isotonic solution as a sterile, nonpyrogenic diagnostic radiopharmaceutical for intravenous administration. Each unit dose contains 1 milliliter and each milliliter contains 2 millcuries of Thalous Chloride Ti 201 at calibration time. pH adjusted to 5.0–6.0 with hydrochloric acid and/or sodium hydroxide. Contains no bacteriostatic preservative. Thalium Ti 201 is cyclotron produced and is essentially carrier-free. Radionuclidic purity at calibration time is at least 90.0% with less than 1.0% Thallium Ti 200.1%, Thallium 202 and 0.2% Lead 203. The concentration of each radionuclidic contaminant changes with time.

**INDICATION AND USAGE:** Thalous Chloride Ti 201 may be used in cardiac imaging to define the extent of myocardial infarction. It may also be useful in conjunction with exercise stress testing as an adjunct in the diagnosis of ischemic heart disease (atherosclerotic coronary artery disease).

**CONTRAINDICATIONS:** None known.

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

**PRECAUTIONS**

- **General:** Do not use after the expiration time and date (4 days after calibration time) stated on the label.
- Discard vial after single use. Do not use if contents are turbid.
- The patient dose should be measured by a suitable radioactivity calibration system immediately prior to administration.
- Ideally, examinations using radiopharmaceuticals, especially those elective in nature on a woman of childbearing capability should be performed during the first few (approximately 10) days following the onset of menses.

- Single dose vials for easy record keeping—one vial per patient.
- The most complete line of up-to-date radiopharmaceuticals in the industry.

Take advantage of us. Let MPI be your prime supplier.

*Activity at calibration time: 2.0 mCi at 10 p.m. Pacific Time.
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Thalous Chloride Ti 201 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.

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

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No long-term animal studies have been performed to evaluate carcinogenic potential, mutagenicity potential, or whether Thalous Chloride Ti 201 affects fertility in males or females.

**Pregnancy Category C**

Animal reproduction studies have not been conducted with Thalous Chloride Ti 201. It is not known whether Thalous Chloride Ti 201 can cause fetal harm when administered to a pregnant woman or can affect reproduction capacity. Thalous Chloride Ti 201 should be given to a pregnant woman only if clearly needed.

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It is not known whether this drug is excreted in human milk. Because many drugs are excreted in human milk, caution should be exercised when Thalous Chloride Ti 201 is administered to a nursing woman.

**Pediatric Use**

Safety and effectiveness in children have not been established.

**ADVERSE REACTIONS:** Adverse reactions related to use of this agent have not been reported to date.

**HOW SUPPLIED:** Thalous Chloride Ti 201 is supplied as a sterile, nonpyrogenic, isotonic solution in unit dose vials containing 1 milliliter. Each milliliter contains 2 millcuries of Thalous Chloride Ti 201 at calibration time. Contains no bacteriostatic preservative.