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CINE 200: The image-data processor for cameras and scanners that speaks your language.

Acquisition, recall and processing operations — all on a single console — with single-button, clearly-labeled controls. This unique CINE 200 feature allows rapid selection of parameters and functions without the use of a teletype or similar I/O device. Elimination of computer access codes permits ordinary language operation by any radioisotope technologist.

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CINE 200 from Intertechnique — just about the most versatile image-data processor ever developed. Sold and serviced in the U.S. exclusively by Raytheon Company. For complete information, contact Raytheon Company, Medical Electronics, Fourth Avenue, Burlington, Massachusetts 01803. 617-272-7270.
The NEN Stannous Glucoheptonate Kit provides lyophilized stannous glucoheptonate to be used in preparing technetium Tc 99m stannous glucoheptonate agent by the injection of technetium pertechnetate sodium Tc 99m. The resulting diagnostic agent, upon intravenous administration, is being studied for its usefulness for kidney and brain imaging and perfusion studies.

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Toshiba's Jumbo Gammacamera, model GCA-202, has an effective field of view 350mm in diameter. Other features include:

* The ability to image a large organ alone or in combination with smaller organs.
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The Jumbo Gammacamera and its Whole Body Adaptor make whole-body-imaging possible in only ten minutes. Other advantages:

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Multi-area dosimeter. 4 main readout areas (1, 2, 3, 4) and 4 backup areas (1a, 2a, 3a, 4a).

Rear view of dosimeter with identification numbers. 2 dots insure dosimeter is properly inserted in reader.

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  - 30% LiF-7 for environmental monitoring.
  - 30% Ca SO₄:Dy for environmental monitoring.
    The Ca SO₄:Dy phosphor has an extremely high sensitivity and low fading characteristic making it ideal for environmental monitoring.
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Radioimmunoassay (RIA)*

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Radioimmunoassay (RIA)*

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Abbott also offers the full family of thyroid radioimmunoassays for hormonal T-3, T-4 and TSH testing*. They—like Quantisorb-125 and Triosorb M-125—are quality thyroid diagnostic tests. So the next time you’re thinking of a thyroid test to use, look to Abbott—the innovators in in-vitro diagnostics—for a complete spectrum of thyroid diagnostic test kits.

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Diagnostics Division
North Chicago, IL 60064
Leon Corporation's new Whole-Body Imager, now in clinical operation, makes whole-body and organ imaging more informative for the clinician, more productive for the hospital, more comfortable for the patient, and simpler for the technician. Here's how:

Unique opto-electronic design eliminates the cross-body movement of a scanner head. The whole-body image is produced by a one-time, slow, noiseless sweep of the 24-inch wide crystal array from head to foot of the patient. Time to scan this 24-inch by 76-inch area is reduced to as little as five minutes (adjustable to 40 minutes, maximum). The patient spends less time on the couch and is relieved of the anxiety caused by a rapidly moving scanner head.

Large crystal area (109 square inches) gives high information density and reproducible results for selected scan times. Display and recording options include: video screen; 8" x 10" x-ray film; Polaroid film; magnetic disk record with playback; keyboard entry of patient data; continuous digital readout of
A Quiet Revolution in Whole-Body Imaging

count density; video magnification of selected image areas. Controls are few and simple; set-up time is minimal; technicians can learn to use the equipment on the day it's installed.

For technical specifications, clinical data, price and delivery information, call or write:

Cleon Corporation 15 Tech Circle, Natick, Massachusetts 01760 / Telephone 617/235-7708
Connect Elscint’s new color nuclear camera... and get possible... it’s that easy to use and that definitive!

Six rectangular regions of interest defined for brain flow study.

Flooded field image before and after uniformity correction.

Dynamic study images of clearance by transplanted kidney.

Multicolor Histogram time function display of cardiac study over five regions of interest (96 frames).

Bolus of $^{99m}$ Tc-Albumin entering right atrium (left frame) and leaving (center frame). On the right, superimposed dual color display of the two frames.

Elscint’s advanced image processor displays static, dynamic or time function studies on a large color or black and white TV screen with color directly related to, and continuously updated by, radiation count levels. Display resolution is exceptional as a result of several built-in image enhancement features. This powerful system receives, processes and stores images with unexcelled speed in a broad variety of modes of operation. Its availability means that now you can see and do things never before possible in this field. But, even with its sophistication, Elscint has made it easy to use. No programming or computer knowledge is required and the simple operation is mastered by any technologist in 2-3 hours. Thus, you spend less time obtaining patient data and more time studying it. Look over the Image Processor’s many features then write or call our nearest facility for detailed information.
image processor to your the most precise patient data

ADVANCED DATA PROCESSING AND LARGE COLOR DISPLAY FACILITATE PRECISE PATIENT DIAGNOSIS.
Processed count information is displayed in 8 colors or monochrome shades of black. To maximize image resolution and permit study of small details the Elscint Image Processor offers several image enhancement features:
- Two unique calibration techniques correct image artifacts resulting from non-uniformities in the electronics of the camera.
- Statistical variations in the image can be reduced by an on-line smoothing function.
- Images at low count rates can be strengthened by adding as many as 99 frames to the display.
- Color elimination pushbuttons blank colors for isocount line determination.
- Background subtraction clarifies image appearance.
- In dual-isotope studies, off-line subtraction can be performed by pushbutton with the process in view on the TV screen. All these features add up to the sharpest, most accurate, easy-to-read display of patient count data.

MODULAR DESIGN PERMITS SYSTEM EXPANSION AT LOW COST.
Elscint's Image Processor is comprised of a camera interface, the videodisplay and one of three data processors. The lowest priced processor is designed for static or slow dynamic studies. The two more complex systems offer the added capability to perform fast dynamic studies plus several additional modes of operation. The most advanced of these two systems enables complete time function data analyses to be done. It includes a built-in mini-computer (8K, 16 bit; 32 bit optional) and a complete battery of clinical programs. Time function data are displayed on a scope and printed out on a teletype or optional line printer. Thus, with no programming knowledge you can study regional blood flow, cardiac output, mean pulmonary transit time, clearance rates, rheography, and so forth. All systems are fully compatible with one another and each can be expanded with any of several available options to give you supplementary image processing capability as required.

LARGE FAST-ACCESS MEMORY SPEEDS IMAGE RETRIEVAL.
Up to 200 discrete (400 optional) images are received and stored on a magnetic disc at a rate of up to 10 frames per second. Average search and readout time for stored images is only 5 ms in forward or reverse — a real timesaving feature in multiple frame reviews. Dual disc memory cartridges speed date manipulation and leave original data untouched. Frame acquisition can be by preset limits or by physiological triggers which can also be used for time delay photographs.

SIMPLE PUSHBUTTON OPERATION FREES YOU FOR DATA ANALYSIS.
Use of the Elscint Image Processor may be learned easily in just a few hours by any of your technologists. Built-in safetyguards prevent accidental loss of data and lighted buttons keep track of all processing underway. Image enhancement activities are noted with lighted indicators for each frame. Study and patient data for each image is easily entered and is thereafter displayed concurrently with the image.

SIX REGIONS OF INTEREST MAXIMIZE DATA EVALUATION.
Six fully-positionable overlapping areas which appear on the screen, plus output from two external scalars may be selected for further digital evaluation. Time function histograms for all regions are displayed simultaneously, each in a different color.

SYSTEM OPTIONS EXTEND APPLICATIONS.
A computer interface is available, an optional larger capacity magnetic disc extends the system's memory to 400 image frames, an optional twin memory is available for dual isotope studies, a telephone interface permits communication with similar remote processors and a camera facilitates obtaining permanent records of displays.

Note: Information given refers to several different Image Processor Systems. All models do not include all features described.

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- Simple selection of both delay and gate duration.
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- May be used with any ECG machine which provides the standard oscilloscope output jack.
- Simple user installed device will not interfere with normal gamma camera operation.
- Full one year warranty plus factory service.

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If I do not want to keep the Cardiographic Gate I will send it back within 15 days and you will return my check or purchase order.
□ Please send me more information. □ I do not have an ECG Machine, send information on a suitable machine.

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Oxford® StaT₃ and StaT₄: Radioactive Thyroid Evaluations.

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- Oxford controls available separately.
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**Easy, reproducible procedures!**

**StaT₃ — 20 Minutes**
3. Mix well and let stand 10 minutes, then centrifuge.
4. Count the liquid phase inside the test unit, using a gamma counter.

**StaT₄ — 40 Minutes**
2. Add 3 ml extractant, using the reverse mode of an Oxford® MACRO-SET Transfer-Pipetting System. Do not mix.
3. Centrifuge 5 minutes and invert.
4. Decant and discard liquid portion.
5. Add 3 ml adsorbent, using the reverse mode of the Oxford® MACRO-SET instrument.
6. Mix well on vortex mixer. Let stand 10 minutes at room temperature.
7. Centrifuge 5 minutes and invert.
8. Count the liquid phase inside the test unit, using a gamma counter.

---

**The Timesavers' Aids**
2. Oxford® SAMPLER® Model Q System.
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New diphosphonate bone scanning agent offers high target to non-target ratio, rapid blood clearance

Your confidence in detecting bone lesions depends on the ability of the imaging agent you use to deliver consistently excellent scans. Three hours post injection, 40-50% of $^{99m}$Tc-labeled OSTEOSCAN has been taken up in the skeleton. Only 6% remains in the blood. The remainder is excreted in the urine. Together with the agent's low soft tissue uptake, the high target to non-target ratio and rapid blood clearance result in clear delineation of skeletal lesions.

OSTEOSCAN consistently provides high labeling efficiency (greater than 95%*). Because of its stable P-C-P bond, OSTEOSCAN resists in vitro hydrolysis and in vivo dissociation. This helps to minimize soft tissue uptake that can impair diagnoses.

**Result:** Consistently excellent scans—and confidence that detectable bone lesions will be imaged.

For product and ordering information, call Mr. Arnold P. Austin at (513) 977-8547 or write: Procter & Gamble, Professional Services Division, P.O. Box 171, Cincinnati, Ohio 45201.

*Thin Layer Chromatography (Cellulose acetate/85% methanol)

---

**A.** 15 mCi $^{99m}$Tc-OSTEOSCAN
Scanned 3.5 hr post injection
Low-Energy, All-Purpose Collimator
Speed: 32 cm/min, Length: 173 cm, Width: 60 cm
Anterior: 834,518 counts/1070 sec (17.8 min)
Comments: Metastatic meningioma

**B.** 15 mCi $^{99m}$Tc-OSTEOSCAN
Scanned 4 hr post injection
High Sensitivity Collimator
Speed: 32 cm/min, Length: 170 cm, Width: 60 cm
Posterior: 861,792 counts/1054.3 sec (17.6 min)
Comments: Cancer of breast. Polaroid image; posterior view taken with detector under table

**C.** 15 mCi $^{99m}$Tc-OSTEOSCAN
Scanned 4 hr post injection
Low-Energy, All-Purpose Collimator
Speed: 48 cm/min, Length: 175 cm, Width: 60 cm
Anterior: 927,833 counts/737.4 sec (12.3 min)
Comments: Patient being treated for a lymphoma

(Above scans made with Searle Radiographics Pho/Gamma Scintiscan*)
OSTEOSCAN®
(5.9 MG DISODIUM ETIDRONATE
0.16 MG STANNOUS CHLORIDE)
SKELETAL IMAGING AGENT

See following page for brief summary of package insert.
PROCTER & GAMBLE
OSTEOSCAN
(5.9 MG DISODIUM ETIDRONATE 0.16 MG STANNOUS CHLORIDE)
SKELETAL IMAGING AGENT

Brief summary of Package Insert. Before using, please consult
the full Package Insert included in each kit.

DESCRIPTION
Each vial of OSTEOSCAN contains 5.9 mg disodium etidronate
and 0.16 mg stannous chloride as active ingredients. Upon addition
of ADDITIVE-FREE 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 ml 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 admin-
istration, patients should be encouraged to drink fluids. Patients
should void as often as possible after the 99mTc-labeled OSTEO-
SCAN injection to minimize background interference from accu-
mulation 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, con-
sistent 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 three (3) 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.
The radioactive sources and phantom of the AECL Gamma Camera Calibration Kit provide an effective means of routinely checking the vital characteristics of your camera system.

Sources are safe, light and easy to carry in the attractive carrying case provided.

Sources are approved for licensing in U.S.A. and Canada.

**FLOOD FIELD SOURCE**
A rapid and convenient way of making the daily check of your camera response. It is a flat plastic disc 12 inches in diameter containing 3 mCi of Gadolinium-153 (100 KeV photopeak, 242 day half life) dispersed uniformly to give an output better than ±5% over the whole surface.

**BAR PHANTOM**
Used with a Flood Field Source to provide an efficient check of the inherent and system resolution of your camera system. It can also be used to check image size and linearity.

The Bar Phantom consists of four groups of lead bars embedded in a plastic holder 13.5 inches square and 0.37 inches thick. The bars are 0.125 inches thick and 0.500, 0.375, 0.250 and 0.187 inches wide respectively. The spacing between the bars is equal to the width of the bars for each group.

**RESOLUTION REFERENCE SOURCE**
A convenient way of checking the resolution of your gamma camera and scanner. The source contains a grid of radioactive lines which vary in spacing. Most cameras should be able to resolve the finest part of the grid. By adjusting the distance of the source from the collimator, the depth resolution of your camera can also be measured. Total activity of the source is 3 mCi of Gadolinium-153.

---

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Volume 15, Number 8 23A
#1...Multi-Imager System

The complete system for static, dynamic, whole body, and physiological function gated imaging.

Three film size formats for optimum imaging versatility:
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5"x7"
11"x14"

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study: Tc 99 m pertechnetate renal flow
exposure: 0.8 seconds/frame
mode: 16 frame dynamic recorded on 11"x14" X-ray film

Matrix Instruments

Journal of Nuclear Medicine
Mail coupon to receive actual size sample studies.

The Multi-Imager System offers:
- Up to 36 image frames on a single sheet of film
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- Electronic frame advance without any moving mechanical components
- Electronic frame advance dead time of less than one μs
- Film cost savings of up to several thousand dollars per year
- Compatibility with all scintillation cameras

The Multi-Imager System is designed for use with scintillation cameras to provide dynamic, static, whole body, and physiological function synchronized imaging. The system operates by altering the CRT deflection signals, changing the size, location, and duration of the image on the display scope. Frame advance is achieved electronically, yielding sequential exposures with essentially no data loss.

The Cardiac Gate accessory records both end-systolic and end-diastolic images simultaneously, using a two frame format. The Multi-Imager System alternates exposures between the two frames synchronous with the patient’s cardiac cycle. The Cardiac Gate is a complete ECG instrument, including a heated stylus strip chart recorder that records both the cardiogram and the exposure gates.

The Respiratory Gate accessory records both inspiration plateau and expiration plateau images simultaneously, using a two frame format. The Multi-Imager System alternates exposures between the two frames synchronous with the motion of the organ being imaged. The Respiratory Gate operates without attaching any sensors to the patient. Either the gamma camera split crystal mode or areas of interest are used to sense organ motion.

Cardiac and respiratory gating can be combined to simultaneously record in a four frame format all four possible combinations: end-systole/inspiration plateau, end-systole/expiration plateau, end-diastole/inspiration plateau, and end-diastole/expiration plateau.
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**Sensitivity and Specificity**

Sensitivity refers to the smallest amount of antigen that is distinguishable from no antigen. The specific activity of the radioactive antigen is most important to the sensitivity of the assay. MDI utilizes a high specific activity antigen, thereby reducing the mass needed for reaction with the antibody, and increasing the sensitivity of the assay.

Each MDI antibody is highly specific, thereby minimizing the problem of cross-reactivity. The cross-reactivity of a typical lot of MDI testosterone first antibody is shown in the table below.

<table>
<thead>
<tr>
<th>Steroid</th>
<th>Relative Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Testosterone</td>
<td>1.000</td>
</tr>
<tr>
<td>Andosterone</td>
<td>0.0003</td>
</tr>
<tr>
<td>Progesterone</td>
<td>0.0001</td>
</tr>
<tr>
<td>Hydrocortisone</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Cortisone</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>0.000059</td>
</tr>
<tr>
<td>Dihydrotestosterone</td>
<td>0.31</td>
</tr>
<tr>
<td>19-Nor-Testosterone</td>
<td>0.15</td>
</tr>
</tbody>
</table>

Eliminates chromatography prior to assay

High specificity of MDI antibodies makes chromatography of the test sample prior to assay unnecessary. Values are compared from replicate MDI assays of the same testosterone samples with and without thin layer chromatography:

**Testosterone Values of Pooled Sera**

Correlation of Values With and Without Thin Layer Chromatography

![Graph](image)

A further advantage: MDI double antibody procedures are highly reliable and reproducible. Once equilibrium is attained, reactions are not time dependent... unlike some R.I.A. procedures demanding precise timing.

Customer Service Information:

**MICROMEDIC DIAGNOSTICS INC.**

1820 E. LINCOLN AVENUE
FORT COLLINS, COLORADO 80522
TEL. (303) 484-4480

Produced by Micromedic Diagnostics, Inc. for Micromedic Systemes, Inc., a subsidiary of Ruhm and Haas Company.

Ordering Information:

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Tel. (215) 592-3582.
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**Renin Activity**

**Digoxin**

**Cortisol**

**Digitoxin**

GammaCoat -- the new generation of antibody-coated tube radioimmunoassay kits that reduce assay time dramatically and free your more highly skilled technicians for other tasks. The method eliminates error sources such as time, centrifugation, partial aspiration or decantation.

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All in a day's work from start to answers. Angiotensin I generation at a controlled 6.0 pH -- three hour assay in the coated tube.

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Total assay time -- one hour. Entire procedure is carried out in 5 simple steps. A special additive minimizes serum protein interferences.

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**125I Digitoxin**

The first solid phase digitoxin assay. One hour assay time. A digitoxin specific antibody permits the assay of digitoxin in the presence of digoxin.

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Tomorrow’s scanning loads make the Maxiscan system worth looking into today.

If you’re thinking of doing whole body scans with a gamma camera and attachments, beware. What begins as 2 to 3 whole body scans per week soon accelerates to 3 or more per day. With the camera tied up with these scans, other exams must be delayed, and department scheduling grossly disrupted.

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Here's the information hospitals are getting with Maxiscan...
Hospitals report scanning performance like this from the Maxiscan system:

These reproductions of scans, from clinical examinations, illustrate the range of diagnostic information possible with Maxiscan and the Videodisplay Processor. A GE motion picture demonstrates the full capability of both units. Ask your GE representative to schedule a desk top showing, at your convenience.

These three images, from a single whole body scan, demonstrate how manipulation of data stored in the VDP electronic memory can enhance desired details and aid diagnosis. The isotope used was 99mTc Polyphosphate. At left, an anterior view displays raw, unmanipulated data from the memory. At right, smoothed data is shown with a Y axis electronic slice through the area of suspicion. The count profile superimposed over this image and shown separately, center, confirms greater uptake on the right side. The photorecorded image showed only a suspicion of greater isotope uptake.

In a case of suspected pericardial effusion, a transmission scan (left) of the chest was obtained using an Iodine 131 source. An emission scan (center) of the same region was simultaneously obtained with the same probe, 15 minutes after an intravenous injection of 99mTc labeled albumin. The heart and liver are outlined. Note how the intracardiac activity (central area of center scan) fails to fill the large mediastinal shadow (central blue area of left scan). This discrepancy, between heart size and that of the mediastinum, is more easily seen when these two scans are superimposed (right); a technic easily accomplished on the VDP. The resulting diagnosis, a large pericardial effusion which appears to be predominantly left-sided, was confirmed by the aspiration of 1800 ml. of fluid from an encysted pericardial effusion.

Scans courtesy of Dr. M. J. Chamberlain, University Hospital, London, Ontario.

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Volume 2, Number 2
(JUNE 1974)

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Letter from the Editor
Glenn Isserstedt

A Table for Quickly Determining Planes of Focus for a Scintillation Tomocamera
Michael D. Sinclair and Vincent L. McManaman

Gamma Camera Photographic Systems: A Cost Comparison
Lance H. Rose and Lewis W. Gumerman

Quality Control in Nuclear Medicine Procedures
Frederic Lovegrove, James Langan, and Henry N. Wagner, Jr.

A Review of Neutron Activation Analysis in Medicine
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PSRO—Its Challenge and Opportunity
Henry E. Simmons

Review of Nuclear Medicine Technology Training in Ontario
Lloyd B. Schneider

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CONTRAINDICATIONS: At present there are no known contraindications to the use of this product.

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Idiopathic examinations using radiopharmaceuticals, especially those effective in nature, of a woman of childbearing capability, should be performed during the first few (approximately 10) days following the onset of menses.

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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.

Note Macrotect (Aggregated Albumin [Human]) is not radioactive. However, after 99mTc is added adequate shielding of the resultant preparation should be maintained.

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Guest faculty will include Gopal Subramanian, Ph.D., Upstate Medical Center, Syracuse, New York; Rodney Ice, Ph.D., University of Michigan Medical Center; and Walter Wolfe, Ph.D., University of Southern California.

Additional information and applications may be obtained by contacting: H. J. Dworkin, M.D., Chief, Department of Nuclear Medicine, William Beaumont Hospital, Royal Oak, Michigan 48072.

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Volume 15, Number 8
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The TechneScan PYP reaction vial contains all of the non-radioactive agents required to prepare a sterile, non-pyrogenic solution of Technetium Tc 99m Stannous Pyrophosphate (TechneScan PYP Tc 99m) for intravenous injection. Each 10-milliliter reaction vial contains a total of 15.4 milligrams of stannous pyrophosphate in the lyophilized state in a nitrogen gas atmosphere. The pH of the solution is adjusted with hydrochloric acid prior to lyophilization.

**INDICATIONS**

TechneScan PYP Tc 99m 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 electively 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 TechneScan PYP Kit must be maintained at refrigerator temperature until use.

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

Sodium pertechnetate Tc-99m solutions containing an oxidizing agent are not suitable for use with the TechneScan PYP Kit.

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

The TechneScan PYP Tc 99m should not be used more than six hours after preparation.

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Both prior to and following TechneScan PYP Tc 99m administration, patients should be encouraged to drink fluids. Patients should void as often as possible after the TechneScan PYP Tc 99m 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 assure minimum radiation exposure to the patient, consistent with proper patient management, and to assure minimum radiation exposure to occupational workers.

**ADVERSE REACTIONS**

None.

**DOSEAGE AND ADMINISTRATION**

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Roche announces a significant contribution to the management and diagnosis of cancer

CEA-ROCHE Carcinoembryonic Antigen assay
In 1974 the estimated incidence of new internal cancer cases in the United States will reach approximately 655,000 persons. Moreover, within this year 355,000 Americans will die of malignancy, a large portion of which is potentially curable.\(^1\) Survival trends are inversely related to the extent of the disease—the less involvement, the better the chances of therapeutic success.\(^1,2\)

This problem of detecting cancer has long absorbed researchers. Now, ten years after the basic investigations were begun, the blending of the sciences of immunology and radiochemistry has resulted in…

**CEA-ROCHE\(^*\)**

**Carcinoembryonic Antigen assay**

A new *in vitro* test to aid in the management and diagnosis of cancer

---

**the discovery of carcinoembryonic antigen**

The term carcinoembryonic antigen (CEA) was first used in 1965 by Gold and Freedman of the Montreal General Hospital to describe a glycoprotein which is a constituent of the glycocalyx of embryonic entodermal epithelium; it is also present in extracts of carcinoma cells.\(^3,6\)

The embryonic gene responsible for CEA synthesis is expressed by many carcinoma cells; however, preliminary experiments suggest that the amount of CEA in different carcinomas varies, indicating gene expression is not an all-or-none phenomenon.\(^2,8\)

As the carcinoma disrupts the normal tissue architecture, cells penetrate the underlying tissue, and glycocalyx components including CEA enter the vascular system.

---

**Diagrammatic representation of microscopic section of fetal colon. CEA is present in glycocalyx which faces lumen of colon.**

---

**a long-term commitment to cancer research**

Roche has long had a serious commitment to cancer research which has resulted in the development of such important chemotherapeutic agents as Fluorouracil (5-fluorouracil), FUDR (fluorouracil), Efudex\(^\text{®} \text{(fluorouracil)}\) and Matulane\(^\text{®} \text{(procarbazine HCl)}\).

Working in conjunction with the original Canadian researchers and with investigators at over 100 leading medical centers and research institutions throughout the United States, England and Canada, Roche Research has adapted, refined and evaluated this test for carcinoembryonic antigen (CEA) found in a variety of cancerous and noncancerous states.

CEA-ROCHE, a radioimmunoassay, employs the Hansen Z-gel method which is capable of detecting and measuring plasma levels of CEA in the nanogram (one billionth of a gram) range. The sensitivity of the assay has been shown to be 0.5 ng/ml of CEA.\(^9\)
Using the CEA-ROCHE assay, elevated CEA titers have been detected in carcinomas of entodermal and nonentodermal origin; in noncarcinomatous malignancies; in such nonmalignant diseases as emphysema, inflammatory bowel disease and colorectal polyps; and in some healthy individuals, particularly chronic smokers. The following data were derived from these studies.\(^1\)

<table>
<thead>
<tr>
<th>Patients</th>
<th>CEA Titer Ranges</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of Pts.</td>
</tr>
<tr>
<td>Healthy Subjects Nonsmokers</td>
<td>892</td>
</tr>
<tr>
<td>Former smokers</td>
<td>235</td>
</tr>
<tr>
<td>Smokers</td>
<td>620</td>
</tr>
<tr>
<td>Colorectal Carcinoma</td>
<td>544</td>
</tr>
<tr>
<td>Pulmonary Carcinoma</td>
<td>181</td>
</tr>
<tr>
<td>Pancreatic Carcinoma</td>
<td>55</td>
</tr>
<tr>
<td>Gastric Carcinoma</td>
<td>79</td>
</tr>
<tr>
<td>Breast Carcinoma</td>
<td>125</td>
</tr>
<tr>
<td>Other Carcinoma</td>
<td>343</td>
</tr>
<tr>
<td>Noncarcinoma Malignancy</td>
<td>228</td>
</tr>
<tr>
<td>Nonmalignant Disease</td>
<td></td>
</tr>
<tr>
<td>Benign Breast Disease</td>
<td>115</td>
</tr>
<tr>
<td>Rectal Polyps</td>
<td>90</td>
</tr>
<tr>
<td>Cholecystitis</td>
<td>39</td>
</tr>
<tr>
<td>Alcoholic Cirrhosis</td>
<td>120</td>
</tr>
<tr>
<td>Active Ulcerative Colitis</td>
<td>146</td>
</tr>
<tr>
<td>Pulmonary Emphysema</td>
<td>49</td>
</tr>
</tbody>
</table>
CEA-ROCHE as an aid in the management of cancer

When used in conjunction with other tests in the diagnostic armamentarium, this highly sensitive and quantitative radioimmunoassay has been shown to be useful as an aid in the management of the cancer patient

• by monitoring the effects of surgery, radiotherapy and chemotherapy,
• by providing a basis for re-evaluating therapy,
• by determining the probable presence of metastatic disease,
• by providing an early indication of the recurrence or progression of malignant disease.

Decreases in CEA titers were reported to be associated with effective therapy.\(^{12-17}\) Serial determinations of CEA proved to be of value in assessing the condition of the patient during therapy.\(^{13-16,18}\)

Persistent increases in titer were associated with a lack of response to therapy or a recurrence of disease; in some cases, the titer rise preceded clinical signs by as much as three months.\(^{19,20}\) Except for primary pancreatic and colorectal carcinoma, titers above 20 ng/ml were, with very rare exceptions, associated with the presence of metastatic disease.\(^{20}\) However, metastatic disease may also occur when the CEA titer is below 20 ng/ml.

CEA-ROCHE as an aid in the diagnosis of cancer

The CEA-ROCHE assay has also been shown to be of value as an aid in cancer diagnosis. When used as an adjunct to other tests and procedures, the CEA-ROCHE assay has proven to be most useful

• in patients with signs, symptoms and clinical history suggestive of a diagnosis of cancer,
• in patients with such diseases as ulcerative colitis, pulmonary emphysema, alcoholic cirrhosis and gastric and duodenal ulcers in which the risk of developing cancer is greater than in the corresponding normal population.

These nonmalignant inflammatory diseases in their active state may give rise to CEA titers above 2.5 ng/ml. These titers usually drop below 2.5 ng/ml when these diseases are in remission.\(^{17,20,22}\)

In a special study of 883 patients, cigarette smoking with titer elevations were associated with atypical sputum cytology.\(^{23}\) Decreases in CEA titer often occurred within 30 to 60 days after cessation of smoking.

It must be stressed that test results and data arrived at using the CEA-ROCHE assay cannot be compared with results obtained by any other method or reagents.

limitations of CEA-ROCHE

CEA-ROCHE is not recommended as a screen to detect cancer. CEA titers are not an absolute test for malignancy, nor for a specific type of malignancy. In the management and diagnosis of the patient suspected or known to have cancer, all other tests and procedures must continue to be given emphasis. CEA titers less than 2.5 ng/ml are not proof of the absence of malignant disease.
representative case history of patient being treated for malignancy without known metastases

A 42-year-old woman presented with a squamous-cell anal carcinoma. CEA-ROCHE level at time of surgery was 0.6 ng/ml. CEA titer rose to 12.6 ng/ml 10 days later and was still 9.8 ng/ml 20 days after surgery. Upon discharge three months later CEA level was 4.1 ng/ml and there was no clinical evidence of disease. Six weeks later titer had risen to 8.8 ng/ml and then to 9.3 ng/ml after another 30 days without any clinical sign of disease. Patient was hospitalized three months later and biopsy was positive for recurrence of cancer. In spite of initial low CEA value preoperatively, titer levels accurately reflected patient’s condition and gave evidence of recurrence some 4 months prior to clinical signs.

representative case history of patient being treated for malignancy with metastases

Chemotherapy was initiated in a 37-year-old man presenting with synovial sarcoma and metastases to the lungs. The first CEA-ROCHE titer was performed three months later. Titer level was 6.2 ng/ml. In six weeks CEA titer dropped to 3.0 ng/ml and a 50% reduction of tumor in the right upper lobe of the lung was noted. One month later titer rose to 4.6 ng/ml and there was a reappearance of a left upper lung lesion.

Chemotherapy was reinstituted and assays run at 2, 3, 5, 12 and 20 weeks. There was no change in radiologic appearance of metastases. Patient gained weight and worked regularly. The CEA titers during this period were 3.8, 0.0, 0.5, 0.0 and 4.6 ng/ml respectively. One and one-half weeks later, CEA titer rose to 10.0 ng/ml and a review of x-ray films revealed appearance of new lesions.

The above representative case histories, using actual CEA-ROCHE titer readings and timing of assays, illustrate the correlation of results with published clinical studies.
CEA-ROCHE
Carcinoembryonic Antigen assay
A significant contribution to the management and diagnosis of cancer

availability of CEA-ROCHE

The CEA-ROCHE assay may be obtained through your hospital, institutional and private clinical laboratory obtaining the necessary reagents and procedure in a kit developed by Roche Diagnostics or as a direct reference service of Roche Clinical Laboratories, Inc.

And, as with all our pharmaceutical agents, this assay may be obtained for your patients who are unable to afford it through the Roche Indigent Patient Program.

comprehensive information available

Because of the clinical significance of CEA-ROCHE and the critical area of medicine involved, a comprehensive Clinical Monograph containing in-depth information on the nature of the assay, its applications and interpretation as well as an extensive summary of the collaborative study has been prepared.

It is recommended that this brochure be consulted before ordering or interpreting the CEA assay. You may obtain a copy by completing and returning the coupon below.

references

1. American Cancer Society: 1974 Cancer Facts and Figures
7. Go VLW: Data on file, Hoffmann-La Roche Inc, Nutley NJ
9. See Package Insert or Physicians' Desk Reference for complete product information
11. Third Conference, Carcinoembryonic Antigen (CEA) Test Collaborative Study, Hoffmann-La Roche Inc, Nutley NJ, April 21, 1973
20. Data available on request from Hoffmann-La Roche Inc, Nutley NJ

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| Isolab, Inc. Akron, Ohio | 26A |
| LKB Instruments, Inc. Rockville, Md. | 87A |
| 3M Company St. Paul, Minn. | 44A, 45A |
| Mallinckrodt/Nuclear St. Louis, Mo. | 36A, 68A, 69A, 70A |
| Matrix Instruments New York, N.Y. | 24A, 25A, 72A |
| Medi-Physics, Inc. Emeryville, Calif. | IFC, 1A, 731 |
| Medix, Inc. Palatine, Ill. | 43A |
| Micromedic Diagnostics, Inc. Fort Collins, Colo. | 27A |
| New England Nuclear Boston, Mass. | 4A, 38A, 47A, 75A |
| Ohio-Nuclear, Inc. Salon, Ohio | 46A, 63A |
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| Packard Instruments Co. Downers Grove, Ill. | 71A, 73A |
| Picker Corp. Mentor, Ohio | 54A, 55A |
| Proctor & Gamble Cincinnati, Ohio | 20A, 21A, 22A |
| Radx Corp. Houston, Tex. | 29A, 65A |
| Raytheon Co. Burlington, Mass. | 2A |
| Riverside Bio-Engineering Riverside, Calif. | 18A, 76A |
| Roche Diagnostics Nutley, N.J. | 77A, 78A, 79A, 80A, 81A, 82A |
| Searle Analytic, Inc. Des Plaines, Ill. | 74A |
| SNM Placement New York, N.Y. | 60A, 62A, 64A, 66A |
| E. R. Squibb & Sons, Inc. Princeton, N.J. | 48A, 49A |
| Teledyne Isotopes Westwood, N.J. | 10A, 11A, 59A |
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