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The in vitro test unmatched for reproducibility, convenience and accuracy.

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See next page for brief summary.
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- on the basis of 350 case reports from 11 investigators, the technetium-sulfur colloid prepared in this manner was found to be highly satisfactory, and produced liver and spleen scans of good diagnostic value
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- the colloid contains no dextran...no rhenium nor other added cation material

Reference: 1. Unpublished data on file at The Squibb Institute for Medical Research.

TECHNETOPE II (TECHNETIUM 99m) STERILE GENERATOR provides a means of obtaining a sterile, non-pyrogenic supply of Technetium 99m (99mTc), a versatile scanning agent that can be administered intravenously or orally. 99mTc, the short-lived daughter (T 1/2 = 6 hours) of Molybdenum 99 (99Mo), T 1/2 = 67 hours), is obtained from the generator by periodic elution. The amount (in millicuries) of 99mTc obtained in the initial elution will depend on the original potency of the generator, while the activity obtained from subsequent elutions will depend on the time interval between elutions.

Warning: Proper radiation safety precautions should be maintained at all times. The column containing 99Mo need not be removed from the lead shield at any time. The radiation field surrounding an unshielded column is quite high. Solutions of 99mTc withdrawn from the generator should always be adequately shielded. The early elutions from the generator are highly radioactive. For radiation protection, a lead shield for the collecting vial is included with Technetope II. Important: Since material obtained from the generator may be intended for intravenous administration, aseptic technique must be strictly observed in all handling. The stops of the eluent bottle, the elution tube, the evacuated collecting vial, and both rubber closures in the generator column should be swabbed with a suitable germicide before entry. All entries into the generator column must be made aseptically. Only the eluent provided should be used to elute the generator. Use a fresh milking tube and collecting vial for each elution; sufficient equipment is provided for this purpose. All equipment used to collect or administer the 99mTc must be sterile.

Do not administer material eluted from the generator if there is any evidence of foreign matter.

Contraindications: Radiopharmaceuticals should not be administered to pregnant women or patients under 18 unless the indications are very exceptional. Since Technetium may be excreted in human milk, it should not be administered to nursing mothers.

TESULOID (TECHNETIUM 99m-SULFUR COLLOID) KIT contains 5 vials (3 cc each) Sterile Sulfur Colloid Reaction Mixture, 5 Unimatic® Disposable Syringes (2 cc each) containing Sterile 0.25N Hydrochloric Acid Solution (Syringe A), and 5 Unimatic Disposable Syringes (2 cc each) containing Sterile Buffer Solution (Syringe B). Each cc. of the Sterile Colloid Reaction Mixture provides 4 mg. sodium thiosulfate, 3 mg. gelatin, 8.5 mg. potassium phosphate, and 0.93 mg. disodium edetate. Each cc. in Syringe A provides 9 mg. hydrochloric acid. Each cc. in Syringe B provides 35 mg. sodium biphosphate and 10 mg. sodium hydroxide.

Warnings: The contents of the syringes (A and B) are intended only for use in the preparation of the 99mTc-S colloid and are NOT to be directly injected into a patient. As with all radiopharmaceuticals, 99mTc-S colloid should not be administered to women who are pregnant or who may become pregnant, during lactation, or to patients under the age of 18 years unless the indications are exceptional and the need for the agent outweighs the possible potential risk from the radiation exposure involved. It should be noted that although radiopharmaceuticals are not generally used in individuals under 18, procedures using such agents are occasionally necessary in many patients. Because of the low internal radiation dosage of 99mTc-S colloid, it should be used in preference to other agents when the liver or spleen scans are necessary.

Formula feeding should be substituted for breast feeding if the agent must be administered to the mother during lactation.

Radiopharmaceuticals should be used only by physicians who are qualified by specific training in the use and safe handling of radioisotopes and whose experience and training have been approved by an individual agency or institution already licensed in the use of radioisotopes.

Note: The Tesuloid Kit is not radioactive. However, after the eluted 99mTc is added, adequate shielding of the resulting preparation should be maintained.

Precautions: As in the use of any other radioactive material, care should be taken to ensure minimum radiation exposure to the patient as well as to all personnel directly or indirectly involved with the patient.

Note: The Tesuloid Kit was designed to be used with the sodium pertechnetate eluate obtained from a Technetope II (Technetium 99m) Sterile Generator. The low concentration of polyvalent cations in the Technetope II eluate results in a 99mTc-S colloid which is suitable for liver-spleen scanning. Use of other sources of sodium pertechnetate having a higher concentration of polyvalent cations may produce an unsuitable 99mTc-S preparation which is not a colloid; this is evidenced by the formation of a flocculent precipitate. If such a precipitate occurs, the preparation should not be used. It is, therefore, recommended that only Technetope II be used as the source of sodium pertechnetate with Tesuloid unless the user has demonstrated that other sources of 99mTc are consistently compatible and meet the standards of Technetope II.

For further information, contact your Squibb Representative or the Manager of Customer Service, E. R. Squibb & Sons, Div. of Nuclear Med., Georges Rd., New Brunswick, New Jersey 08903.

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FIGURE 1. SERIAL SCINTIPHOTOS. ANTERIOR VIEW.

FIGURE 2. AREAS-OF-INTEREST. ANTERIOR VIEW.

FIGURE 3. PULMONARY DILUTION CURVES, ABNORMAL.
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FIGURE 4. PULMONARY DILUTION CURVES, NORMAL.
Traced from original chart recordings for clarity of reproduction.
The Cardiac Dynamic Study

A Dynamic Technique Using the Nuclear-Chicago Pho/Gamma® Scintillation Camera and Data-Store/Playback System

This study combines serial scintiphotos of the circulation of 99mTc pertechnetate through the heart and lungs, photographed from the Pho/Gamma Scintillation Camera, with a time-concentration curve of the pulmonary circulatory dynamics using the Data-Store/Playback Accessory and a dual-channel ratemeter/dual-pen chart recorder.

SETTING UP. The patient is positioned beneath the Pho/Gamma detector so that the heart and lungs are included within the field of view. For adults, a central venous catheter is inserted and the tip is advanced to the superior vena cava. For children, a percutaneous femoral venous puncture is performed.

ISOTOPE AND DOSE. 50 microcuries/lb. of 99mTc pertechnetate are injected as a bolus. This is followed by a sterile saline “flush.” It is imperative that the tracer be administered as a bolus for proper interpretation of the pulmonary dilution curve.

DATA ACCUMULATION. Since the 99mTc pertechnetate is injected so close to the heart, serial hand-pulled scintiphotos are started immediately. Each exposure is for 1-2 seconds and no more than eight films are necessary. Alternatively, the automatic-sequencing 35mm camera may be used to obtain precisely timed sequential images.

The Data-Store/Playback Accessory plays an important role in the examination. The entire sequence is recorded in a high-resolution digital format (256 x 256 matrix) on the magnetic tape recording system. Subsequent replay of the tape allows reconstitution of the original images at any desired frame rate and permits correction of film exposure factors to provide excellent scintiphotos. The study may be viewed on the system’s variable-persistence oscilloscope during both original recording and upon tape replay.

The pulmonary dilution curves are obtained by choosing two separate areas-of-interest, one corresponding to the right lung field, the other to the left lung field. With this system’s variable controls, these areas-of-interest may be rectangular or oval in shape. It is important, however, that these areas-of-interest correspond only to the lung fields, and no portion of the heart or great vessels should be included. Time-activity curves are generated with the dual ratemeter/recorder with a time constant of 0.5 seconds and a chart speed of 12 inches/minute.

CASE HISTORY. The clinical study on the opposite page is that of a seven-year-old child suspected of having a small left-to-right intercardiac shunt based on the characteristics of a systolic murmur. The child was not cyanotic. Following the diagnostic nuclear-medicine procedure, the patient was catheterized. A ventricular septal defect with a 1.3-1-2 left-to-right shunt was revealed as determined by standard dye dilution curves. In addition, there was a supravalvular obstruction of the pulmonary artery. Systemic pressures were observed in the right ventricle suggesting the diagnosis of an “Acyanotic Tetralogy of Fallot.”

EVALUATION. The serial two-second images (Fig. 1) were produced upon replay of the Data-Store/Playback Accessory. The bolus of 99mTc pertechnetate is clearly seen in the inferior vena cava (0-2 sec.), having been injected into the right femoral vein. The tracer, thereafter, flows into the right atrium (2-4 sec.), then into the right ventricle and out through the pulmonary artery into both lung fields (4-6 sec.). Later frames show the return of the tracer to the right atrium, the right ventricle, and then out to the aorta.

The pulmonary dilution curves were produced by adjusting the area-of-interest controls of the Data-Store/Playback Accessory, causing the areas-of-interest to correspond to the right and left lungs as indicated by the intensified areas seen on the representive scintiphoto (Fig. 2). The resulting pulmonary dilution curves (Fig. 3) show a rapid rise in count rate to a peak count rate C1 at time T1. T1 - T0 is the interval from time of rise onset to time of peak activity. At time T2 (T2 < T1 - T0), count rate C2 is determined from the curve. As shown, C2 is 50-54% (C2/C1) of count rate C1. These curves are abnormal and suggest the possibility of a left-to-right shunt. Normally, C2/C1 is less than 40% as shown by normal curves (Fig. 4).

CONCLUSIONS. The diagnosis of a left-to-right shunt was confirmed in this case, both at cardiac catheterization and at surgery.

An abnormal pulmonary dilution curve, it should be noted, does not indicate the anatomical location of the defect, nor does it indicate the severity of the left-to-right shunt. This cardiac dynamic study should be considered only as a screening procedure. In the event of an abnormal radionuclide pulmonary dilution curve, further diagnostic procedures are indicated.
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Often, when a simpler way of doing things is developed, it is also a better way. Electronic and mechanical simplicity are important attributes of the Radicamera 50. They mean less probability of down-time, faster study set-up and consistent, stable performance.

The complex, leviathan gamma cameras of the Sixties, with their geared, motor-driven detector heads and several cubic feet of components, belong to a bygone decade.

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Simplicity is, indeed, the language of truth.
1. Be not dissuaded: diagnostic certitude is to be cherished above all.
2. Before you diagnose the patient, be sure you can diagnose the machine.
3. First, diagnostic confidence. Everything else, second.
4. Choose not a scintillation camera that asks you to accept its output on faith.
5. Sacrifice diagnostic certainty last.
6. Be not kidded: resolution is not the be-all, and end-all. (Ask about uniformity, ask about linearity, ask about speed, for example.)
7. Resist not the temptation to take a good, hard look at the Dynacamera™ 2 for it is the one that provides good, hard information.
For elaboration—and for detailed Dynacamera 2 "application data sheets"—contact your local Picker man or write Picker Corporation, Dept. C12, 333 State Street, North Haven, Connecticut 06473.
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Obviously we quarrel not with Dr. Sam Johnson who said: "...to count is a modern practice, the ancient method was to guess."

Finally, this is just one of many ways in which the Dynacamera 2 provides you with what you want most: maximum diagnostic certainty. What else, after all, is there?

Very valuable for looking at scintigrams. Except for the situations when one's eyes may be deceived.

Speak to your local Picker man or drop us a line. We'll forward detailed information on the Dynacamera 2 and a series of Dynacamera 2 "application data sheets." Picker Corporation, Dept. A12, 333 State Street, North Haven, Connecticut 06473.
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Why stop with a scintigram when there's more information down the road?

The typical scintillation camera gives you a scintigram that helps indicate the presence of a lesion. And only that. But one camera (and only one) has a built-in system to help characterize the lesion.

By offering this built-in "lesion characterization capability," Dynacamera™ 2 yields more diagnostic information than any other camera.

And lesion characterization can be achieved at the same time the static study is being done.

This capability permits functional comparisons of one region vs. another. And the comparisons are quantitative. (Output includes histogram plots of both regions.)

The Dynacamera 2 also permits imaging of two different radiotopes simultaneously. Plus quantitative data in the form of histograms.

What we're saying is: why stop short of lesion characterization when the name of the game is information? Why, indeed?

For maximum diagnostic information, for maximum diagnostic confidence, nothing touches the Dynacamera 2.

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2. "Lesion characterization capability" that takes you to the next logical diagnostic step. (Such characterization goes far beyond mere identification by helping to determine the type of lesion you're confronting.)

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5. Isotope push-button selection. (More reproducible, more dependable, much faster.)

6. Image enhancement system option. (With contrast enhancement, background suppression, and readout in color—all of which simplify discernment of small lesions.)

If you're unwilling to forego any of these features that serve to improve your diagnostic certainty, look to Dynacamera™ 2. It is the only scintillation camera that puts your diagnostic needs above all other considerations. For further information and a series of "application data sheets," speak to your local Picker representative or write Picker Corporation, Dept. E12, 333 State Street, North Haven, Connecticut 06473.
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REVIEW FOR BOARD EXAMINATION IN NUCLEAR MEDICINE

This symposium under the auspices of the Central Chapter of the Society of Nuclear Medicine will be held at Indiana University Medical Center, Indianapolis, Indiana, on Wednesday, Thursday, and Friday, September 15-17, 1971. The curriculum will stress the basic sciences including physical principles, instrumentation, radiobiology, and radiopharmaceuticals, as well as review the common therapeutic and diagnostic procedures with radionuclides. The fee for the course, which does not include housing, will be $75.00 for physicians. Because of the general nature of the course, a limited number of technologists can be registered at a reduced fee. For further information contact:

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More important: it's the easiest camera to work with when your goal is diagnostic certainty. No camera approaches the Dynacamera™ 2 in providing the only thing you really care about: as much reliable information as possible.

Example: the Dynacamera 2 doesn't ask you to base your diagnosis exclusively on a picture. We give you hard numbers: lesion count vs. surrounding tissue count, or count of one region vs. another. (Exclusive with Dynacamera 2.)

Example: the Dynacamera 2 has a built-in "lesion characterization capability" which takes you to the next logical diagnostic step. (Exclusive with Dynacamera 2.)

Example: the Dynacamera 2 lets you diagnose the machine before you diagnose the patient. Built-in, easy-to-operate systems tell you whether the instrument is behaving properly. The instrument doesn't ask you to take anything on faith. (Exclusive with Dynacamera 2.)

For other examples of how the Dynacamera 2 is absolutely unique in its emphasis on diagnostic certainty and for detailed Dynacamera 2 "application data sheets" — speak to your Picker man. Or write Picker Corporation, Dept. B12, 333 State Street, North Haven, Connecticut 06473.
The Camera with the Scanner image.

A closer look at the old image surrounding Cameras, and at the new images being generated at Baird-Atomic.

By Johan Govaert and Frank Troiani

Star Phantom Co 1 mc

1. Model 5700 Autofluoroscope®
   140,000 counts, 80 seconds
   2 inches from Standard Collimator
   (All defects — bubbles — are accurately imaged. Separation of radiants imaged by Autofluoroscope at 2 to 2.5mm)

2. Pho Gamma-HP
   50,000 counts, 70 seconds
   2 inches from High Resolution Collimator

3. Dynacamera
   On surface of Collimator

4. Model 5700 Autofluoroscope
   Positive Mode: lungs

5. Model 5700 Autofluoroscope
   Positive Mode: liver/spleen

Traditionally, of course, Cameras have been valuable because of their through-put capabilities. That certainly is not an insignificant contribution to nuclear medicine. But one which we here at Baird (and no doubt elsewhere) have not been willing to leave alone. After all, there is a lot more to the picture — if you will — than that.

All of which has led B/A to several years of intensive and extensive work. Our Camera, the Autofluoroscope®, has always done a satisfactory job in the area of statics. But there, too, we were far from satisfied.

What we wanted was better image. Or, if possible, a whole new kind of image. We became determined to make our Camera produce images which were a significant order of magnitude better. We wanted images that could approach those obtainable by the Scanner.

And as of now, we've got it.

This comparative Star Phantom study shows that. Picture number 1 shows Baird's Model 5700 Autofluoroscope's image compared to those of the...
Nuclear Chicago Pho/Gamma HP® and the Picker Dynacamera™ in pictures 2 and 3, respectively.

One thing which you'll notice right off is the accuracy with which the Autofluoroscope has imaged all defects — eg bubbles. And that the rays are imaged all the way down to the separation of 2 to 2.5mm.

Now take a look at pictures number 4 and 5. They show the Autofluoroscope's ability to image large organs — lungs and liver/spleen — in the positive mode.

All right. From there, let's pass on to a Positive Brain Study. This is of a 66 year old male, CVA. The isotope dosage is 10mCi 99mTc. Pictures 1 and 2 are made by the Model 5700 Autofluoroscope. Pictures 3 and 4 are of the same man, same data, but made by the 5-inch Rectilinear Scanner.

Quite frankly, we never expected the Camera to come along quite this far. We're getting the imaging capability, the clarity, the resolution from the Autofluoroscope that you'd only expect from the Scanner. With none of the narrow-focus problems. None of the concern for missing a lesion by being at the wrong depth.

Study the definition. Especially in the posterior fossa area. See how the skull shows up.

Quality of image. Depth of image. All the way through the head. The implications are fantastic.

But that's not all.

Finally, let's look into serial imaging. We have proven capability in quantitative function studies. Now, as you can see, we also offer exceptional clarity visualization of dynamic events. This cardiac study pretty much speaks for itself. It's a radio isotopic angio-cardiogram, anterior view, of a normal subject.

It represents a Camera advance that's almost too good to be true. And, as a matter of fact, we could hardly believe it ourselves when we saw what we'd done.

But it is true.

What this means is that Baird Atomic has taken the Autofluoroscope and compounded its value by giving it imaging capabilities like those of the Camera. In both statics and dynamics.

And the whole point is that, as of now, the Autofluoroscope isn't like any other Camera. It's virtually a new kind of instrument (incidentally, all the capabilities that we've talked about here can be readily installed in existing Autofluoroscopes).

Write us, or call us. Because there's a lot more to be said.
Here's what Nuclear-Chicago's Pho/Gamma® Tomocamera™ System offers you (in addition to full, conventional capabilities of the Pho/Gamma Scintillation Camera):

Four equally spaced, in-focus planes simultaneously displayed.
Variable spacing of equally separated focal planes—from 1/2 to 1-1/2 inches.
Distance from collimator to farthest focal plane is variable to 7-3/4 inches.
Pho/Gamma tomographic images can be recorded, replayed, and analyzed with the Pho/Gamma Data-Store/Playback System.
Obscuring events above and below each plane of focus are effectively "tuned out."
And much more.
Your Nuclear-Chicago Sales Engineer has all the details. Or write us.

Brain, right lateral view. Standard scintiphoto.

Brain, right lateral views presented simultaneously in a single tomographic scintiphoto. Lesion in right frontal region is delineated best at 2- and 3-inch depths. Surgery revealed well differentiated adenocarcinoma.