

III in a periodic table and are non-specific in chemical and biological properties.

Although it is important that a large amount are accumulated in tumor, in external counting method high tumor-organ concentration ratio is more important. Considering these points, ^{67}Ga -citrate, ^{131}I -fibrinogen, ^{203}Hg -chlormerodrin, ^{131}I -albumin are excellent in clinical scintillation scanning.

It is thought that ^{131}I -fibrinogen is taken by protective process and ^{131}I -albumin is taken as nutrition in tumor. The binding capacity of these mercuric and bismuth compounds to protein is strong, and retention

value of these compounds in the tumor was nearly in proportion to the binding capacity to protein. So, these compounds will be carried in tumor by serum protein after i.v. injection. Retention value decreased the slowest as time elapsed in tumor tissue comparing the other principal organs, except in the kidney.

Ga, In and Sc have weak protein binding capacity, but uptake in tumor is so great. In case of Ga, carrier-free ^{67}Ga -citrate and ^{67}Ga -nitrate are much taken in tumor as gallium ion.

Automatic Data Storage and Processings for the Liver Scintigram Using CCTV and Small Computer

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The liver photo-scintigram is converted to the digital image by the data-storage-system combined with a CCTV and a small computer. The first circuit separates the video signal and two synchronizing signal from TV signals.

Synchronizing signals are used for the control of the computer and the marker signal. The computer discriminates beginning in each field following by means of vertical synchronizing signal, and the horizontal synchronizing signal triggeres time base generator of the oscilloscope with the delay pulse circuit.

Time base generator begin the sweep by one of horizontal synchronizing signal. Next trigger does not work in the oscilloscope until a sweep time finish. Sweep time determines vertical interval of sampling position.

Delay pulse from the oscilloscope is available for the following items:

1. start pulse of sampling to the computer

2. visible marker-signal to the CRT monitor
3. sample and hold (S/H) pulse

The S/H circuit is used to holding for a short time the video signal during the Analog to Digital conversion by S/H pulse.

For the sampling of two-dimensional data, sampling location is moved to horizontal (X axis) by change of delay time in the oscilloscope continuously.

The storage time of whole data is about 0.3 sec minimum, and the conversion time of one point is 80 μsec , the volume of maximum number of data is 3500 point.

The correction of linearity of the video signals are executed by the programming.

The digital image of the liver photo-scintigram is processed by the programming for classification of normal and disease pattern.

1. correction of linearity.
2. smoothing of nine points.
3. measuring profile of the liver.
 - a. maximum diameter of the liver height

- and width, 10% and 60% area of pulse density.
- b. distance from left end of the liver to point of maximum and minimum height of 10% area.
 - c. distance from 10% area to 60% area,

- vice versa of each liver height.
- d. ratio of the left lobe of the liver.
- e. when the spleen density appeared on the digital image maximum height, transverse diameter, integral density and ratio of the spleen to the liver are measured.

The Development of Simultaneous Scinti-tomograms of Multiple Layers and Their Clinical Applications

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The scinti-tomograms of multiple layers can be simultaneously produced on a Polaroid picture by using a standard scintillation camera. This fact was demonstrated with the phantom experiments and selected clinical cases.

The equipment used in the study was a Nuclear Chicago's Pho/Gamma III with a special-designed rotating collimator and an optical device. The collimator was made of multi-parallel holes inclined 70 degrees from the surface of the NaI crystal. The optical device was made of two sets of lenses focusing images on a Polaroid film. Each set of lenses rotated on a circle of given diameter synchronously with the rotatory motion of the collimator.

As the collimator was rotating on the supporting frame with constant speed, the radioactive sources at the far distance from the

surface of the collimator made rotating images of large diameter on the monitor scope, but, those at the close distance made ones of small diameter. The images rotating with large diameter were focused to the Polaroid film as the static ones through the rotating lenses on the large circle. Those rotating with small diameter, however, were projected on the film as the static ones through lenses on the small circle. Thus, the diameter of circular movements of the lenses decides the tomographic layer.

The clinical usefulness of the scinti-tomograms was too early to be evaluated. Our method of the scintitography, however, is expected to be helpful in differential diagnoses of diseases of internal organs, on which radioactivities of adjacent organs frequently influence to disturb the images of the target organ.