Q. Others

The Uptake of ^{3}H-thymidine and Relation between Zona Pellucida and Blastocoelic Fluid on Rabbit Blastocysts

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The rabbit blastocysts (6.25 days old, p.c.) were cultured in semisynthetic media (TCM 199+10% calf serum) containing ^{3}H-thymidine (0.1 μc/ml). The following data were obtained from the autoradiographs made by Moog's flat-mount technique after the pulse labeling and chasing under the various conditions, i.g., intact, zona pellucida free and f-lattend blastocysts.

(1) The intact blastocysts must be exposed to ^{3}H-thymidine for at least 12 minutes before grains appeared in nuclei.
(2) The blastocysts could utilize the pooled precursor in blastocoelic cavity to synthesize DNA, when they were reincubated for 58 minutes in ^{3}H-thymidine-free media after 2 minutes incubation in the hot media. In case of 10 min. labeling and chasing, the uptake was demonstrated almost similar grade to control (60 min. labeling).
(3) The incorporation was not detected in the flattend blastocysts which were cultured in ^{3}H-thymidi-free media after washing out the blastocoelic fluid exposed to hot thymidine for ten minutes before rupture.
(4) The zona pellucida was estimated to prevent the phenomenon that ^{3}H-thymidine in the blastocoelic fluid permeates through to the cold media.

Radioisotope Diagnosis of Pleural Effusion and Ascites

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Purpose: Pleural effusion and ascites are occasionally difficult to diagnose by conventional radiologic methods. In the presence of pleural effusion there develop high position of the diaphragm on the chest films and there arise difficulties in differentiating from abdominal tumor, paralysis of the phrenic nerve, eventration, herniation of the diaphragm, subdiaphragmatic abscess and other similar conditions. Ascites may not present any significant abnormality. In order to suppliment radiologic findings we have performed simultaneous liver and lung scanning by the use of two radioisotopes and by the technic of transmission scanning.

Methods: For simultaneous lung and liver scanning 200 μCi of ^{131}I-MAA and 200 μCi of ^{198}Au

colloid were utilized for imaging of the liver and the lung. For transmission scanning liver scan was performed by use of 1.5 mCi of $^{99m}Tc_2S_7$ colloid with placement of 20 mCi of ^{99m}Tc pertechnetate solution behind the chest to delintate the lung by transmission technic.

Patients with suspected pleural effusion were examined in supine and sitting position, while supine position was used for delineation of ascites.

Scanning was performed 30 minutes after the injection of isotopes. 410 kev window setting was chosen since the energies of ^{131}I (364 kev) and ^{198}Au (411 kev) were sufficiently similar to be included in one spectrometer.

Results: Sixteen patients were studied including 8 normals, 4 ascites, and 4 pleural effusions. There was no separation of liver and lung in all normal patients, but there was definite decreased uptake or separation between the liver and the lung or between the liver and speen. Therefore, we have concluded that this technic is a useful adjunct in demonstration of pleural effusion and ascites.

Radiation Exposure from the Syringe Containing Radioisotope

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Using computer FACOM-230-60, mathematical approach was first made for calculation of absorbed dose in tissue of finger.

The solution of ^{99m}Tc, ^{131}I, ^{198}Au, ^{203}Hg and ^{59}Fe are made with concentration of 1 mCi/ml and 0.2 mCi/ml. Each of them was used to be a radiation source of 1 ml or 5 ml. The radiation source of 12 mmϕ×9 mm or 12mmϕ×45 mm was assumed to contact with water equivalent rectangular solid body of 30×20×100 mm in size. The dose was calculated with such that the radiation source consisted of 1000 or 5000 point sources of 1 mm^3 in size. The gamma ray from each point source attenuates with self-absorption of radiation source, with absorption of wall of syringe, and the skin tissue. Attenuation arises also with the inverse square law.

The total absorbed dose "D" in an arbitrary point in tissue follows with the formula

$$D = f \cdot \Gamma \iiint e^{-\mu d} / l^2 \, dx \, dy \, dz$$

where f is rad/R conversion factor, Γ is specific γ-ray constant, μ is absorption coefficient for water, d is the distance passing through the absorption material, and 1 is the distance between