Studies on the Absorption of Fat and Protein with Application of R.I.

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Albumin, triolein or oleic acid labeled with radioactive iodine are widely used for the estimation of intestinal absorption. However, the exact mechanism of intestinal absorption of these radioactive substances remains unknown. The present paper reports some basic findings obtained in the dog mainly concerning the role of lymphatics in the transportation phase of intestinal absorption.

The absorption and transport of protein

1. Radioactivity of γ-rays was determined chronologically in each 0.5 cc of the thoracic duct lymph, portal vein and femoral vein blood after intragastric administration of ^{131}I- or ^{125}I-albumin. The γ-rays were detected in the portal blood as early as 2 minutes and in the thoracic duct lymph 6 to 7 minutes after the administration of radioactive substance. The radioactivity, thereafter, was about the same both in the portal blood and thoracic duct lymph. Autoradiography of the superior mesenteric lymph nodes 2 hours after the administration of radioactive substance revealed fairly marked radioactivity.

2. It was determined in which form the administered radioiodine combined with albumin was present in the portal blood and thoracic duct lymph; namely, in the form of free inorganic I or in combination with protein. This was performed after the modification of Turner's method. Over 99% of radioiodine was combined with protein when injected into the femoral vein, whereas around 60% of it was coupled with protein when administered into the stomach.

3. ^{131}I-albumin given intravenously can be eliminated into the intestinal canal and reabsorbed. This was substantiated by the fact that a lot of radioactivity was noted in the thoracic duct lymph and some 0.3 to 0.4% of total radioactivity was proven within the contents of gastrointestinal tract after intravenous injection of ^{131}I-albumin.

The absorption of fat

1. ^{131}I-triolein and oleic acid were rapidly absorbed through the portal vein and thoracic duct as observed in the absorption of protein.

2. Almost equal amount of free and protein-bound radioactive iodine was found in the portal vein blood and thoracic duct lymph after intragastric administration of radioiodide.

The absorption of protein and fat in ascitic dogs

The above experiments were also performed in the ascitic dogs with disturbed lymphatic flow. The absorption through lymphatics was especially disturbed both in albumin and fats.

In summary, it is surmised that lymphatic system plays an important part in absorption of both protein and fats, and that there exists some question about the interpretation of absorption test with peripheral blood whether it reflects exactly the absorption of protein and fats or not, because this method actually measures only the radioactivity of iodide.

Absorptive Defects in Malabsorption Syndrome

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In order to find out absorptive defects in malabsorption syndrome, commonly available isotopes including ^{131}I-triolein, ^{131}-oleic acid and RISA were used for absorption tests and to evaluate diagnostic values of each isotopic absorption rates were compared with chemical fat and nitrogen absorption coefficients (A.C.) calculated by balance study, which were per-