

Absorption of medium chain fatty acids and absorption or lipolysis of medium chain triglycerides, in vitro and in vivo, in comparison with long chain triglycerides

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The intestinal hydrolysis and absorption of MCT were compared with those of LCT under various experimental conditions.

Experimental procedure

Male albino rats weighing 120 ~ 150g were used in four groups; control group, bile duct ligated group, pancreatic duct ligated group, both bile and pancreatic duct ligated group. Test meals containing sodium octanoate-1- C^{14} , or trioctanoin-1- C^{14} , or tripalmitin-1- C^{14} were administered into the duodenum. Lipids of intestinal contents and the intestinal wall were extracted according to the methods of Folch and Lee. Samples of the lipid extracts were assayed for radioactivity of Tricarb liquid scintillation counter and then analyzed with thin layer chromatography and autoradiography thereof.

In the other experiments, trioctanoin-1- C^{14} or tripalmitin-1- C^{14} were incubated with albumin solution, lipase solution, taurocholic acid and phosphate buffer (pH 7.4) at 37°C.

Results

1. Of MCFA, MCT, and LCT, MCFA was absorbed in the most. MCT was absorbed

more than LCT.

2. In absence of bile, absorption rate was reduced and intraluminal lipolysis was impaired. The reduction and the impairment were more markedly observed in absence of pancreatic juice, especially in absence of both bile and pancreatic juice. These results suggest the impairment of micelle formation in the course of lipid absorption from the small intestine.

3. In the case of the administration of MCFA or MCT, a portion of lipids in the mucosa existed in the form of LCT. This suggests that a part of LCFA portion of Mucosal LCT are displaced by MCFA.

4. In the intestinal mucosa, LCT was resynthesized from LCFA. On the other hand, MCT was not resynthesized from MCFA.

5. At 0.5 ~ 1.0% of taurocholic acid concentration, the fatty acid formation in vitro showed its saturation.

6. In the absence of taurocholic acid in vitro, impairment of lipolysis was larger in LCT.

^{99m}Tc for the Estimation of Gastric Secretion and for the Scanning of the Stomach

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To investigate the usefulness of ^{99m}Tc as a measure of gastric secretion, 500 μC of ^{99m}Tc was injected intravenously to 28 subjects, and the rate of intragastric excretion of the label was compared with the rate of gastric secre-

tion. Scanning over the epigastric area was tried in some cases after intravenous injection of 2 mC of the isotope. Gastric juice was collected by Lambing's Method. The following results were obtained:

1) ^{99m}Tc was excreted in the stomach having a good correlation with the volume excretion of the gastric juice.

2) ^{99m}Tc in the stomach had no correlation with the acidity of the gastric juice.

3) Free HCl in the juice, especially when

stimulated with histalog, had some parallelism with ^{99m}Tc excretion.

4) Scanning of the stomach using ^{99m}Tc did not seem a good mean for the diagnosis of gastric diseases.

Renal Excretion of Radioiodinated Rose Bengal and Splenic Visualization on the Rose Bengal Abdominal Scans

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The renal visualization on the radioiodinated rose bengal abdominal scan was recently pointed out by Eyler, and Freeman et al., and we also recognized this fact clearly in the all of nine cases in which serum alkaline phosphatase exceeds 29.6 units, direct serum bilirubin 6.1 mg./dl., GOT 118 units, GPT 50 units, urinary bilirubin (Gumelin reaction) one positive.

The renal visualization seems to be caused by disturbance of the excretion of bile pigment. Jacobson and Freeman et al. indirectly suggested that free- ^{131}I , which may be dissociated from the rose bengal in vivo, could be main component of the radioactivity in urine. But we cannot agree with them because in our studies the renal visualization appeared immediately after the intravenous injection of ^{131}I -RB, and in these cases after the injection of ^{131}I Na the clear gastric visualization was occurred instead of the kidney.

Otherwise, paperchromatographic analysis of ^{131}I -RB in our studies showed mainly three Rf points of respectively nearly the origin, 0.45 ~ 0.55, and 0.8 ~ 0.9. And the second point was identified ^{131}I -RB itself with the amount of 96% of the total, and the third point was identified free- ^{131}I with the amount of 3.7%. And then this analysis of concentrated urine also showed mainly three Rf points of respectively nearly the origin, 0.1 ~ 0.6, and 0.8 ~ 0.9. Then the third point was identified the free- ^{131}I with the amount of only

4.1% though we think to be necessary to still more investigation in this analysis to consider the influence of uric acid. In the result, we suggest that the main component of the radioactivity in urine may be ^{131}I -RB itself.

On the other hand, we confirmed splenic visualization clearly in six cases and obscurely in three of ten cases which showed the renal visualization on the ^{131}I -RB abdominal scan. Spleen were visualized immediately after the injection of ^{131}I -RB in seven cases of which two cases showed the splenic images for over 24 hours. We experienced a case with incomplete cicatricial obstruction of the common bile duct and lower renal function within normal limits in which splenic visualization was recognized without the renal appearance. Mechanism of the visualisation of kidney and spleen cannot be explained to be only the blood pool, since the dots of the intracardiac space on this scan was disappeared in 24 hours at longest after the injection. In case of the high degree of jaundice, bile pigment deposits in the space of the distal renal tubules in the form of column, occasionally is also found in the cells of the renal tubules, and otherwise seems to be taken by RES in the spleen. In consideration of BSP-uptake in RES, we assume that ^{131}I -RB take the same attitude with bile pigment in vivo, though we intend to study still more this problem by mean of the microautoradiography and the like.