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The comparative fat content of the portal vein as determined by the presence of fat particles with the darkfield microscope.

By PIERRE A. FISH

[*From Cornell University, Ithaca, N. Y.*]

Although it is generally stated that not all of the fat ingested can be recovered from the thoracic duct, there is no very satisfactory evidence to show that fat is absorbed *directly* into the blood under normal conditions. Fat absorption through the villi into the lacteals and thoracic duct as the "molecular basis of chyle" and the entrance of these minute particles (chylomicrons) into the venous system has been known since the time of Boyle, Hewson and Gulliver, and is not difficult of demonstration.

The use of the darkfield microscope has been of distinct value in studying the increase and decrease of the chylomicrons during, and after, the period of fat absorption with the use of the ocular micrometer, following the method of Gage for counting these minute particles with approximate accuracy.

In connection with other study upon fat absorption, observations were made upon the chylomicron content of the blood of the aorta, jugular and portal veins at different periods of digestion with results as shown in the following table:

CHYLOMICRONS

Animal	Digestion	Aorta	Jugular V.	Portal V.
Kitten	6 hours	75	.....	59
Kitten	4 hours	132	.....	48
Kitten	7 hours	192	.....	126
Cat	3½ hours	142	117	45
Kitten	6 hours	35	26	1
Kitten	7 hours	121	100	76
Cat	18½ hours	90	100	22
Dog	4 hours	13	15	5
Dog	24 hours	11	.....	1.5
Cat	5½ hours	8	25.8	2
Cat	4 hours	100.2	152.2	33.4
Kitten (600 gms.)	4 hours	56.2	66.8	15

Dog	6 hours	241	215	237
Cat	5 hours	120	148	120
Cat	29½ hours	.....	1	.8
Kitten (300 gms.)....	1½ hours	117.2	130.6	119
Kitten (300 gms.)....	4½ hours	111.6	116.8	122.8
Kitten (300 gms.)....	5 hours	117.2	140.6	133.8
Kitten (300 gms.)....	2 hours	55	78.4	87.4
Kitten (600 gms.)....	19 hours	35.4	46.6	38

Following the course of the circulation, it should be noted that the liver has a double source of supply of these particles: (1) through the hepatic artery and (2) through the portal vein, the origin of which is principally from the capillaries of the mesenteric arteries in the villi of the intestine.

The result of the blood examinations was rather unexpected for it might naturally be assumed that the fat particles, distributed throughout the circulation, would be represented in the portal vein to the same extent as in the blood of other parts of the body, or if there were *direct* absorption into the blood even in greater numbers. In the majority of the cases the counts showed quite a distinct decrease in the number of the fat particles in the portal vein as compared with the jugular vein or aorta. Out of the total of 20 cases examined, 12 showed this decreased condition very clearly; the remaining 8 cases showed an approximately equal distribution of the fat particles in the blood of the three vessels. Six of the kittens in the list were unweaned and still being nursed by their mothers—four in one litter weighing approximately 300 grams each, and two in the second litter weighing approximately 600 grams each. The remaining fourteen included a few adults and a number of young animals which had passed beyond the nursing stage. Classifying the animals according to their degree of development the table shows that all of the nursing kittens, with one exception, possessed an approximately equal distribution of the fat particles in the blood of the three vessels. The exception was one of the second litter and although still nursing was able and did eat solid food.

In the more mature group only three showed the same condition as in the nursing group. One of this group might be considered as a neutral factor, since a period of 29½ hours had elapsed after the administration of fat and the chylomicron content of the blood would therefore be at a low ebb.

Another interesting difference was noted between the nursing kittens and the maturer animals. In some instances the red dye Sudan III was dissolved in the fat (butter) administered. In the nursing kitten the liver showed a slight pink color and when a portion of the liver was dried and extracted with ether a distinct pink color was shown in the extract. The same treatment applied to the liver of the more mature animal failed to give the pink color in every instance in which it was tried.

Two possible theories may be suggested to account for the diminution of the chylomicrons in the portal vein of the more mature animals: (1) that a certain proportion of them are eliminated in the intestinal capillaries and excreted into the contents of the intestine; (2) that some of them may be converted into a soluble form—through the absorption of bile salts—and can not therefore be observed under the microscope.

In the nursing kitten it would appear, from the chylomicron count and the Sudan III experiments, that the liver is utilized for the storage of fat, but in the more mature animals this function has apparently been diminished. The storage of fat in the liver of young animals was noted by Koelliker in 1856.

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Biological reactions of X-rays. Effect of X-rays on the rate of specific hemolysis.

By KARL F. CORI and G. W. PUCHER (by invitation)

[*From the State Institute for the Study of Malignant Disease and the Chemical Department of the Laboratories of the Buffalo General Hospital, Buffalo, New York*]

1. The radiation of the individual components of a hemolytic system does not increase the rate of hemolysis of that system.
2. Radiation of the whole hemolytic system increases the rate of hemolysis of that system.
3. X-rays influence the rate at which the equilibrium of a reaction is reached. Further studies are in progress to determine the effect of X-rays on the velocity of chemical reactions.