development of adjuvant arthritis, but in the rats treated with EACA the disease was slighter and of shorter duration than in the controls.

It seems that adjuvant arthritis is not inhibited by EACA so greatly as by whole body irradiation[10], 6-mercaptopurine[11], steroids or some other clinically used drugs[12], but it is possible that the effect of EACA or its analogues on adjuvant arthritis might have some clinical implications.

Effect of EACA on the duration of adjuvant arthritis in rats

Treatment	Duration of arthritis (days) in rats observed	
	24 days[a]	31 days[a]
Controls	12.7 ± 1.9 (20)	18.5 ± 4.8 (10)
50 mg EACA/rat daily	11.2 ± 3.3 (20)	15.6 ± 6.7 (10)
100 mg EACA/rat daily	10.6 ± 2.1[b] (22)	12.6 ± 4.9[c] (12)

[a] Mean $\pm$ standard deviation is given. The figures in parenthesis refer to the number of rats in the group. [b] Compared with the controls by Student's t-test, $0.01 > P > 0.001$. [c] $0.02 > P > 0.01$. Other differences are statistically insignificant; $P > 0.05$.

It is held that EACA suppresses immunologic processes of the delayed type in general[9]. The present findings agree with this, since strong evidence has been presented suggesting that adjuvant arthritis is an immunologic phenomenon of the delayed type[13]. The exact functional mechanism of EACA in this respect is, however, difficult to assess, especially since EACA probably has no significant effect on the production of antibodies[9].

Zusammenfassung. Die experimentelle Arthritis bei der Ratte, verursacht durch Injektion von mycobacterialem Adjuvans, wird von ε-Aminocapronsäure zu einem geringen Grade gehemmt, indem das Krankheitsbild milder und die Dauer der Arthritis kürzer wird.

P. TOIVANEN and AULI TOIVANEN

Department of Medical Microbiology, University of Turku (Finland), May 19, 1964.

[10] B. H. WAKSMAN, C. M. PEARSON, and J. T. SHARP, J. Immunol. *85*, 403 (1960).
[11] J. L. KALLIOMÄKI, H. A. SAARIMAA, and P. TOIVANEN, Ann. rheum. Dis. *23*, 78 (1964).
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Lipoid Bodies under Different Conditions of Diet in the Intestinal Epithelium of a Mammal, *Funambulus pennanti* Wroughton

During the course of studies on the lipoid bodies in the epithelial cells of small intestine of *Funambulus pennanti*, the author has investigated the effect of different diets on the above-mentioned inclusion and its histochemistry. The results given in the paper are with particular reference to the conditions, namely normal, starved and overdose of phospholipines in the food, for which a few squirrels collected from the field were immediately chloroformed, another set of squirrels was starved for three days and a third set was fed with the yolk of hens' eggs for three days. The material was fixed in calcium formal[1] and McManus fluid, and was cut into sections of 6 μ and stained with Sudan black B. The lipoid bodies are fairly large, granular and spherical in shape (Figure 1) but some of them look irregular, also, in normal condition. In the villi of the starving squirrels, the lipoid bodies had decreased to a considerable extent (Figure 3), but in the villi of the other set which was given an extra dose of phospholipines (yolk), the lipoid bodies had greatly increased in number and size (Figure 2).

Frozen section technique was followed for the histochemical studies of lipoids. The sections were tested for triglycerides, phospholipines and lipo-proteins, The main scheme employed for testing the various lipoids consists of three steps[2].

(1) The frozen sections were first tested for triglycerides with nile blue sulphate[3].

(2) Another set of sections was treated with acetone and then tested for phospholipines with Sudan black B and acid haematein[4–6]. Acetone dissolved out the triglycerides from the frozen sections.

(3) Another set of sections was treated with ether and alcohol. This treatment dissolved both triglycerides and

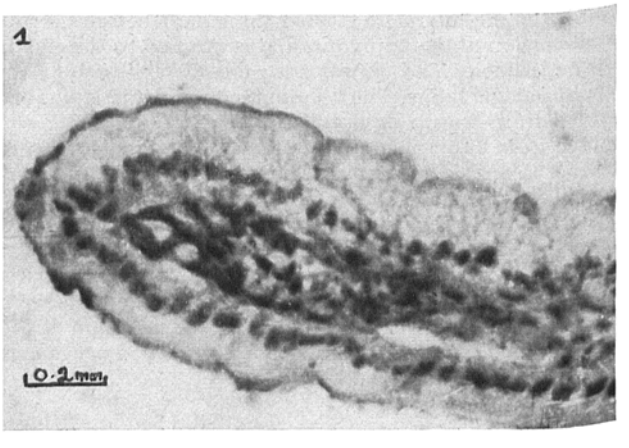

Fig. 1. A villus of small intestine of squirrel showing lipoid bodies in normal condition.

[1] J. R. BAKER, Quart. J. micr. Soc. *85*, 1 (1944).
[2] D. KRISHNA, Proc. Ind. Acad. Sci. *20*, 60 (1950).
[3] A. J. CAIN, Quart. J. micr. Soc. *88*, 388 (1947).
[4] J. R. BAKER, Quart. J. micr. Soc. *88*, 463 (1947).
[5] J. R. BAKER, Quart. J. micr. Soc. *88*, 115 (1947).
[6] A. J. CAIN, Quart. J. micr. Soc. *88*, 467 (1947).

phospholipines from the sections. The sections treated with ether or alcohol were free of triglycerides and phospholipines. These were then tested for lipoproteins with Sudan black B.

The lipoid bodies in frozen sections were coloured blue or blue-black with Sudan black B and orange with Sudan black IV. They were not coloured red by nile blue. This indicated that triglycerides were absent. The lipoid bodies gave a positive result with acid haematin test. It gave a blue-black colour to the lipoid bodies showing in them the presence of phospholipines as irregular granules (Figure 4). Further, it was confirmed by the application of acid haematein test after pyridine extraction. The small granular bodies after ether or alcohol treatment became somewhat circular by losing most of their contents (Figure 5). The lipo-proteins gave a faint blue colour with Sudan black B.

These observations lead to the conclusion that the lipoid bodies in the intestinal epithelium are mainly spherical and granular and are found more in the periphery and perinuclear regions. When they are irregular in shape, it is due to irregular deposition of phospholipines. The main contents of the lipoids are the phospholipines as revealed by the histochemical observations. The feeding experiments give some idea about the nutritive function of the lipoid bodies in the epithelial cells. Whenever a dose of lipoids was given to the animal, the lipoid bodies considerably increased in number and size. It plainly suggests that the absorbed food (lipoids) is directly stored in the lipoid bodies. In the villi of the starved squirrels, the lipoid bodies decreased very much. It shows that the lipoid bodies are consumed to meet the requirements of energy in a starvation period. Similar observations[7] were made in the epithelial lining of the intestine of a mouse, which was given an extra dose of phospholipines; the lipochondria (BAKER considers the golgi bodies as lipochondria because of their lipoidal nature) had increased in number and size.

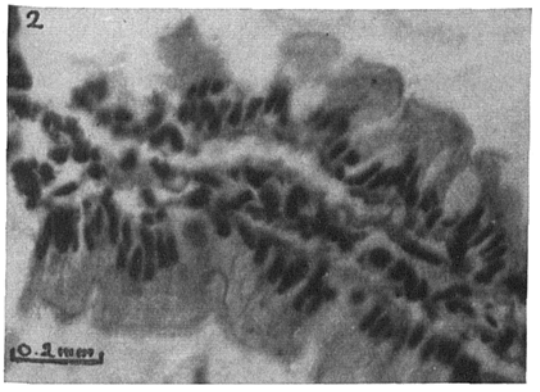

Fig. 2. A villus of small intestine of squirrel showing increased lipoid bodies. The material was taken from the animal which was fed upon yolk of hens' eggs for three days.

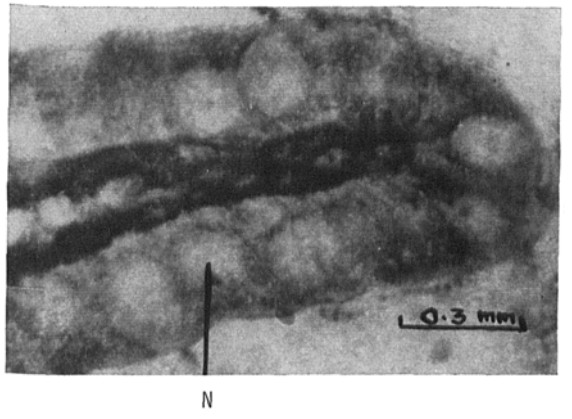

Fig. 3. A villus of small intestine of squirrel showing reduced lipoid bodies. The material was taken from the animal when starved for three days.

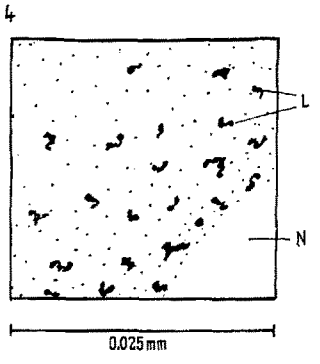

Fig. 4. A part of epithelial cell of small intestine of squirrel showing phospholipines.

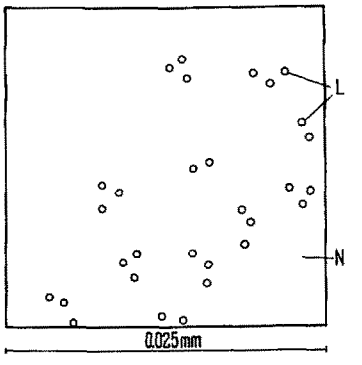

Fig. 5. A part of epithelial cell of small intestine of squirrel showing lipo-proteins. (N – nucleus, L – lipoid bodies.)

Zusammenfassung. Die meist sphäroid und unregelmässig geformten Lipoide lassen sich auf unregelmässige Deposition der Phosphatide zurückführen (Phosphatide und Lipoproteine). Bei zusätzlicher Verfütterung von Lipoidmengen kommt es zur Grössenzunahme vermehrter Lipoidkörner, während bei Unterernährung eine entsprechende Reduktion eintritt.

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Department of Zoology, University of Rajasthan, Jaipur (India), January 7, 1964.

[7] J. R. BAKER, Quart. J. micr. Soc. *92*, 79 (1951).