The facts are compatible with the hypothesis that ET and terramycin compete for the same or a metabolically closely related substrate. Relatively low concentrations of terramycin may antagonize the action of ET because terramycin is not firmly bound to the substrate and may therefore become detoxified later on. An additional point in favour of this hypothesis is the fact that mutual antagonism occurs. A concentration of 200 ppm of terramycin alone prolongates the time of larval development by 3 days, but has not this effect when combined with ET. In the combinations the time needed to complete larval development is shorter and corresponds to that with ET alone.

Zusammenfassung. Subletale Konzentrationen von Terramycin hemmen in *Drosophila* teilweise die toxische Wirkung des hitzestabilen Exotoxins von *Bacillus thuringiensis*, wobei die Steilheit der Dosis-Mortalitätskurven nicht verändert wird. Es wird die Hypothese begründet, dass es sich um eine kompetitive Hemmung des Exotoxins durch das Antibioticum handeln könnte.

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Ultrastructural Aspects of the Pancreatic Islets in Carps of Spontaneous Diabetes Mellitus

It has long been known that, during the course of feeding, culture carps frequently show the atrophy of their dorsal muscles which is a widely known symptom called Sekoke in Japan. A series of pathological and biochemical studies on carps with such symptoms[1-3] have disclosed that they are cases of spontaneous diabetes mellitus. According to the light microscopic observations on the pancreatic islets of the diabetic fish, the insular B cells are found to undergo degranulation and marked glycogen deposition, and there are more clear islet cells than in the insular tissues of normal fish[1].

The aim of the present study is to observe the ultrastructural aspects of the pancreatic islets in the diabetic and normal carps and to interpret the nature of the spontaneous diabetes in terms of the modified secretory activity of the islet cells.

A total of 20 diabetic and 50 normal carps of both sexes, ranging in age from 6 months to 1 year, were used. Principal islets from these donor animals were fixed at 0 °C in either modified Dalton's fixative[4] or phosphate buffered (pH 7.4) 2% osmium tetroxide, dehydrated and embedded in Epon 812. Some of the tissues were fixed at the same temperature in phosphate buffered (pH 7.4) 2.5% glutaraldehyde, postfixed in similarly buffered 2% osmium tetroxide (pH 7.4) and processed as above. Thin sections of the islet tissues were cut on a Porter-Blum microtome, doubly stained with methanolic uranyl acetate and aqueous lead citrate and examined with an electron microscope (Hitachi Hu 11A). The pancreatic islets of normal carps consist of 4 types of glandular cells, A, B, clear and D cells (Figure 1). The A and B cells are easily identified by the criteria previously postulated[5] in the same species of the teleost. The A cell is provided with an indented nucleus and with a relatively electron dense cytoplasm containing 200–270 nm sized round secretory granules of high electron opacity. In contrast to this, the B cell is recognized by its 200–400 nm sized secretory granules which have polymorphous (crystalloid, homogeneous or finely particulate) cores. While Titlbach[5] previously regarded islet cells other than A and B cell types as being only one cell type, the D cell, we can differentiate here, with certainty, a clear cell from the D cell in addition to A and B cells. The cytoplasm of such clear cells fixed in modified Dalton's or buffered osmium tetroxide solutions contains varying numbers of vesicles with a diameter ranging from 150 to 500 nm, moderate numbers of cisternae of the granular endoplasmic reticulum and a few secretory granules. In the clear cells, occasional granules are found to encase crystalloid cores characteristic of B cells. If the islet tissues are subjected to double fixation with glutaraldehyde and osmium tetroxide, vesicles within the clear cell cytoplasm acquire a high electron opacity. Furthermore, contiguous thick (1 μm) sections stained with aldehyde fuchsin reveal that the content of the clear cell vesicles is reactive for this reagent. These cytological properties of the clear cells strongly suggest that the clear cell is a variety of the B cell. The D cell is a rather dark cell type containing 150–220 nm sized secretory granules and a few slightly dilated cisternae of granular endoplasmic reticulum.

The pancreatic islets of diabetic (Sekoke) carps are characterized by the presence of appreciably more numerous clear cells than those in the analogous glands

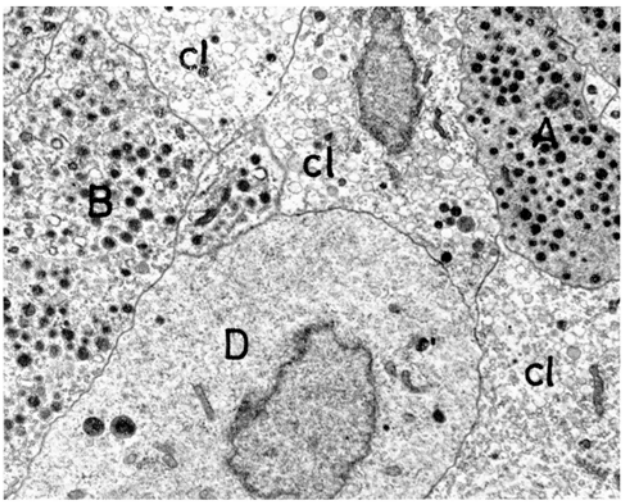

Fig. 1. Electron micrograph of part of the pancreatic islet in a normal carp. A cell (A), B cell (B), clear cell (cl), D cell (D). Modified Dalton's solution fixation. ×6000.

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of normal carps. Within the cytoplasm of the clear cells of the diabetic fish, a huge number of tiny vesicles with a diameter comparable to that of Golgi vesicles are disseminated throughout (Figure 2). In addition, the elements of granular endoplasmic reticulum in these cells are rather well developed and often represent lamellar arrangements of the cisternae (Figure 2). In view of the present result that the clear cell is a variety of the B cell, the ultrastructural aspects observed in the pancreatic islets of the diabetic fish can be conceived to imply that there is enhanced B cell hormone synthesis and release in the insular tissues. The present cytological data in the carps with spontaneous diabetes should be evaluated as important for experimental research on diabetes mellitus, inasmuch as similar cytological changes in the pancreatic islet were reported to exist in mammals with spontaneous diabetes mellitus[6-11].

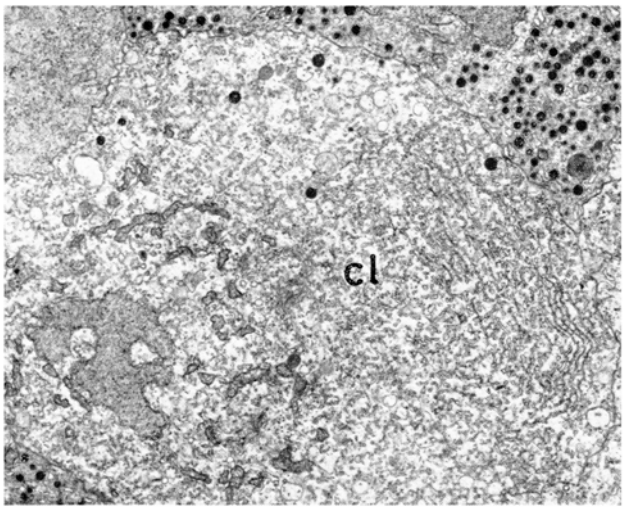

Fig. 2. Electron micrograph of a clear cell (cl) of a diabetic (Sekoke) carp. Numerous cisternae of granular endoplasmic reticulum and abundant tiny vesicles are illustrated. ×6000.

Zusammenfassung. Elektronenmikroskopisch konnten in den Langerhansschen Inseln im Pankreas von normalen und diabetischen Fischen bestimmte Typen von Drüsenzellen differenziert werden, nämlich A-, B- und D-Zellen sowie klare Zellen. Bei diabetischen Fischen ist vor allem die sehr starke Vermehrung sogenannter klarer Zellen typisch.

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Growth of Fetal Organs after Maternal Partial Hepatectomy or Unilateral Nephrectomy

Results are conflicting as to whether the partial ablation of a maternal organ in the pregnant rat can influence the growth of fetal organs.

With reference to the fetal kidney after bilateral or unilateral nephrectomy in pregnant mammals, no significant change was observed[1-3]. On the other hand, BALLANTINE[4] was able to show that the fetal liver was heavier 7 days after partial hepatectomy in pregnant rats as compared with sham operated animals; 4 days after the same operation on a restricted number of animals, we did not find any difference between experimental and sham animals[5]. As regard the lungs of the fetuses, when one lung is removed from the mother a 126% increase in weight over controls was reported by VYASOV et al.[6].

In order to clarify this relation between a hypothetical humoral growth factor in the mother and the growth of the fetal organs, 5 independent series of experiments

Table I

Series	Experimental period[a]	Operation	Sham operation No. of fetuses		Weight (g)	Experimental No. of fetuses	Weight (g)	t
1	11–17	Hepatectomy	229	F	0.4163 ± 0.0024[b]	320	0.3825 ± 0.0025	9.46
				L	0.0314 ± 0.0003		0.0270 ± 0.0003	10.05
2	13–20	Hepatectomy	137	F	3.1767 ± 0.0205	164	2.7360 ± 0.0339	11.14
				L	0.3120 ± 0.0039		0.2249 ± 0.0051	13.54
3	13–21	Hepatectomy	78	F	4.4421 ± 0.0254	76	4.0019 ± 0.0319	10.79
				L	0.4128 ± 0.0051		0.3195 ± 0.0065	11.32
4	13–21	Nephrectomy	89	F	4.3211 ± 0.0278	93	4.0704 ± 0.0378	5.34
				L	0.4011 ± 0.0082		0.3648 ± 0.0072	3.32
5	13–21	Nephrectomy	137	F	3.8800 ± 0.0250	143	3.7402 ± 0.0269	3.80
				L	0.3198 ± 0.0033		0.3051 ± 0.0036	3.02

[a] Day of pregnancy. [b] Standard error of the mean. F, fetus; L, liver. P is in each series < 0.01. Weight of fetuses = fetal wet weight/liver wet weight.