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].

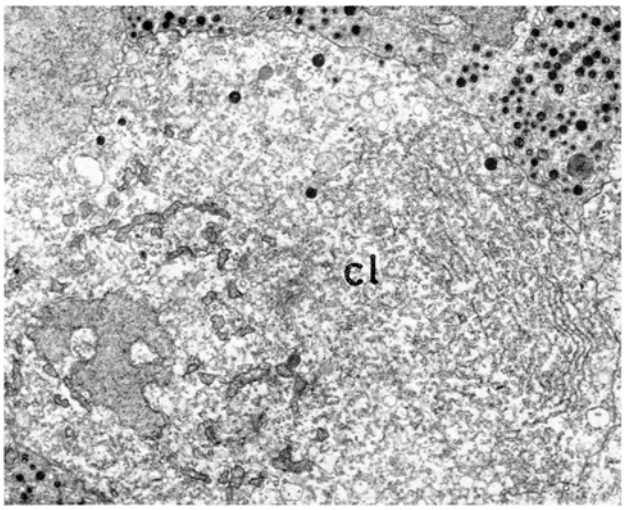

Fig. 2. Electron micrograph of a clear cell (cl) of a diabetic (Sekoke) carp. Numerous cisternae of granular endoplasmic reticulum and abundant tiny vesicles are illustrated. ×6000.

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.

Table II. Analysis of covariance (liver weight)

Series	F	P
1	16.77	<0.01
2	56.48	<0.01
3	30.95	<0.01
4	0.331	>0.05
5	1.243	>0.05

Table III

Series	No. of fetuses	Sham operation Weight (g)	No. of fetuses	Nephrectomy Weight (g)	t
4	89	F 4.6805 ± 0.0319[a]	93	4.4025 ± 0.0437	5.139
		K 0.0417 ± 0.0004		0.0327 ± 0.0005	15.160
5	137	F 4.1663 ± 0.0268	143	4.0270 ± 0.0295	3.492
		K 0.0334 ± 0.0003		0.0252 ± 0.0003	18.581

[a] Standard error of the mean. F, fetus; K, kidney. Weight of fetuses = fetal wet weight/kidney wet weight. P is in each series <0.01.

Table IV. Analysis of covariance (kidney weight)

Series	F	P
4	185.09	<0.01
5	374.69	<0.01

were carried out. In the first 3 series the partial hepatectomy in the pregnant rat was performed. In series 1 and 2 only the fetal liver was weighed, while in the third series, besides the liver weight, the heart and kidney weights were measured. In series 4 and 5 one kidney was removed from the mother and the fetal kidney and liver were weighed. Sham operated animals served as controls. In the first 4 series randomly bred rats were used, while in the last series the unilateral nephrectomy was performed in the pregnant inbred Fischer rats. Unfortunately the latter strain did not support the partial hepatectomy during pregnancy; 6 out of 10 animals died 2 days after the operation, and in 4 animals the resorption of all litters took place.

Our results are presented in 4 tables. From Table I it can be seen that in all 5 series there is an obvious difference in weight between 2 groups of embryos and fetal livers. However, when testing differences in corrected means, F was significant in the first 3 series, which means that if the liver weights are compared after the weights of the embryo are adjusted, they differ significantly (Table II). On the contrary, after the nephrectomy (series 4 and 5) the liver weight does not show any significant difference.

Furthermore, in the series 3 the relative weights of the fetal heart and kidney were the same in both groups of animals so that no analysis of covariance was calculated (heart: sham animals 0.55%, experimental animals 0.56%; kidney-left or right 0.41% in both groups).

As can be seen from Table III, the weights of fetuses and fetal kidneys were reduced in the experimental series as compared with the sham operated controls (series 4 and 5). The analysis of the covariance shows a significant inhibition of kidney growth (Table IV).

From these data it can be concluded that, after partial hepatectomy in the mother, only the growth of the fetal liver is inhibited, while after the unilateral nephrectomy, only the fetal kidney showed a decrease in weight as compared with sham animals. This inhibitory effect seems, therefore, to be highly specific, in addition to the general reduced fetal growth after the operational stress. If we try to explain these results we must be very cautious, but a tentative hypothesis can be put forward. It seems reasonable to speculate that the maternal organs show an increase in production of specific inhibitory factor[7,8] at the end of the compensatory growth period.

In order to test this hypothesis, more data must be obtained, especially during the experimental period used in our experiments which have so far been carried out.

Résumé. Après hépatectomie partielle ou néphrectomie unilatérale pratiquées chez les rates portante, quelques-uns des organes fœtaux ont été pesés. Quelques jours après l'opération, on a constaté une inhibition de la croissance des organes fœtaux correspondants. Des rates gravides ayant subi une laparotomie ont servi de témoins.

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