Um diese Frage abzuklären, haben wir die Basalplatten von Placenten männlicher Neugeborener untersucht. In diesen Placenten müssen die von der Mutter stammenden Zellen in mindestens 35% ihrer Zellkerne das Geschlechtschromatinkörperchen enthalten; die zur Placenta fetalis gehörenden Zellen dürfen in höchstens 5% ihrer Zellkerne ein Chromatinkörperchen aufweisen, das in Grösse und Form nicht vom Geschlechtschromatinkörperchen zu unterscheiden ist[8].

In den bis jetzt untersuchten Placenten von männlichen Neugeborenen haben wir Geschlechtschromatinkörperchen in über 35% der Zellkerne dieser abgeplatteten Zellelemente gefunden (Figur 2). Dieser Befund stützt die Auffassung, dass die Endothelzellen der mütterlichen Uteroplacentargefässe sekundär über das Rohrsche Fibrin auswachsen und auf die Art und Weise eine sekundäre zellige Begrenzung des intervillösen Raumes auf der Basalplatte von Geburtsplacenten bilden.

Die Untersuchungen werden an einem grösseren Material unter Einbeziehung von Placenten von weiblichen Neugeborenen fortgesetzt, um statistisch einwandfreie Ergebnisse zu erhalten und unsere vorläufigen Befunde zu erhärten.

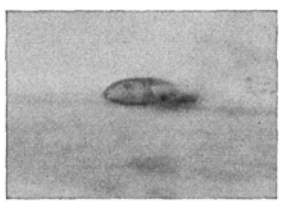

Fig. 2. Endothelzelle aus derselben Placenta mit einem typischen Geschlechtschromatinkörperchen. Fixation und Färbung wie bei Figur 1. Vergr. 800 ×.

Summary. The basal plate of the human placenta in the last months of pregnancy is covered over with flattened endothelial-like cells against the intervillous space. These cells are sex-chromatin positive in more than 35% of the placentas of male newborns. For this reason we believe that they are endothelial cells of the maternal vessels which are spread out secondarily over the surface of the basal plate.

K. S. LUDWIG und A. WANNER

Anatomisches Institut der Universität Basel (Schweiz), 25. September 1964.

The Effect of Chronic Prolonged Water Loading on Prednisolone Induced Adrenocortical Atrophy

A basic problem of steroid therapy has been, and still is, the atrophy of the adrenal cortex in the course of treatment. Neither concomitant administration of ACTH nor intermittent dosage of steroids[1] have sufficiently solved this problem.

In earlier works we were successful in demonstrating, in man[2,3] and in rats[4], that chronic prolonged administration of water has an increasing effect upon the activity of the adrenal cortex. Therefore, in a series of experiments, attempts have been made to prevent atrophy of the adrenal cortex induced by steroids by giving the same pattern of water loading.

Methods. The experiments were performed on 80 male albino rats of the same breed. The initial weight of the animals in the first series attained 140 g. The animals were distributed in 4 groups, Group 1 serving as control. Animals in Groups 2, 3 and 4 received subcutaneously 1 mg of prednisolone per 100 g of body weight daily for 5 days. Besides steroid treatment, animals in Group 3 were given 4 × 5 ml and Group 4 4 × 10 ml of tap water daily by means of a gastric tube. In the second series, rats with an initial weight of 210 g were used. The arrangement of the experiments was similar to that described in the first series, with the only difference that the dosage of water loading was 4 × 6 ml in Group 3 and 4 × 12 ml in Group 4. The animals were killed on the 6th day, their adrenals were weighed and then treated with 5% formaline for histological examination. Microscopic structure of the adrenals was studied in sections prepared after embedding in paraffin and stained with haematoxylin-eosin, their lipid content was ascertained in frozen sections stained with Sudan III, and the amount and localization of lipids showing double refraction was detected by polarized light. The average breadth of the glomerular and fascicular zone was determined in each group.

Results. In both series there was a significant difference to be found in the weight of the adrenal glands (mg per 100 g of body weight) between Group 2, which received only prednisolone, and the remaining three groups, i.e. Group 1 which served as untreated control, and Groups 3 and 4 in which water loading had been undertaken besides prednisolone treatment. The average weight of the adrenals in the hydrated groups was essentially the same as that found in the untreated group. Also, there was no substantial difference in the average adrenal weights between Groups 3 and 4 receiving single and double doses of water (Figure 1).

Histological survey of the adrenals revealed signs of atrophy in the fascicular zone in Group 2 which received prednisolone only: breadth of the zone decreased significantly and the amount of refracting lipids diminished; also, sudanophilia was decreased and the cell nuclei showed a marked reduction in size. On the other hand, the structure of the glomerular zone did not alter essentially. In Groups 3 and 4, where prednisolone treatment had been accompanied by concomitant administration of water, the above signs of atrophy diminished substantially; breadth of the fascicular zone increased significantly and its sudanophilia, the amount of lipids with

[1] P. VECSEI and V. KEMÉNY, Acta physiol. hung. *21*, 73 (1962).
[2] I. PURJESZ and G. URBÁN, Presented at the 1st International Congress on Steroid Hormones, Milano (Italy), May 1962. Summary appeared in Excerpta Med. Int. Congress Series No. 51.
[3] I. PURJESZ and G. URBÁN, Acta med. hung. *18*, 213 (1962).
[4] I. PURJESZ and I. HÜTTNER, Lancet *1964 i*, 885.

double refraction and the size of cell nuclei increased as compared to the group which had been treated only with prednisolone, and were rather similar to those observed in the untreated group. However, the glomerular zone in these groups was significantly wider than in the control and prednisolone-treated groups (Figures 2 and 3). There was no apparent difference in the histological picture of the adrenals in the two hydrated groups.

Discussion. The results presented here – both alterations in the weight of the adrenal glands and the microscopic picture – indicate that prednisolone treatment adjusted according to the above pattern causes atrophy of the adrenals in rats and concomitantly administered water loading is effective in considerably reducing the degree of this atrophy, the protection being complete with respect to the weight of the adrenals.

A protective activity of water loading against adrenal atrophy induced by steroids has already been demonstrated in a previous work[5]. However, in these earlier experiments, steroids were given in an extremely high dosage (5 mg of prednisolone daily to each rat), and accompanied by a sodium salt (2 × 4 ml of a 7.5% solution of NaH_2PO_4, administered by a gastric tube). In contrast to the present findings, it was found that (i) besides the fascicular zone, the glomerular zone also showed considerable atrophy, (ii) water loading was effective only when administered previous to steroid treatment, and (iii) the administration of water was fully protective only in the case of the glomerular zone and was only moderately efficient in preventing atrophy of the fascicular zone. In the present experiments, however, concomitant water loading was also effective; on the other hand, atrophy of the fascicular zone was also successfully prevented. The inconsistency of the previous and present results may be attributed, with all probability, to the difference in the mode of treatment and the doses employed. Nevertheless, it is to be mentioned that the dosage of steroid used in the present study is much nearer to the usual dosage pattern employed in the clinical practice, although it is still many times greater than that given to men.

It was also demonstrated in an earlier work[6], where no steroid treatment had been undertaken, that the doubling of water dosage results in a substantial difference in both the average weight and the histological picture of the adrenals. This failed to become apparent in the present experiments where prednisolone was also given. The explanation of this phenomenon is lacking.

The data presented here will be completed by hormone assays and karyometric evaluation of the adrenocortical zones.

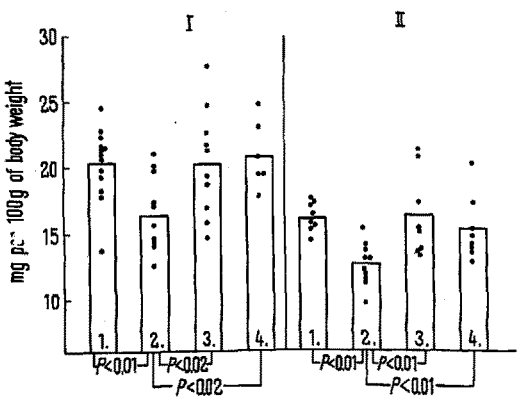

Fig. 1. Alterations in the weight of the adrenals in response to the treatment in the various groups. a, Untreated control group. b, Group receiving prednisolone. c, Group receiving prednisolone + water. d, Group receiving prednisolone + twofold dose of water.

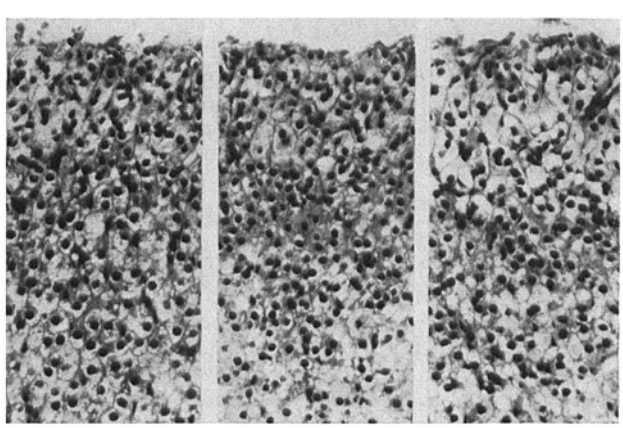

Fig. 2. Microscopic picture of the adrenals I. Haematoxylin-eosin staining, magnification 420 ×. a, Untreated control group. b, Group treated with prednisolone. c, Group treated with prednisolone + water.

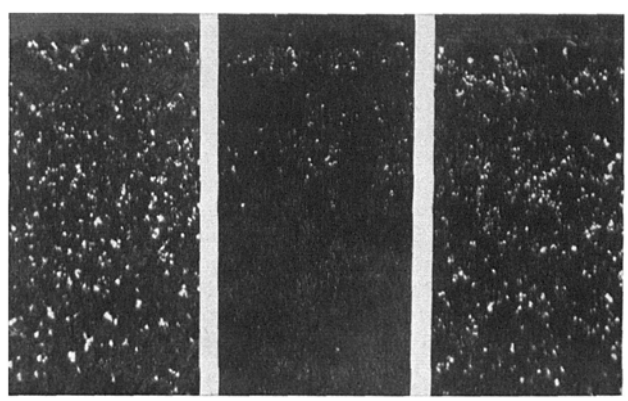

Fig. 3. Microscopic picture of the adrenals II. Preparation with freezing, polarized light, magnification 180 ×. a, Untreated control group. b, Group treated with prednisolone. c, Group treated with prednisolone + water.

Zusammenfassung. Bei mit Prednisolon (1 mg/100 g) 5 Tage lange behandelten Ratten wurde eine Nebennierenrindenatrophie verursacht, die durch eine perorale Wasserbelastung verringert werden konnte.

I. Purjesz, J. Sturcz, and I. Hüttner

Department of Physiology and 2nd Department of Pathology, University Medical School, Budapest (Hungary), July 17, 1964.

[5] I. Purjesz and I. Hüttner, Steroids *3*, 471 (1964).

[6] I. Purjesz and I. Hüttner, Presented at the Annual Conference of the Hungarian Association of Physiologists (1963).