23 AGE-DEPENDENT CHANGES IN THE SYNTHESIS AND RELEASE OF PITUITARY GONADOTROPINS IN THE MALE RAT FOLLOWING LH-RH AND CRYPTORCHIDISM. D.Gupta, K.Rager and M.Eichner, Dept. of Diagnostic Endocrinology, Univ.Children's Hospital, Tübingen, Germany.

Even with more understanding regarding the 'shift' in the hypothalamic sensitivity threshold occurring with the onset of puberty the synthesis and release of the pituitary gonadotropins in the intact male rat still remains in the dark. We have studied the pituitary content and circulating levels of LH and FSH in the intact animal and under the modulatory effects of LH-RH and bilateral cryptorchidism during sexual maturation. Both gonadotropins registered increment in content with maturation until day 35 of life and then declined. The peripheral levels however were not parallel with maturation, and while LH level rose to a new post-maturation height, the FSH concentration showed characteristic decline with maturity. With LH-RH the maximal depletion in the pituitary reserve of LH occurred at day 35 within 1o-3o min post-LH-RH, during which period the peripheral circulation registered maximal concentration. Most prominent depletion of the pituitary reserve of FSH was also noted in the 35-day-old animals 3o min post-LH-RH with a concomitant rise in the peripheral concentration. Bilateral cryptorchidism caused marked depletion of the pituitary reserve of LH during this critical 3o-35 day of life and raised the peripheral concentration to a high level. FSH, however, registered a simultaneous higher pituitary content and circulating level at comparable ages. The data revealed that the age 3o-35 day in the life of the male rat is associated with the most dynamic changes in this regulatory mechanism.

24 INSULIN BIOSYNTHESIS AND SECRETION IN ISOLATED MATERNAL AND FETAL RAT ISLETS WITH AND WITHOUT ARTEFICIAL HYPERGLYCEMIA. E. Heinze, W. Beischer, W.M.Teller, and E.F. Pfeiffer, Dept. Endocrin. & Metab., Ctr. of Int. Medicine & Pediatrics, Univ. Ulm/Donau, F.R.G.

During the last 24 hrs of gestation 6 pregnant rats were continuously infused with glucose, so that their urine contained more than 2g/dl of sugar. Delivery was performed by caesarean section at 21 days. Seven animals without infusion served as controls. Insulin synthesis and secretion were determined in isolated islets of the mother and their fetuses by a method previously reported (1). In comparison to normal mothers a glucose concentration of 3oo mg/dl greatly enhanced the biosynthesis of (pro-) insulin in the glucose infused group of mothers. However, in isolated fetal islets of both groups loo mg/dl of glucose augmented the incorporation of ^{3}H-L-leucine into (pro-) insulin to the same amount. 3oo mg/dl of glucose had no additional effect on the biosynthesis. Only the conversion of proinsulin to insulin was increased in the fetuses of the glucose treated compared to non-treated mothers. On the other hand, glucose stimulated the secretion of insulin from isolated islets of hyperglycemic but not of normal fetuses. The results show that hyperglycemia shortly before delivery influences the development of the insulin secreting mechanisms in the fetus while insulin biosynthesis is only slightly altered. This is in contrast to the findings in the adult maternal ß-cells.

(1) E. Heinze, C. Nierle, H. Schatz and E.F.Pfeiffer
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25 BIOCHEMICAL CHANGES DURING PHYSICAL EXERCISE IN JUVENILE DIABETICS. H. Holzer, J. Buchberger, K. Zuppinger, A. Rotter, H. Käser, Departments of Pediatrics and Physiology, University of Bern, Switzerland.

11 boys with diabetes (dia) 9-16 yrs old and 9 boys with small stature (sm) 9-14 yrs old were given a three step 3o min work load on a bicycle ergometer, the last step being near the maximal work load (15-2o kpm/kg). The mean physical working capacity at pulse rate 17o was 12.7± 3.4 kpm/min/kg in the dia and 11.3±2.1 in the sm. Maximal O_2 consumption was 43.5±6.4 ml/kg/min in the dia and 43.6±12.9 in the sm. Biochemical parameters were measured before, during and after exercise. The mean relative increase of plasma glucose was 9.8±12.6% in the dia and 11.4±11.5% in the sm. Blood lactate rose 2.32±0.98 mMol/l in the dia and 2.32±2.32 in the sm. Free fatty acids changed similarly in both groups. Plasma growth hormone rise was 22.7±11.0 ng/ml in the dia and 2o.7±15.3 in the sm. Plasma cortisol changes were small. The rise of urinary epinephrine and NOR epinephrine was similar in both groups. All metabolic changes were not significantly in the two groups and the strenuous exercise had no untoward effects in any of the patients.

26 EARLY SURGICAL MANAGEMENT OF A BOY WITH PERSISTENT MULLERIAN STRUCTURES. J. Homoki, H. Mildenberger, H. Herrmann, R. Meder, A.T.A. Fazekas, W.M.Teller, Dept. Kinderheilkunde, Abt.Anatomie, Univ. Ulm und Abt. Kinderchirurgie Univ. Tübingen, FRG.

No information is available about therapeutic management of young boys with persistence of Mullerian structures. We therefore report the first total surgical correction in a boy aged 3 8/12 years. Bilateral cryptorchidism was noted at birth. At age 13 mo. at left inguinal herniorrhaphy a uterus and a gonad were found in the hernial sac. Histological: Reduction of spermatogonias by 5o%. Karyogram: XY. Normal basal urinary excretion of C_{19} and C_{21} steroids determined by capillary GLC; following 25 µg LH-RH i.v.: max. ΔLH:65 ng/ml; max. ΔFSH: 21o ng/ml; normal rise of plasma testosterone after infusion of HCG. At age 3 8/12 yrs. a laparatomy was performed. Uterus and Fallopian tubes were removed. The gonads were placed into the scrotum together with their adnexa and the distal end of the vas deferentia. Leydig cell function was re-examined by an i.v. HCG test: normal rise of plasma testosterone. The etiology of persistent Mullerian structures in a chromosomal male is unknown. Insufficient secretion of testosterone during early fetal life or the absence of a factor similar to that described by Josso (1) may be responsible.

(1) Josso, N.: Ped. Res. 8 (1974), 755.
Supp. by DFG; SFB 87, Proj. C_3.

27 THE INFLUENCE OF ORAL GLUCOSE LOADING ON THE INSULIN RESPONSE TO I.V. GLUCAGON IN CHILDREN AND ADOLESCENTS Z. Josefsberg, E. Flatau, M. Doron and Z. Laron,* Institute of Pediatric and Adolescent Endocrinology, Israel Counselling Center for Juvenile Diabetics, Beilinson Hospital, and Sackler School of Medicine, Tel Aviv University, Israel.

Fourteen children and adolescents (12 males and 2 females) aged from 7 6/12 to 18 6/12 years underwent an oral glucose tolerance test (OGTT 1.75 g/kg) followed at 18o min by i.v. glucagon injection (0.03 mg/kg). On a separate occasion these children underwent a simple i.v. glucagon test. Combining the glucose and insulin response in the two glucagon tests for each child we found that whereas in the single test the blood glucose rose slowly with a peak at 39 min , in the combined test the peak was at 5 min . The mean peak values were similar (129 and 121 mg%). The mean peak insulin response in the single test was 79 mIU/ml (at 2 min) as compared to 253 mIU/ml (at 2 min) in the combined test. Our studies provide further evidence for a direct effect of glucagon on insulin release and that glucose preloading augments this effect, without relation to the blood glucose concentrations.

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28 REFERENCE VALUES FOR CORTISOL IN URINE, PLASMA AND CEREBROSPINAL FLUID DEPENDING ON AGE. K.Kellerer, H. Fellier and H. Gleispach (Intr. by H. Gleispach), Department of Pediatrics, University of Graz, Austria.

Reference values were established for urinary and plasma cortisol in healthy persons, in the ages from newborn till adulthood,using a protein binding technique. We found an increase in the plasma cortisol level during the first months of life (10-30 ug/l with 1-3 m, 3o-75 ug/l with 3-6 m and 3o-15o ug/l till the ages of 12m). For persons in the ages of 1-3o years a range of 65-22o ug/l was detected for plasma cortisol if the blood collection was performed at 8 a.m.

For urinary cortisol in contrary a continuous increase, well correlated with body maturation was found. For children in the ages of 1-12 m a urinary cortisol level of 1-12 ug/d was detected, in adults the urinary cortisol excretion reaches a level of 2o-9o ug/d.

Reference values for cerebrospinal fluid (CSF) cortisol could only be established on patients in whom a lumbar puncture was necessary for diagnosis. From all patients blood was collected for cortisol measurement before spinal puncture was performed.Patients with a normal number of cells and a normal level of glucose and proteins in the CSF served as reference group. It was found that the cortisol level is more or less independent from the age and lies in the range of 1-2o ug/l, or, if correlated to the plasma cortisol level, CSF cortisol lies below 6% of the plasma cortisol. In patients with cerebral alterations an increase in CSF cortisol was estimated.