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Changes of TSH secretion in goitrous children treated with potassium iodide.

In adults with goiter due to iodine deficiency it has been shown that short term treatment with potassium iodide is able to normalize the abnormal T3/T4 ratio without altering TSH responses to TRH. We have treated 12 children with simple goiter with KI(300µg/day for two weeks). This caused a rise of serum T4 from 6.7 to 8.0 µg/dl($p < 0.1$).(Controls (N=26):4.4-12.6µg/dl).Basal TSH values decreased from elevated (versus controls)(2.8µU/ml,$p < 0.05$) to normal (1.8µU/dl)values. (Controls (N=26):0.4-9.5). ‡After TRH the maximal TSH increments (ΔTSH) decre ased from 13.1 µU/ml ($p < 0.05$)to normal(9.6) (Controls: 4.1-26.9); the integrated TSH secretion after TRH (0-12 min)decreased from 1361 µUx120'/ml ($p < 0.05$) to 984 (controls (N=26):372-2495). This normalization of TSH secretion as a result of iodide repletion suggests that in children, where goiter still appears to be in a developmental stage, sensitive "feed-back" regulation is existing,while in adulthood autoregulative mechanisms may become more important.(‡ranges given).

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3β-Hydroxysteroid dehydrogenase deficiency (3β-HSDD). Steroid studies in a girl with pubertal bone age (BA).

A 14.7 yr old girl with known 3β-HSDD was reevaluated for small stature and insufficient puberty. Height was 146 cm, BA 12 yrs, pubic hair stage 3 and breast 2. On regular cortisol (F) (20 mg and fludrocortisone 0.05 mg), plasma (P) and urinary (U) steroids were normal or slightly high (P-DHA 800, P-17OHP 540 ng/100 ml, U-pregnanetriol (PT) 4.6 mg/24 h). LH and FSH (basal and after LHRH) were normal. Without F (1 week), P-DHA (4750), P-17OHP (3000 ng/100 ml), U-PT (94.9) and U-pregnenetriol (53.7 mg/24 h) were high and the U-F-metabolites low. On increased F (40 mg daily), P-estradiol did not respond to HMG (6 x 150 U), but P-DHA increased. This observation indicates that 1) the defect is present in the ovaries and estrogen replacement is necessary ; 2) the presence of 17OHP and PT cannot be explained by an incomplete defect, but is probably due to liver 3β-dehydrogenation ; 3) 17OHP can be used only partially for androgen and estrogen formation ; 4) the high U-PT suggests partial formation of PT from 17OH-pregnenolone.

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Biologic effect of testosterone and dihydrotestosterone on rabbit chondrocytes in vitro.

Many clinical observations suggest that androgens play a role in skeletal growth. Experimental studies have shown that the sulfate uptake by costal cartilage from hypophysectomized rats is increased after in vivo administration of testosterone (T)(Salmon et al.,1963). A similar stimulating effect of T on cartilage after in vitro administration has not been reported. The purpose of the present study was to evaluate the effect of T and dihydrotestosterone (DHT) on the sulfation of hormone deprived cultured chondrocytes. Cultured chondrocytes from prepubertal rabbits were incubated in a medium without fetal calf serum. After 20 hours, purified T or DHT to a final concentration of 10^{-15}M to 10^{-9}M with $Na_2{}^{35}SO_4$, was added. After a second twenty hours incubation both cells and medium were extracted in guanidinium chloride and dialyzed against tris buffer. Radiolabelled sulfate incorporation was counted. T stimulated the sulfate incorporation with a maximum effect at 10^{-10}M. A comparable response was obtain with DHT using a 100 times lower concentration. In conclusion, T and DHT stimulate chondrocytes metabolism at concentrations close to the physiological range with DHT being more active than T.

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Somatomedin (SM) activity and SM-carrier protein release by rat liver in organ culture.

SM activity of rat liver culture medium was studied by measuring ^{35}S uptake in chick embryo cartilage. In the absence of hormones, an inhibiting effect was observed, reduced but not suppressed by heating. GH (1 mU/ml) produced a slight but significant effect on the release of SM activity. Insulin was stimulating in a dose related manner (0.1 - 1 mU/ml). Both hormones were synergistic. Cortisol (1 - 100 ng/ml) stimulated the release of inhibitors. All these effects were suppressed by cycloheximide. Gel filtration study (G 75) showed that fractions containing the large molecules inhibited cartilage sulfation, while at acidic pH, a SM activity was observed in the 6 -10,000 MW material. Studies with SM-A and NSILA-S (gifts of Dr Fryklund and Dr Zapf) showed the presence in the culture medium of high affinity proteins (MW ∿ 65,000) which bind specifically these molecules ($K \sim 2.10^8$ M^{-1}). A competitive binding assay using the rat liver carrier protein was set up. The results attest the validity of liver organ culture to study the hormonal control of Somatomedins and their carrier proteins biosynthesis.

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Serum TSH, T4, T3 and thyroid hormone-binding globulin (TBG) prealbumin (TBPA) and albumin (Alb) during acute and recovery stages of idiopathic respiratory distress syndrome (IRDS).

In 27 IRDS infants and 52 healthy babies blood was collected 1-2 times weekly until 30 days of life. During the first 2 days of life se-TSH was lower in IRDS than in healthy babies. Se-T4 and -T3 were low in IRDS and decreased to minimal levels by day 3-5. Se-T3 increased to normal levels by day 6-10, and se-T4 by day 21-30. Se-TBG was low in IRDS reaching normal levels during recovery. Se-TBPA and se-Alb levels were normal, but se-TBPA increased and exceeded significantly TBPA-levels of healthy babies by day 11-20. The T4/TBG ratio was low during recovery from IRDS.

The low se-T4 and se-T3 values in IRDSare associated with a reduced TSH stimulation and a low se-TBG in the acute stage. During recovery, a decreased saturation of se-TBG and, possibly, an increased T4 to T3 coversion occur.

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Secretion of hGH in constitutional delay of growth and adolescence (CDGA) and in "early normal puberty" (ENP).

Acc. to our hypothesis (1972), the retarded sexual maturation in CDGA and the accelerated maturation in ENP are no primary phenomenons but secondary ones - due to a slow resp. fast somatic development in general, connected with different growth velocity. In order to elucidate the cause of the latter one we measured the sleep-induced hGH-secretion in 15 pat. with CDGA, 14 controls with same bone age and 1 girl with ENP. The mean value of the highest individual peaks of plasma-hGH was 38.9 ng/ml for the controls and 22.6 ng/ml for the pat. with CDGA (Δ signif. w.$p < 0.01$). The highest peak of the accelerated girl was 55 ng/ml in the first half of the night and 157 ng/ml 5 a.m.. The controls showed a mean hGH-secretion of 4814 ng/ml during the 5 1/2 hours observation time, the pat. with CDGA of 2614 ng/ml (Δ signif. w.$p < 0.001$). The accelerated girl had a hGH-secretion of 6648 ng/ml per 5 1/2 hours.

First therapeutic trials with hGH (12 i.u./m^2/week) appeared successful, growth velocity being nearly doubled.