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Effects of early postnatal undernutrition on rat CNS myelin proteins and glycoproteins.

Fisher rats were undernourished from the first postnatal day to 20 days of age by maintaining 15 pups with each mother. Control animals came from 5 pups litters. Body and brain weights from 30-day-old undernourished rats were reduced to 66% and 86% respectively, of control values. Myelin was purified from undernourished and control animals at 15, 20, 30 and 60 days of age. The amounts of myelin isolated per gram fresh brain were decreased in undernourished animals during starvation and after a long recovery period. Myelin protein composition was not different in undernourished or control rats. The major fucose-labeled glycoprotein in myelin of undernourished rats had a slightly higher apparent molecular weight than that in myelin from same age controls, corresponding to younger age. These results are similar to previous observation on hypothyroid rats (J.-M. Matthieu et al., Brain Res. 84: 443, 1975) and suggest that in undernutrition myelination is not only depressed but also delayed.

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29 G.DAHLQUIST*, B.PERSSON, St. Göran's Children's Hospital, Stockholm, Sweden. Cerebral metabolism during starvation in infant and adult rats and the effect of intrauterine growth retardation (IUGR).

Cerebral blood flow (CBF) was measured with radioactive microspheres in 20 days old IUGR rats,normal littermates and adult rats. Cerebral a-v diff. of acetoacetate (AcAc), D-β-hydroxybutyrate (βHBA),glucose,lactate,oxygen and brain DNA content were determined in other corresponding groups of similarly treated animals. Mean CBF values of 0.48±0.04 and 0.62±0.07 ml/gxmin(± SEM) in infant and adult rats resp. were not sign. diff. CBF was unaffected by starvation and was not diff.between IUGR and normal littermates. Cerebral uptake of ketone bodies (umol/mg DNAxmin) was higher in infant than adult rats during starvation. Cerebral uptake of βHBA was higher in controls than in IUGR rats after 48 h. of starvation. Uptake of glucose was not diff. between infant and adult rats or between IUGR and normal littermates. Arterial blood glucose was sign. lower in 48 h. starved IUGR rats than controls. Cerebral uptake of oxygen was lower in infant than adult rats and also lower in IUGR than normal littermates during starvation. The average percentage of the total cerebral uptake of substrate (mmol/min) accounted for by ketone bodies was 15.2, 25.7 and 41.0 % resp. in adult rats,20 days old IUGR and normal littermates. Conclusion: 1) Ketone bodies are more important substrates for the brain in 20 days old than adult rats during starvation. 2) Cerebral utilization of ketone bodies is reduced in 20 day IUGR rats compared to normal littermates suggesting greater sensitivity to starvation.

30 L. Wille*, P. Lutz and P. Jürgens (Intr. by P. Lutz). A comparison of oral feeding and total parenteral nutrition in premature infants.(University Childrens'Hospital Heidelberg, FRG)

Ten normal-sized premature infants, 32-35 weeks of gestation, were assigned to a control group(A) receiving a humanized milk formula. Ten normal-sized premature infants of the same gestational age and with severe RDS and artifical ventilation received a new amino acid-carbohydrate-electrolyte mixture(B) intravenously adapted to the requirements of premature infants. The N-retention and the pattern of plasma amino acids were compared.- N-balance was positive from the first day of life in group B, whereas in group A it became only positive during the 3rd or 4th day of life. In both series 40% (B) and 45% (A) of the N supplied was retained, respectively. Plasma concentration of most amino acids measured during parenteral nutrition at the 1st, 3rd, 5th and 7th day of life followed the physiological range of group A. No imbalances were encountered and no metabolic acidosis was observed. The concentration of threonin, glycin and alanin was higher than in group A. The serum electrolytes (Na, K, Cl, Ca, Mg, P) could be kept in the normal range. - The new solution under investigation meets fairly well the requirements of newborn infants.

32 L. SANN, A. REVOL, M. ZACHMANN, J.C. LEGRAND and M. BETHENOD. Hôpital DEBROUSSE - LYON - (FRANCE) Unusual low renin hypertension in a child (Intr. by R. FRANCOIS)

A 4 years old girl with hypertension (14/7), chronic hypokaliema (1,9 -3,3 mEq/l) alkalosis (pH= 7,52 - 7,47) and renal potassium wastage (urinary potassium 23 -48 mEq/24h) was studied. High exchangeable sodium : 56,7 mEq/kg (N= 45 -50), low plasma renin activity : 6 ng/l/min (N= 26,5 ± 3,1) were associated with low aldosterone secretion rate (S.R.) = 5,56 µg/24h (N= 60 - 150). Low corticosterone S.R. = 0,228 mg/24h (N= 0,50 -0,60), low urinary T.H. DOC : 0,07 mg/24h (N= 0,03 -0,09) and undetectable urinary THS were found. Plasma ACTH was normal 78 -128 pg/ml. The low cortisol S.R. (1,80 mg/24h) rose to 65 mg/24h after ACTH stimulation. Plasma aldosterone rose from 10 to 293 pg/ml after ACTH administration. S.R. of 18 OD DOC was slightly high : 55 µg/24h (N= 20 -40). No urinary 16 OH-DHA could be detected. Low sweat Na/K ratio (0,25) was observed . Spironoloctones (200 mg/day) and dexamethasone (4 mg/24h for 21 days) induced normal blood pressure (11 -10/6) and kalemia (4,2 - 5,2 mEq/l). This results show that this hypertension and potassium wastage have an adrenal origin. Hyperaldosteronism 11 β- and 17α hydroxylase deficiency could be ruled out. Since the mineralocorticoid potency of 18 OH DOC is weak, the hypersecretion of strong but still unkown mineralocorticoid which could influence ACTH secretion is suggested in this new case of low renin hypertension.

33 R.P.WILLIG and W.BLUNCK, Univ.-Kinder-Klinik, Hamburg Circadian variation:30 diurnal patterns of plasma progesterones determined every 60min.in children with CAH

In untreated congenital adrenal hyperplasia (CAH) the plasma levels of glucocorticoid precursors progesterone (P) and 17-Hydroxy-Progesterone (17-OHP) are elevated. Few investigations suggest circadian variations of these. But two factors remain uncertain: first the time of maximal peaks which may be important for timing of replacement therapy and second to what extent therapy has to suppress circadian variations. To elucidate this we estimated plasma progesterones in 60 min. intervalls over a period of 24 hours. The method as reported previously, does not differentiate between P and 17-OHP. 13 untreated patients showed circadian variations as known for cortisol: the lowest values were noticed at 7 p.m. (51±14 ng/ml, range:6-156), the highest at 4 a.m. (202±26 ng/ml, range:78-379). In 7 untreated patients dexamethasone (2 mg/d) caused a marked decrease of plasma levels within a few hours. Circadian variations were abolished and plasma levels at 7 p.m. (8±1 ng/ml,range: 4-13) and 4 a.m. (10±2 ng/ml, range:6-21) were low. 10 patients treated with 25 mg/m^2/d hydrocortisone revealed suppressed but still visible diurnal patterns with a maximal increment at 7 a.m. (88±20 ng/ml, range:26-226). Trials of different dosage and timing of replacement therapy failed to have a convincing effect on flattening the circadian curves. Current replacement therapy obviously does not cause complete suppression. This possibly is brought about by overdosage only. Growth under usual therapy might be related to the average hight of the circadian curves.

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Adrenocortical 20α-hydroxysteroid oxidoreductase at various ages.

Bovine adrenal 20α-hydroxysteroid oxidoreductase has been measured in various age groups.Fetal (33-35 weeks gestation);newborn;calf(prepuberal) and adult The substrate 20α-hydroxyprogesterone was used under conditions favoring oxidation.Results are as nM of progesterone produced/gm. protein/ 4 hours.Highest levels were in prepuberal calves:228-250 units. The second highest but much lower was in newborns,68-73 units.Fetal glands had no activity and adult glands were low,2-7 units.The highest levels in prepuberal tissue suggests the oxidoreductase reduces progesterone and precludes it from further conversion and side chain cleavage to C-19 steroids.With adrenarche the activity drops probably accounting for rises of the adrenal C-19 steroids at this time.Such a system may also operate in the gonads and represent an additional mechanism for onset of puberty.Absence of this oxidoreductase in the fetus is consistent with the known high levels of C-19 steroids. It is to be noted that under the conditions employed, 17α,20α - dihydroxyprogesterone as substrate did not undergo oxidation. All measurements of extracts were made by suitable derivatives on GLC chromatography.