95 Serum vitamin A concentration in breast fed low birth weight infants. L.SANN, M.LECLERCQ, M.GUILLAUMOND, Hôpital Debrousse and Institut Pasteur, Lyon, France.

The vitamin A status was evaluated by measuring serum vitamin A by HPLC. Serum vitamin A concentration was lower at birth in term small for date (SFD) infants (mean ± 1 SD) : 190 ± 95 µg/l than in appropriate (AGA) term infants : 314 ± 139 µg/l ($p < 0,02$) ; no difference was observed between preterm AGA and SFD infants at birth or after birth. After birth, serum vitamin A was determined in 40 AGA and 14 SFD preterm infants. Their gestational age was 31,8 ± 2,8 and 34 ± 2 weeks respectively. They were fed banked human milk (vitamin A concentration : 119 ± 53 µg/l) and supplemented only with 5000 IU vitamin A up to the age of 8 days. Serum vitamin A increased from 225 ± 124 µg/l at day 1-2 to 304 ± 118 µg/l at day 15 ($p < 0,01$) with values higher than baseline until day 60 (275 ± 102 µg/l). The proportion of values below 200 µg/l was 54 % before and 16 % after supplementation ($p < 0,01$). The median ratio of serum vitamin A/retinol-binding protein was similar before (0,98) and after (0,99) supplementation. The incidence of values higher than 1,13 was similar after supplementation (19 %) and before supplementation (17 %). These data suggest that all the preterm infants and SFD term infants are at risk from vitamin A deficiency. This risk can be avoided by an oral daily administration of 5000 IU vitamin A without inducing vitamin A toxicity.

96 ADAPTED AND PRETERM FORMULA: EFFECTS ON GROWTH AND AMINOACIDS METABOLISM IN LOW-BIRTH WEIGHT INFANTS. F.Donzelli, V.Carnielli, C.Caprioglio, F.F.Rubaltelli, Department of Pediatrics, University of Padova, Italy.

Two groups of premature infants were fed with isocaloric formulae. One group, 11 babies (b), mean gestational age 32 weeks(w), mean birth weight 1600 gm (g), received a preterm formula. This is an attempt by dietary industries to provide a food closer to the nutritional needs of premature neonates (mean protein intake 3.36 gm/kg/day). The other group (10b, 32w, 1706g) was nourished with an adapted formula, which is recommended for full-term neonates by the ESPGAN (2.88 gm/kg/die). No statistically significant differences were found in the anthropometric parameters between the two groups of infants during this study. Moreover, the time taken to reach the weight of 2100 gm was the same: 30.5 days for the adapted formula fed group and 30.9 days in those fed with the preterm formula. The total length and head circumference at the end of the fourth week were similar in the two groups of infants. The preterm formula fed group presented a higher total blood protein during the second week (5.35 gm/dl versus 5.11-$p<0.05$ and a higher BUN during the third week (0.13 gm/dl versus 0.08-$p<0.01$). Serum essential aminoacids/total aminoacids ratio is constantly higher in the infants fed with the richer proteic preterm formula. Our data show no definitive advantages for anthropometric or biochemical parameters regarding the use of the formula studied for the preterm infant in comparison to the adapted formula for the full term infant.

97 The effect of age and severity on the metabolic response to surgery in infancy and childhood

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In order to test the hypothesis that the metabolic response to surgery in childhood would vary both with age and severity, 46 children aged 1 month to 10 years undergoing a variety of operations under a standard anaesthetic were studied.

Blood samples were drawn pre- and post-operatively and 6, 12, 24 and 48 hours after surgery. Blood concentrations of glucose and 7 other metabolic fuels were measured by micro enzymatic assays and serum insulin by radioimmunoassay. Severity of surgery was scored using the Oxford surgical stress scale (SSS).

Surgery caused significant increases in the concentrations of lactate, pyruvate and ketone bodies which were related to SSS (tau=0.34 ($p<0.01$), 0.34 ($p<0.01$), 0.26 ($p<0.01$) respectively) but not to age. Increases in blood glucose and insulin were also related to SSS (tau=0.20 ($p<0.05$), 0.21 ($p<0.05$); older children tended to have slightly less increase in blood glucose (tau=-0.19, $p<0.05$) and much higher preoperative insulin concentrations (tau=0.47 $p<0.001$). Total gluconeogenic substrate concentrations were markedly depressed 24 hours after surgery; this was well predicted by SSS (tau=-0.43 $p<0.01$) but not by age.

The metabolic response of children to surgery, though different from both adults and neonates is stable over a wide age range. The Oxford scale predicts the degree of metabolic displacement due to surgery and may thus prove a useful instrument in trials of anaesthesia and analgesia in infants and children.

98 NEUROPHYSIOLOGICAL DYSFUNCTION IN NEONATES AND CHILDREN WITH BLOOD GLUCOSE CONCENTRATIONS OF LESS THAN OR EQUAL TO 2.5 MMOL/L.

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That hypoglycaemia can cause brain damage cannot be disputed. There is, however, controversy over the definition of hypoglycaemia in neonates and children and over its significance when asymptomatic. We have measured sensory evoked potentials and correlated them to blood glucose concentrations in 15 children aged one day to 15 years. Eleven were fasted during investigations for recurrent hypoglycaemia; two were studied during spontaneous hypoglycaemia and two had insulin provocation for the investigation of short stature. Serial brainstem evoked potentials (EPs) were measured in 10 and somatosensory EPs in five. A blood glucose level ≤ 2.5 mmol/l was recorded in nine children, eight of whom showed abnormal changes in EPs; only four were symptomatic. Following restoration of the blood glucose level > 2.5 mmol/l EPs returned immediately to normal in six, but in two (both neonates) the EPs remained abnormal for one hour and two days respectively. The only subject with no change in EPs had hyperketonaemic hypoglycaemia. No change was recorded in serial EPs in the six children who maintained blood glucose levels > 2.5 mmol/l. We conclude: 1) EPs allow an objective measurement of neural function in relation to intermediary metabolism; 2) asymptomatic hypoglycaemia is associated with neurophysiological dysfunction; 3) more detailed studies will allow a functional definition of hypoglycaemia in different groups of neonates and children.

99 ORAL SUPPLEMENTATION AND RENAL TUBULAR FRACTIONAL TUBULAR REABSORPTION(FR)OF CALCIUM AND PHOSPHATE IN VERY LOW BIRTHWEIGHT INFANTS(LBW).

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Supplementation of milk formulas with Ca and PO4 for prevention of osteopenia in very LBW infants(<1500g) is generall accepted as necessary.The optimal performance is still discussed.

We therefore measured FR of ionised Ca and PO4 under inulin-clearance conditions in 14 LBW at conceptional ages(CA) from 32 to 40 weeks.Mean birth weight was 930 g and gestational ages at birt ranged from 29 to32 weeks.Ca and PO4 were added to standard formula(Beba 0,Nestle) in capsules containing 60mg Ca and 20mg PO4 per 100ml milk.Resulting concentrations were 110 and 50 mg/100 ml for Ca and PO4.Vit.D was substituted with 1000U/d.

Tubular reabsorption rates increased for both ions with maturation in parallel to increasing glomerular filtration rates.FR of Ca (Tc/Cin) remained constant over the range of CA measured(mean 1.16 + 0.03 umol/ml). FR of PO4 increased with maturation from 1.07 to 1.85 umol/ml. Infants with lowest weight and CA had lowest serum levels of PO4 and lowest rates of FR.

Results:Need for increase of PO4 intake in very immature infants.

100 RENAL ECHOGENICITY IN VLBW INFANTS SUPPLEMENTED WITH CA AND P TO PREVENT BONE DEMINERALIZATION.

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Severe bone demineralization is commonly observed in VLBW infants. It has been shown, that intrauterine bone mineralization rate can be achieved in infants who are supplemented with Ca and P in quantities sufficient to result in urinary excretion of both elements (1). In the present study we examined by ultrasound (ATL Sector Scan 7.5 MHz) the kidneys of 20 infants supplemented in this way (median birthweight 1240 g, range 430-1610). The sonographic findings were related to age and averaged Ca-intake and are shown in the figure. Only 1 infant showed bilateral calcified pyramids propably as the well known side-effect of 3-4 mg furosemide per day for 6 weeks. **Conclusion:** Intrauterine bone mineralization rate can be achieved in preterm infants (1) without the risk of renal calcification. (1) Assessment of Ca and P requirement and prevention of osteopenia in VLBW infants. Pediatr Res 20:1050, 1986.