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TRANSFORMING GROWTH FACTOR ß1 (TGFß1) INHIBITS PROLIFERATION BUT DOES NOT INDUCE DIFFERENTIATION IN INFANT RENAL EPITHELIAL CELLS . Eva Bratt, Henrik Ekblad, Hans Nyctelius, Anita Aperia and Stefan H Larsson. Department of Pediatrics, S:t Göran's Children's Hospital, Karolinska Institutet, Stockholm, SWEDEN.

Postnatal maturation of the proximal tubule cell (PTC) is characterized by proliferative growth and differentiation of membrane transport such as Na,H-exchange. TGFß1 is a well characterized inhibitor of epithelial growth and is known to induce differentiation in certain cell-types. The effect of TGFß1 on rat PTC growth and differentiation was studied in infant (I) and adolescent (A) cells after 2 days in primary culture. Proliferation was studied by 3H-thymidine autoradiography and the rate of proliferation determined as the percentage labelled nuclei (LI) .The capacity of Na,H-exchange was determined by studying intracellular pH (pHi) using quantitative fluorescence microscopy.

I cells proliferate at a basal rate of 18±4%, whereas A cells significantly slower 1±1% ($p<0.05$). In I cells TGFß1 inhibited the growth rate in a dose dependent manner with a maximal effect of 97±2% at 0.1 pM. In A cells no significant effect was seen. TGFß1-neutralizing serum did not change the growth rate of A cells, excluding a paracrine effect of endogenously produced or activated TGFß1.

pHi is the same in I and A cells 7.31±0.03 vs 7.32±0.03. The capacity of Na,H-exchage is significantly lower in I than A cells, 0,29±0.04 vs 0.42±0.05 pH/min ($p<0.05$). 24h treatment of I PTC with 0.1 pM TGFß1 lead to no increase in the transport capacity (0.27±0.06 pH/min, NS).

**Conclusion**: TGFß1 inhibits PTC proliferation in an age-dependent manner, without inducing maturation. This suggests that TGFß1 may play a role in disturbed renal maturation in the neonate.

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**ENERGY REQUIREMENTS IN ANOREXIA NERVOSA: A NUTRITIONAL APPROACH TO MANAGEMENT.** A Mark Dalzell, Judy Wilcox, Mark K Patrick, Ross W Shepherd. The Children's Nutrition Research Centre, The Royal Children's Hospital Brisbane, Herston Road, Brisbane 4025, Queensland, Australia.

We investigated the nutritional requirements of four adolescent females with anorexia nervosa, and describe a management approach based on nutritional principles. The median age of presentation was 14.15 years (range 14-16.1 years). The median weight loss in the preceding six months was 27% (range 21-33%). At presentation the median energy intake was 2710 Kj per day (range 2083-4166 Kj) and represented a median of 26% of that expected. Energy requirements to reverse the state of severe malnutrition were 14634 kj per day. In addition to voluntary intake, energy was delivered via nasogastric tube using energy dense defined formulae in order to ensure a minimum intake of 150-200% RDA, until 50% of lost weight had been regained. The median time to regain 50% of lost weight was 44 days. Continued weight gain occurred during 1 year follow up.

Energy deficits in patients with anorexia nervosa are considerable and can be safely and rapidly restored by an enteral feeding programme which is well tolerated by the patient.

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VALIDATION OF A FOOD FREQUENCY QUESTIONNAIRE FOR INFANTS. Roberto Bellù,Enrica Riva,Maria Teresa Ortisi,Marina Camiletti,Carlo Agostoni,Maurizio Trevisan §,Marcello Giovannini. 5th Department of Pediatrics, University of Milan, Italy and § Dept. of Social and Preventive Medicine, SUNY at Buffalo, NY.

Food frequency questionnaires are useful tools for epidemiologic research in adults. The aim of this study was to measure the reliability of a semiquantitative food frequency questionnaire designed for a pediatric population. METHODS. Ten one-year-old children were investigated. The mothers completed the questionnaire and then underwent a 7-days dietary history. The dietary history data were used as reference measure of dietary intake of calorie, protein, fat, carbohydrates, poly-, mono-, saturated fatty acids, cholesterol calcium and iron. Reliability was assessed by the coefficient of correlation between the nutrient intakes estimated by the two methods.RESULTS. Correlation coefficients were very high for calories (0.89), protein (0.93), carbohydrates (0.91); fat (0.68), monounsaturated fatty acids (0.56), saturated fatty acids (0.71), cholesterol (0.54), calcium (0.75) and iron (0.60) had intermediate values. A low correlation coefficient was calculated for polyunsaturated fatty acids. CONCLUSION. These preliminary data show a good reliability for the food frequency questionnaire developed for a population of one-year-old children. Improvement of efficiency of epidemiologic studies could be obtained with this time-sparing method.

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HIGHER GAIN OF FAT-FREE-MASS IN FORMULA- THAN IN BREAST-FED INFANTS BETWEEN 1-4 MONTHS OF AGE. C.Huemer, F.Haschke, B.Pietschnig, C.Male, B.Eder. Deptartment of Pediatrics, University of Vienna, A-1090 Austria.

Recently published data indicate that weight and length gain of exclusively breast-fed infants is lower than in formula fed-infants at least beyond 2 months of age. We studied the composition of weight gain (gain fat-free-mass + fat) in a homogeneous group of exclusively breast- or formula fed infants.
Methods: Weight, length and body composition (TOBEC$^R$) of male term breast- (n=8) and formula-fed (Enfalac$^R$ 1,5 g protein/dl; 67 kcal/dl; n=8) were measured at 30, 61, 91 and 122 (± 2) days of age.
Results: Weight, length and body composition did not differ at 30 days of age. Weight and length gain tended to be higher in the formula fed-infants between 1-4 Mo and during each month of observation (Anova),but differences did not reach statistical significance. Daily gain in fat-free-mass (g/day; $\bar{x}$ + SD) was significantly higher in the formula fed-infants (13,8 + 2,3 vs 10,3 + 2,4; $p < 0,05$; Anova) between 1-4 Mo, but no differences in daily fat gain (14,4 + 2,7 vs 14,1 + 4,6) were observed.
Conclusion: The data indicate that during the period when exclusive breastfeeding is recommended, formula fed infants deviate in their composition of weight gain from breast-fed infants. It is speculated that higher protein intake of formula-fed infants results in higher gain of fat-free-mass.

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N-ACETYL-TYROSINE (NAT) AND ACETYL-CYSTINE (AC): AN ALTERNATIVE TO LOW INTAKE OF TYROSINE AND CYSTINE IN NEONTAL TOTAL PARENTERAL NUTRITION (TPN)?
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Introduction: Due to low solubility of the (semi-)essential amino acids Tyrosine (Tyr) and Cysteine (Cys-ss-Cys) and to stability problems with Cysteine (Cys) some AA solutions contain acetylated Tyr and Cys. We compared plasma AA levels in 2 groups of preterm infants fed two commercially available AA solutions different in way of offering Tyr and Cys.
Patients and Methods: Infants on TPN were studied on day 7 of life. Group A (n=5, birthweight 1.41±0.32 kg, gest. age 31±2 wk, study weight 1.37±0.32 kg) was fed 2.5±0.3 g AA -and 63±11 kcal/kg.d, with acetylated Tyr and Cys. Group B (n=4, bw 1.34±0.43 kg, ga 30±2 wk, sw 1.28±0.33 kg) received 2.1±0.2 g AA -and 62±5 kcal/kg.d with maximal concentrations of free Tyr and Cys. AA levels were measured by HPLC.
Results:

| | intake µmol/kg.d mean±sd | | plasma level µmol/L mean [range] | | | |
|---|---|---|---|---|---|---|
| | Tyr or NAT | Cys or AC | Tyr | NAT | Cys | AC |
| A | 711±97(NAT) | 70±10(AC) | 121[18-367] | 331 [213-415] | 5[0-17] | 18[2-69] |
| B | 87±7 (T) | 170±10(C) | 30 [6-49] | - | 22 [13-31] | - |

Normal range in breastfed term infants is Tyr: 38-119 µmol/L and Cys: 35-69 µmol/L. Urinary excretion for NAT was 281±108, for AC 28±5 µmol/kg.d. in group A.
Conclusions: 1. By administering acetylated Tyr and Cys (group A), plasma levels of NAT and AC are higher than those of free Tyr and Cys. Cystine levels in 3 out of 5 patients were detected in trace amounts only. Almost 40% of administered NAT and more than 50% of AC was excreted in urine. 2. Tyr and Cys administered in dosages as in group B resulted in plasma levels below reference value. 3. Both ways of administration do not provide in reference Tyr and Cys levels. 4. Results indicate that both ac Cys and ac Tyr are not appropriate substrates to supply the corresponding free amino acids.

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**NEONATAL SMALL INTESTINAL RESECTION IN INFANTS : STUDY OF GLUTAMINE METABOLISM USING STABLE ISOTOPE.** **R. Hankard, O. Goulet, V. Colomb, M. Rongier, J-F. Desjeux, C. Ricour, D. Darmaun. Inserm U290-Hôpital St Lazare. Hôpital Necker-Enfants Malades. Paris. France.**

**Since glutamine (Gln) is considered a major fuel for small bowel (SB), extensive SB resection could alter whole body Gln metabolism in vivo. Very few data are available on Gln metabolism in infants. Eleven infants with extensive neonatal SB resection leading them with 35 ± 12 cm SB length and 4 controls were studied. During the post-absorptive state infants received primed continuous iinfusion of 1,5 mg/Kg/h L-[2-15N] Gln and 0,4 mg/Kg/h L [1-13C] leucine. From stable isotopes plasma enrichments were calculated : Gln and Leu fluxes (Ra Gln) (Ra Leu). The 2 inflow components of RaGln were calculated : release from protein breakdown (B Gln) and de novo synthesis (D Gln) :**

| µmol/kg/h | Ra Gln | D Gln | B Gln | Ra Leu |
|---|---|---|---|---|
| **Patients** | 568 ± 124 | 175 ± 100 | 396 ± 98 | 228 ± 60 |
| **Controls** | 816 ± 149* | 359 ± 181 | 457 ± 87 | 263 ± 50 |

*** $p < 0,05$ vs controls. Mann Whitney tests.**

**Gln fluxes are reduced after SB resection, mainly due to reduced de novo synthesis. In controls, Gln and Leu fluxes are significantly higher than in adult respectively : 344 ± 47 and 88 ±12 µmol/Kg/h (Metabolism 1991, 49 : 42-4). Those differences reflect difference in protein turn over rate and protein accretion between adult and infants.**