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BONE MARROW TRANSPLANTATION FOR SELECTIVE T-HELPER CELL DEFICIENCY (T+, B+, NK+ SCID)

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A term-born 4 months old male infant presented with recurrent septicemia, no palpable lymph nodes, hepatosplenomegaly, and high leucocyte (1.5 - 8 x $10^4/\mu l$) and lymphocyte (0.6 - 6 x $10^4/\mu l$) counts. Flowcytometric lymphocyte phenotyping by a panel of monoclonal antibodies revealed the presence of CD2, CD3/TR, CD8, CD38, as well as class I and II MHC antigens, whereas the CD4 antigen was virtually absent. B cells and immunoglobulins were present but no specific antibodies could be detected. NK cells were elevated in number; cytotoxicity towards K562 was 30% of normal. In accordance with the phenotypical absence of T-helper cells, no proliferative response could be provoked by T dependent mitogens (PHA, ConA, PWM) or alloantigens. Addition of IL-2 did not enhance lymphocyte proliferation. IL-2 receptor was not expressed on resting or stimulated (PHA or PHA/TP1) T cells. Circulating maternal cells were not detected (HLA typing and cytogenetics); therefore, in utero mother to child transfer of immunocompetent cells with consecutive GVHD was unlikely to be the reason of the immunodeficient status. Thymic biopsy confirmed the diagnosis of congenital SCID. Further studies on the DNA level as well as successful treatment by haploidentical maternal BMT will be discussed. To our knowledge this is the first description of a selective T-helper cell deficiency.

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TRANS-ISOMERIC FATTY ACIDS CROSS THE HUMAN PLACENTA

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Consumption of dietary trans-isomeric fatty acids (t-FA) has increased markedly in industrialized countries, due to the extensive use of partially hydrogenated fats. T-FA may exert adverse effects through alteration of essential fatty acid and prostaglandin metabolism and membrane function. These effects may influence tissue growth and development during early life. It has been assumed that t-FA do not cross the human placenta in significant amounts (Life Sci. Res. Office Report to U.S. Fed. Drug Admin., 1985). We measured, for the first time, t-FA in plasma lipids of 30 mothers in labour and their full-term infants (birthweight 3510±322 g), using high-resolution capillary gas-chromatography. Results: The relative proportion of 6 trans-isomers in maternal plasma lipids (%wt/wt, median + interquartile range; see Table) was similar to that found in Western diets. Cord plasma lipids showed similar t-FA values, but 16:1t and 18:1t were significantly lower (sign-test).

TRANS-FATTY ACIDS IN MATERNAL AND CORD PLASMA (%wt/wt,Med+IQR)

(*P<0.05)	14:1t	16:1t	18:1t	18:2t-iso	Total t-FA
maternal	0.05±0.02	0.35±0.15	1.19±0.33	0.28±0.10	1.81±0.50
cord	0.08±0.08	0.15±0.12*	0.85±0.22*	0.20±0.27	1.59±0.43

Conclusions: 1. Since humans do not synthesize t-FA, our data demonstrate their placental transfer. 2. Lower 16:1t and 18:1t values in cord plasma may result from dilution with fatty acids synthesized de novo by the fetus and/or from placental discrimination against transfer of these t-FA. 3. High t-FA consumption during pregnancy might affect fetal development.

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PLASMA AMINO ACID DIFFERENCES IN VLBW-INFANTS FED EITHER PROTEIN FORTIFIED HUMAN MILK OR A WHEY-PREDOMINANT FORMULA.

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In a prospective, randomized study involving 20 VLBW-infants (AGA) we have evaluated the effects on growth and metabolism of human milk fortified with ultrafiltrated human milk protein and a whey-predominant (whey/casein = 60/40) formula containing 2 g/dl of protein. The study was initiated at a mean age of 30 days when 180 ml/kg/d was tolerated and continued until a mean age of 48 days when a weight of 2 kg was reached. The protein intakes in both groups was 3.5 g/kg/d. All infants in both groups reached intrauterine rates of growth for the age, weight = 18.0 g/kg/d, and length 1.2 cm/week. BUN, acid-base status, total protein and albumin were normal and similar in the two groups. Plasma levels of threonine, glycine, citrulline, methionine and total essential amino acids were significantly greater in the formula-fed infants. Taurine and proline had higher concentrations in the protein fortified human milk group. These differences in plasma amino acid profiles suggest that the dietary protein quality in formulas for preterm infants must be further modified.

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GLUCOSE PRODUCTION AND OXIDATION DURING TOTAL PARENTERAL NUTRITION(TPN) IN VERY LOW BIRTH WEIGHT INFANTS.

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Glucose utilisation and oxidation were measured at day 8 in 19 stable VLBW infants (b.w. 1389±300g, g.a. 32±2wks) receiving cont. TPN of 76±4 kcal/kg/d. Glucose utilisation was measured by ind. calorimetry during 8 hrs and glucose oxidation by measurement of $13CO_2/CO_2$ ratio in breath by IRMS during primed constant infusion of U-13C glucose (2.7 µmol/kg/h). Results ± S.D.:

Glucose intake	Glucose utilisation (ind. calorimetry)	Glucose oxidation ($13CO_2$ production)
7.78±0.42 mg/kg/min	6.46±1.81 mg/kg/min	5.16±1.27 mg/kg/min

In 5 patients the rate of glucose appearance (Ra) in plasma was quantified from the enrichment of 13C glucose (m+6) by GCMS analysis. The Ra was 10.8±9.6% above glucose intake representing endog. gluc.prod. and recycling. Therefore the max. plasma glucose oxidation is 5.85±1.42 mg/kg/min. We conclude that during this feeding regimen: 1) 66±13% of the Ra is directly oxidized representing 75±18% of the glucose intake; 2) endogenous glucose production and glucose recycling is low; 3) glucose utilisation is close to glucose oxidation indicating limited lipogenesis.

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ALBUMIN EXCRETION RATE (AER) IN DIABETIC CHILDREN AND ITS RELATION TO METABOLIC CONTROL

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Urinary albumin excretion was evaluated in 43 type 1 diabetic children (27 females), aged 8.2 to 22.1 yr with duration of diabetes > 3 yr; the patients were divided into two groups according to their HbA_1c: HbA_1c < 8.0% (group A: n. 25) or HbA_1c > 11% (group B: n. 18); 43 healthy sex and age-matched subjects served as controls. Three overnight urine collections were used to calculate the AER, basing on albumin concentration, urine volume and collecting time. The median values for AER in overnight urine were 5.1 µg/min in group A (range 1.8 - 13.7) and 16.3 µg/min in group B (range 5.2 - 83.7)($p < 0.001$). In spite of up to 10 yr duration of diabetes, none of the group-A patients had AER above 15 µg/min; no difference in AER was observed between the low HbA_1c group and the controls. After 12 months of improved metabolic control (HbA_1c to < 8%), 8 of the children of group B showed normal overnight AER. Thus, a large percentage of poorly controlled diabetic children has AER > 15 µg/min regardless of diabetic duration; these findings question the value of using moderately elevated AER as a marker for the later development of nephropathy.

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EFFECT OF WEIGHT REDUCTION ON HDL SUBFRACTIONS IN OBESE CHILDREN AND ADOLESCENTS.

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High density lipoproteins, in particullar the HDL2 subfraction, is proposed to be a "protective" factor regarding the development of atherosclerosis. The effect of 3 a weeks weight reduction regimen (700 kcal) on HDL subfractions in 68 obese (mean±SD overweight 74±23%) children and adolescents aged 10 to 14 years (11.7±1.6 years) was investigated. Fasting plasma HDL-cholesterol was determined after ultracentrifugation and polyanionprecipitation (LDL) enzymatically, afterwards HDL subfraction 2 and 3 were measured by precipitation methods (dextran sulfate and polyethylen glycol). Weight loss during the dietary treatment was 7.2±1.5kg.

Results: (SD, md/dl)

	HDL-C	HDL_2	HDL_3	HDL_2/HDL_3
begin	50.1±6.1 *	15.3±1.9	34.2±3.4 +	0.44±0.06
end	44.2±5.6	14.7±1.6	30.7±3.6	0.49±0.05

* $p<0.001$ + $p<0.01$

After weight loss a significant reduction of plasma HDL-C by 12% was found. The decline in HDL-C accounted almost entirely for by the reduction of HDL3 levels, whereas HDL2 concentrations remained constant. The HDL2/HDL3 ratio increased slightly. Based on our results we conclude that the decline in HDL-C in obese undergoing weight reduction does not represent an increased atherosclerotic risk. In contrast, the decreased cholesterol and LDL-C levels and the increased HDL2/HDL3 ratio suggests a lowered risk after weight reduction.