35 DIET INDUCED THERMOGENESIS IN OBESE CHILDREN:EFFECT OF BODY COMPOSITION, PLASMA INSULIN AND GLUCOSE TOLERANCE. Dénes Molnár Department of Paediatrics, University Medical School, Pécs, Hungary.

Recent investigations have proved that diet induced thermogenesis (DIT) is an important factor in the regulation of energy balance. The aim of the present study was to investigate DIT and its relationship with plasma insulin levels, glucose tolerance and body composition in childhood obesity. Resting energy expenditure was measured before and after the consumption of a test meal (energy (mean±SE):60.3 kJ/kg LBM, LBM=lean body mass) in 19 control (C) and 46 obese (O) children (age C:11.7+-0.5 yr, O:12+-0.4yr; body weight C:37.4+-2.2 kg, O:80.7+-3.3 kg; LBM C: 29.7+-1.5 kg, O:48.6+-2.1 kg). Oral glucose tolerance test was performed in 23 O children (1.75 g/kg ideal body weight, max.100g glucose). In nine O children definitely low DIT was observed (1.2 +-0.3 kJ/kg LBM/3h), while in 37 O children (3.68+-0.3 kJ/kg LBM/3h) the DIT was similar to that of controls (3.44+-0.27 kJ/kg LBM/3h). Neither body composition, nor basal and glucose-induced plasma insulin levels showed any relationship with DIT. The quality of glucose tolerance had no influence on the DIT of O children either. Conclusion: Decreased DIT can be detected in about 20 % of obese children. These children, however, cannot be distinguished from those with normal DIT either by anthropometric, or biochemical (insulin, glucose tolerance) parameters.

36 THE EFFECT OF MEAL FREQUENCY ON POSTPRANDIAL THERMOGENESIS IN OBESE CHILDREN.
Dénes Molnár Department of Paediatrics,University Medical School, Pécs, Hungary.

The present investigation was planned to study the effect of meal frequency on diet induced thermogenesis (DIT) in obese children (3 boys, 2 girls). Their body weight, body fat and lean body mass (LBM)were 13.7 +-0.6yr, 100.6+-7.0 kg, 38.9+-1.3% and 61.8+-3.3 kg (mean+-SE),respectively. Postprandial resting metabolic rate (RMR)was monitored for 5h continuously by indirect calorimetry.The children consumed 1 large meal (60 kJ/kg LBM),or 3 consecutive small meals (20 kJ/kg LBM) at 1.5h intervals on subsequent days.
The average oxygen consumption was 4.4+-0.1 and 4.46+-0.08 ml/kg LBM/min before eating the large or small meals, respectively.DIT was higher after the consumption of one large than after small meals (5.71+-0.27 vs 3.53+-0.46 kJ/kg LBM/5h, $p < 0.02$).The postmeal plasma insulin level was higher at 30 (92.5+-10.9 vs 51.5+-6.7 µU/ml) and 60 min (92.0+-11.0 vs 55.3+-9.3 µU/ml, $p < 0.05$)after the large meal than after the small meal. Conclusion:In obese children DIT is decreased when meal frequency is increased.The higher insulin response following the large meal may be a factor promoting DIT.

37 METABOLIC ADAPTATION OF INFANTS OF DIABETIC MOTHERS (IDM) ON THE FIRST DAY OF LIFE.
Rienk Baarsma, Tom Chapman, Ruud Berger, Albert Okken. Div. of Neonatology and Research Lab., Dept. of Pediatrics, University of Groningen, The Netherlands.

Increased glucose utilisation and decreased mobilisation of fat and subsequent lack of free fatty acids (FFA) and ketone bodies as alternative substrates, in theory, may be factors causing hypoglycaemia in IDM's.
We studied the metabolic adaptation in 15 infants of strictly controlled diabetic mothers. The infants had a gestational age of 38 ± 2 wk (mean ± SD) and a birthweight of 3300 ± 750 g and were studied at a postnatal age ranging from 3 - 16 hours. Glucose disappearance rate (Rd) and glucose production rate (EGPR) were measured with the prime dose-constant rate technique using 6,6-dideutero glucose, prior to any oral feeding. Infants received a low dose glucose infusion (mean 3.2 mg/kg/min). Results: Rd ranged from 3.8 to 8.2 mg/kg/min (mean 5.2), EGPR ranged from 0 to 4.8 mg/kg/min (mean 1.8). Plasma 8OH butyrate concentration ranged from 0.02 to 0.4 mmol/l. FFA ranged from 61 to 621 µmol/l.
Conclusion: In the presence of a low dose glucose infusion IDM's of strictly controlled diabetic mothers appear to have a normal glucose turnover postnatally. The appearance of FFA and ketone bodies into the circulation, however, seem to be impaired.

38 ANTHROPOMETRIC ASSESSMENT OF CHILDREN WITH HYPERCHOLESTEROLEMIA IN A LONG-TERM STUDY
K. Widhalm, Beatriz M.da Cruz, Gabriele Leitner, K. Zwiauer
Department of Pediatrics, University of Vienna

Familial hypercholesterolemia (FH), the most common disorder of inborn errors of metabolism, and non familial hypercholesterolemia, are characterized by significant elevation of Total-Cholesterol (TC) and Low-density-lipoproteins (LDL). Based on the results of studies in adults, it is anticipated that even in children diet and, if necessary, drugs might be able to prevent later CHD. In this regard, only few long-term follow-up studies exist: Glueck (1977) et al. reported in a 7 years follow-up normal growth, whereas Lifshitz 1989 reported adverse effects of strict dietary regimen on the growth in some patients.
The aim of our study was to examine the efficacy and safety of long-term cholesterol-lowering diet (mean 4.5±2.1 years) in 14 children (9 boys, 5 girls) with hypercholesterolemia. From the total group 9 had FH, 5 polygenic hypercholesterolemia. Diet composition was: fat 30 % and cholesterol less than 250 mg per day (saturated fat intake was less than 10 % of total energy). 12 patients were treated with diet alone, 2 had diet plus bile acid-binding resins (Cholestyramine 20 g/d). Additionally, we prospectively followed the children in regards to their development of height and weight during the whole period of treatment. All children grew on continuous percentiles and also had a normal weight percentile. Over the time, a significant reduction of TC (-25.8 %), LDL-C (-29.4 %) and ApoB (-33.6 %) respectively, was found. Only 1 child who did not follow the diet had a falloff in linear growth from 25 to 15 percentile and a reduction of weight from 75 to 45 percentile.
From these results, we conclude that careful monitoring of children receiving a low-fat/low-cholesterol diet ensure adequate nutrition for normal growth and development and also is associated with significant reduction of TC and LDL-C.

39 SIGNIFICANCE OF DL-ALPHA-TOCOPHERYL [α-T] ACETATE SUPPLEMENTATION IN PATIENTS WITH CYSTIC FIBROSIS [CF]
B.Winklhofer-Roob(1), D.H.Shmerling(1), M.G.Schimek(2), P.Tuchschmid(1) - Univ. Depts. of Pediatrics (1)Zurich, Switzerland, (2)Graz, Austria

Vitamin E deficiency [VED] in exocrine pancreatic insufficiency [EPI] and cholestatic liver disease [CLD] is well documented. In the clinical management of CF patients, high dose oral dl-α-T acetate supplements [α-TS] are routinely used. Yet, no data have been available concerning the need and effectiveness of these supplements.
In 52 CF patients (0.8-27.6 yrs), we investigated the significance of oral α-TS and the contribution of EPI (72 hr fecal fat, coefficient of fat absorption, absorbed fat [AF]), associated CLD (sonography, γGT, AP, serum bile acids) and nutritional status (weight, upper arm circumference [UAC], skinfolds) on α-T status. Fat malabsorption [FMA] was found in 48, CLD in 10, poor fat intake in 28, and malnutrition [UAC] in 9 patients. VED defined by plasma-α-T (1), RBC-α-T (2), and plasma-α-T/cholesterol (3) below the cut-off was found in 45% (1), 17% (2), 42% (3) of group A (50-600 mg/d α-TS, n=36) and 87%, 50%, 71% of group B (no α-TS, n=16), resp. 19%, 83%, 58% of group A had normal α-T, as did 13%, 50%, 29% of group B. There was no correlation between α-T and the total daily dose. α-T of 9 matched pairs (daily α-TS, degree of FMA) with and without CLD, revealed no significant difference. In patients with CLD, a multiplicative relationship ($y=ax^b$) between plasma-α-T/cholesterol and γGT was found (slope sign. at p=0.004). No regression model could be fitted for α-T depending on AF. In 2 out of 4 patients with corrected FMA, α-T deficiency was still present. In CF patients, high dose oral α-TS do not protect against α-T deficiency and do not correlate with α-T status. The prevalence of α-T deficiency varies markedly depending on the parameters used to evaluate α-T status. Indication and effectiveness of α-TS in CF patients should be documented. Special attention has to be paid to concomitant factors such as uncorrected FMA and CLD.

40 HUMAN ATRIAL NATRIURETIC PEPTIDE EXERTS ELEVATED GLUCOSE CONSUMPTION IN HUMAN PLACENTA
Ivo A. Henrichs, Michael B. Kellner, Reiner Benz[1], Walter M. Teller
Depts. of Pediatrics I and [1]Gynecology, Univ. of Ulm, D-7900 Ulm, FRG

Human atrial natriuretic peptide (hANP) receptors have been identified in human placenta. HANP phosphorylates placental membrane proteins involving cyclic GMP-dependent protein kinase. - Because of this evidence for endocrine signalling via cGMP, does hANP have effects on carbohydrate metabolism in the human placenta? - **Material and methods:** Term placental tissue were incubated with 16.7 mmol/l glucose in medium 199 for 120 min. Alpha-hANP (Sigma) was added (50 and 100 pg/ml). Glucose utilization (U_G), L-lactate production (P_L) and the corresponding metabolic rates of free glucose by labelled substrate techniques were determined. - **Results:** 1. With 100 pg/ml hANP, the U_{G100} increased significantly ($p < 0.006$) to 31.6±4.3 % (mean ± SD) above controls reaching 6.3±1.6 umol/h/g (n=16). 2. U_{G50} was elevated to 19.7±10.4 % above controls (n=16). 3. The relative increment of P_L referring the controls were 5.2 resp.11.1% ($p < 0.03$). 4. The U_G and P_L out of free glucose were dose dependently increased to 15.6±7.4 % resp. 16.2±7.8 %. - **Conclusions:** These results may reflect an elevated glucose turnover stimulated by hANP working as a vasoactive substance in the fetal placental vessels. - Supported by DFG (He 1107/2-3)