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ELEVATED LEVELS OF LIPOPROTEIN (a) IN CHILDREN WITH FAMILIAL HYPERCHOLESTEROLEMIA

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Lipoprotein (a) concentrations and their correlation to total cholesterol (TC), LDL-C and TG were investigated in 20 children affected with familial hypercholesterolemia (FH) and for comparison in 20 obese but otherwise healthy children, matched for sex and age. Lp(a) was measured by radial immunodiffusion, cholesterol and triglycerides by enzymatic routine methods, and LDL-C and HDL-C by ultracentrifugation and polyanionprecipitation. The mean values of Lp(a) in patients with FH (29.5. mg/dl±27.3) were higher than in the control group (17.4 mg/dl±18.7), the difference not being significant. Also the frequency distribution of Lp(a) in both groups is different: The proportion of Lp(a) levels above 60 mg/dl is significantly greater in the patients with FH compared with controls ($p<0.05$). Patients with Lp(a) ≥60 mg/dl have remarkable low levels of TC and LDL-C, but higher concentrations of HDL-C. Accordingly, in FH patients correlations between Lp(a) and TC/LDL-C are negative (n.s.), between Lp(a) and HDL-C positive ($r= 0.48$; $p <0.05$). Correlations between Lp(a) and TG in FH, as well as between Lp(a) and all investigated lipid parameters in the control group do not show any significance.

These results show that even pediatric patients with FH have increased Lp(a) levels. Since this elevation - in particular in combination with increased LDL concentrations - is associated with an increased risk for coronary heart disease, cervical atherosclerosis and cerebral infarction, it seems very important to lower LDL levels in those FH patients with increased Lp(a) concentrations. This is especially true since up to now appropriate treatment for lowering increased Lp(a) levels has not been established.

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LEVELS OF [15N]LEUCINE AFFECT RATES AND ENRICHMENT OF [15N]ALANINE RELEASED BY L6 MUSCLE CELL CULTURES.

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Leucine serves as a major nitrogen donor for de novo alanine formation in muscle. To study factors affecting nitrogen transfer, L6 muscle cells were cultivated in DMEM - Dulbecco's MEM containing 5 mM glucose and 10% fetal bovine serum (FBS). Replicating cells were inhibited on days 9 and 11 with 1 mM cytosine arabinoside. On day 15, when cultures were fully differentiated into myotubes, experimental incubations were done for 4 hr in DMEM without glutamine and FBS. L-[15N]leucine was added at 0, 0.05, 0.2, 0.5, 1.0 or 5.0 mM. Amino acids in the media were determined as N(O,S)-heptafluorobutyryl isobutyl esters by gas chromatography and selected ion monitoring electron impact mass spectrometry. With increasing media leucine concentrations the rate of alanine release decreased from 315.1±35.0(SEM) nmol/mg cell protein per 4 hr at 0 mM to 212.1±51.5 nmol/mg at 5.0 mM. By contrast, [15N]enrichment of alanine increased from 1.9 mol% excess at 0.05 mM [15N]leucine to 21.5 mol% excess at 5.0 mM. Concomitantly, [15N]enrichment of glutamate and glutamine rose from 2.5 to 8.5%. Smaller [15N]enrichments were also found in valine (from 0.4 to 1.3%) and in isoleucine (from 1.4 to 7.2%). Under the studied culture conditions, alanine release was inhibited rather than stimulated by increasing media leucine levels. However, leucine became progressively more important as a nitrogen donor.

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NONINVASIVE ASSESSMENT OF tRNA-, rRNA- AND mRNA-TURNOVER: COMPARATIVE HUMAN AND ANIMAL EXPERIMENTS

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We have shown that whole-body turnover of tRNA, rRNA and mRNA in man can be determined by measuring the excretion of specific modified RNA catabolites (Sander et al (1986) Clin Sci 71: 367-374). Our method is suitable for assessing metabolic status and its alteration e.g. by nutritional influences (Schöch et al (1988) Ped Res 24: 270 and 419). We therefore looked for animal models apt to improve the results we have already obtained in man. As we have observed, the overall principle holds true for all species investigated so far, although with species-specific differences in the suitability of the different turnover markers (Table), the use of animal models thus presupposing selection of the appropriate marker(s):

Species	suitability of turnover markers for tRNA			rRNA		mRNA
	t^6A	m^2_2G	m^3C	Ψ	m^3U	m^7Gua
man	+	+	-	+	*	+
5 other primates	+	+	*	+	*	+
rat	+	-	+	+	+	+
tree shrew	+	+	+	+	+	+
hamster	+	+	-	+	+	*
mouse	+	-	+	+	+	*

+ usable, - nonusable, * not yet investigated

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Energy expenditure and whole body protein synthesis and catabolism in preterm infants.

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The increased energy expenditure (EE) in preterm infants (PT) fed a high protein diet could be due to the energetic cost of protein synthesis. We assessed EE and whole body protein synthesis (S) and catabolism (C) in 7 AGA-PT (age : 31 ± 11 d., weight : 1800 ± 83 g, corrected GA : 34 ± 1.7 wks), fed either human milk (HM) (n = 4 ; 1.6 g proteins/dl) or protein enriched HM (n = 3 ; 2.1 g proteins/dl). Leucine turnover (TO) and oxidation were determined by constant infusion of L-1-13C leucine. Whole body protein TO, S, C and net protein gain (S-C) were derived from leucine fluxes values assuming a protein leucine content of 8%. EE was measured by indirect calorimetry. Results (g protein/kg.day-mean ± SD)

	TO	S	C	S-C	EE (kcal/kg/d)
Human milk	7.4±1.6	6.0±1.4	4.2±0.8	1.8±0.9	51±2
Prot enr. HM	10.4±2.5	8.4±2.0	6.1±2.0	2.3±0.1	64±9.5

EE and S were positively correlated : EE = 3.97 x S ± 24.42 ($p < 0.02$ - r : 0.868). Conclusion : 1) whole body S and C measurements are possible in PT by using 13C leucine. 2) high protein diet is accompanied by an increased protein TO, C and S, this latter being correlated with increased EE.

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GROWRH HORMONE THERAPHY IN NON GH-DEFICIENT SHORT CHILDREN

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The growth response during Growth Hormone (GH) treatment was evaluated in a heterogeneous group of 17 prepubertal non GH-deficient short children. Diagnosis were: familial short stature (3), constitutional delay of growth associated with familial short stature (3), intrauterine growth retardation (3), sporadic primary microcephaly (3), and idiophatic short stature (5). Mean height(±SEM) was -2.98±0.08 SD, mean bone age was -2.84±0.27 years,and growth rate was 3.45±0.15cm/year. All children showed a normal GH response to standard pharmacologic stimulation tests. Biosynthetic GH was administered for 6-12 months at a dose of 7-14 IU/m2 b.s./week, 3 or 6 times weekly, i.m. or s.c. Mean growth rate increase was 2.50±0.31 cm/year, 12 children showing an increase >2 cm/year. Growth rate increase was not correlated with height, bone age or GH dose and was weekly correlated with pretreatment height velocity ($r=-0.58$, $p<0.05$); a lack of correlation was also demonstrated with mean nocturnal spontaneous GH concentration (arithmetical mean of GH levels in blood samples drawn every 30 min. from 8 p.m. to 8 a.m.) and SmC levels. As suggested by several Authors, a diagnostic-therapeutic trial of GH therapy, with auxological monitoring, may be the only means of identifying the non GH-deficient short children who will benefit from treatment.