

548 RESPONSE OF SERUM TOTAL CHOLESTEROL AND HIGH DENSITY LIPOPROTEIN (HDL) LEVELS IN PREMATURE INFANTS TO VARIATIONS IN DIETARY LEVELS OF POLYUNSATURATED FATTY ACIDS (PUFA). Belan Fineza, Nathan Rudolph, Aruna Parekh, and Leonard Glass. SUNY, Downstate Med. Cent., Bklyn., N.Y.

Premature infants between 1000 and 1600g were assigned at 3 days of age to one of 4 groups, and fed a standard formula in which only the proportion of PUFA was varied by changes in the fat blend, and in which the vitamin E:PUFA ratio was kept constant. Sequential blood sampling showed a progressive rise in serum HDL levels in virtually all infants by 20 days of age (p<.01). Total cholesterol levels rose significantly (p<.05) by 20 days only in the group on the lowest concentration (16%) of PUFA.

Sequential serum cholesterol and HDL levels were as follows:

Group (%)	Serum Total Cholesterol	HDL(mg%)	Mean±S.D.	
Number	I(16%)	II(29%)	III(40%)	IV(50%)
3 days	Chol: 92±24*	98±22	101±15	90±25
	HDL: 18±8	21±8	21±8	18±10
20 days	Chol: 123±18**	109±31	103±14	96±24
	HDL: 36±8	35±8	38±9	32±5
40 days	Chol: 138±18**	104±19**	103±24**	101±25**
	HDL: 46±9	33±4	41±12	36±9

*p<.05 **IvsIIp<.01; IvsIIIp<.05; IvsIVp<.01

The results demonstrate the ability of very-low-birth-weight infants to exhibit rapid metabolic adjustments in response to variations in dietary PUFA levels, though the long-term significance is conjectural at this time.

549 SELECTIVE FETAL MALNUTRITION: A NEW CONCEPT IN THE FETAL ALCOHOL SYNDROME (FAS). Stanley E. Fisher, Mark Atkinson, Ian Holzman, Ronald David, David H. Van Thiel (Spon. T.K. Oliver), Children's Hosp. of Pitt., Univ. of Pittsburgh Sch. of Med., Pittsburgh.

Several features of the FAS suggest intrauterine growth retardation. Traditionally, these findings have been ascribed to the direct toxic effects of ethanol (EtOH) or its metabolite, acetaldehyde (ACh). Deprivation of essential fetal nutrients at the placental level (selective fetal malnutrition) has not been considered etiologic. EtOH is known, however, to inhibit membrane transport of amino acids (A-A). We have therefore investigated the effect of EtOH and ACh upon human placental uptake of the actively transported, non-metabolized A-A, α-aminoisobutyric acid (AIB). Term human placental villi were incubated with ¹⁴C-AIB in the presence or absence of EtOH (300 mg/dl). No inhibition of uptake was seen at 30, 90 or 150 min. of incubation. However, after 90 min. of incubation with varying concentrations of ACh (readily achieved in the blood of drinking humans), there was significant (p<.01) inhibition of AIB uptake. % inhibition (mean ± SEM); 2 μM = 25 ± 8.7%; 5 μM = 34.7 ± 4.0%; 10 μM = 54.6 ± 2.9%; 20 μM = 61.5 ± 7.5%. When villi were pre-incubated with 10 μM ACh for 60 min. and then incubated with ¹⁴C-AIB in the absence of ACh, normal AIB uptake was not totally restored: % inhibition (90 min.) = 25.5 ± 5.6%, p<.01. CONCLUSION: (1) In vivo metabolism of EtOH to ACh in the chronic alcoholic pregnant human may impair placental transport of essential A-A's, thereby contributing to the pathophysiology of the FAS. (2) The effects of ACh upon placental function may not be totally reversible.

550 THE EXTENT OF MICROBIAL DEGRADATION OF BILE ACIDS: AN IMPORTANT FACTOR MODULATING THEIR ABSORPTION. André Fontaine, Claude C. Roy, Guy Lepage, Liette Chartrand, Claude L. Morin and Andrée Weber. Univ. of Montreal, Hôpital Ste-Justine, Dept. of Pediatrics, Montreal.

Experimental work has shown that less polar bile acids, although better absorbed passively, have a reduced affinity for the ileal transport system and are more extensively adsorbed to residues and microbes. This study examines the fecal excretion of bile acids and the % adsorbed in relationship with the qualitative pattern in 2 categories of patients with an intact ileum. The contaminated small bowel syndrome was diagnosed in 4 cases of chronic idiopathic intestinal pseudoobstruction with fat (19.3 ± 6.8g/24h) and bile acid (693 85mg/m²/24h) malabsorption. Primary bile acids were essentially absent. The sum of deoxycholic, lithocholic, 3-ketocholanoic and 3-betacholanoic acid accounted for 80.3±6.2% of the total. Only a small % (16.7±5.4) of bile acids could be recovered in the aqueous phase. A marked reduction (P < .001) of the anaerobic flora in a fresh stool obtained from 6 CF children on triple I.V. therapy was associated with a reduction in the concentration of the secondary forms (P<.005) and with a 5-fold increase (10.2 vs 52.7) in the % of bile acids in the aqueous phase when compared to 7 studied off antibiotics. In 4 CF patients studied both on oral cloxacillin and during I.V. therapy, there was no change in steatorrhea (15.9±5.7 vs 18.8±7.8g/24h) but a large decrease in bile acid loss (751±182 vs 366±93). This study suggests that the extent of microbial transformations of bile acids in the GI tract plays a role on their absorption.

551 LEAN WEIGHT AS A FUNCTION OF BODY FAT. Gilbert B. Forbes. Department of Pediatrics, University of Rochester Medical Center, Rochester, New York.

Several factors are known to influence the lean body mass, and these include the obese state. A review of our data on body composition (K-40 counting) for females of widely varying body fat content, including anorexia nervosa, reveals a most interesting relationship between the amounts of fat (F) and lean (L). The data nicely fit the equation L = a log F + b, which in differential form (dL/dF = a/F) states that the change in L with respect to F declines in curvilinear fashion as F increases. Observations by others, using different methods for estimating body composition, generally confirm this trend.

This finding leads to the following predictions: 1) because the ratio a/F in the equation is smaller, obese people will lose less nitrogen during caloric deprivation than thin people; 2) deliberate overfeeding will cause an increase in L as well as F; 3) refeeding patients with anorexia nervosa will produce a sizeable increase in L, since the ratio a/F is relatively large; 4) induced weight loss by whatever means will produce loss of L as well as F; hence no scheme for treating obesity can really "spare" body protein; 5) since they are fatter, women can tolerate famine better than men, and likewise adults better than children. All of these predictions find confirmation in the literature and/or in our own experience.

Hence it appears that the lean and fat components of the body are interdependent; some internal mechanism(s) must exist to regulate their relative proportion.

552 ALTERATION OF LOW DENSITY LIPOPROTEIN CHOLESTEROL BY CHANGES IN DIETARY CHOLESTEROL, TOTAL FAT, AND P/S IN NORMAL AND HYPERCHOLESTEROLEMIC CHILDREN. P.Gartside, E.A.Stein, J.Shapero, C.J.Glueck. Univ. Cincinnati, College of Medicine, Cincinnati General Hosp., LRC, GCRC, Cincinnati, Ohio.

Dietary cholesterol(DC), P/S ratios, and total fat (TF, as a % of calories) were altered during two 3 month diet(D) periods to assess effects of D on plasma low density lipoprotein cholesterol (LDLC) in 11 normal(N) children(CH), and in 12 CH heterozygous for familial hypercholesterolemia(FH). The baseline ad lib D (<350 mg DC, TF 40%, P/S 0.7) was compared to a therapeutic(T) D, (<150 mg DC, TF 35%, P/S 1.0), and subsequently to a DC rich, lower P/S D (>450 mg DC, TF 40%, P/S 0.6). Adherence to D and nutrient intakes (NI) were assessed monthly using a 7 day D diary. General food patterns were retained; targeted NI levels were reached by substitutions with commercially available fat-altered foods. The number(n) of N and FH CH by age, race, and sex-specific LDLC percentile distributions during the D periods were as follows:

	N CH	25th	50th	75th	90th	95th	FH CH	25th	50th	75th	90th	95th
ad lib	0	4	3	4	0	0	0	0	0	0	0	12
TD	2	4	3	2	0	0	0	0	0	3	9	
DC rich	0	0	6	2	3	0	0	0	0	0	12	

The TD shifted LDLC in N CH downward from levels on ad lib D, moving the LDLC mode to the 50th percentile, while DC rich D elevated LDLC, with all 11 N CH at or above the 75th percentile. In FH CH, LDLC generally remained >the 95th percentile irrespective of D. TD have major utility in N CH, many of whom acquire elevated LDLC on ad lib and DC rich, low P/S D.

553 LONGITUDINAL CHANGES IN MILK COMPOSITION OF MOTHERS DELIVERING PRETERM AND SMALL-FOR-GESTATIONAL AGE INFANTS. Cutberto Garza, Carmen A. Johnson, Nancy F. Butte, O'Brian Smith, and Buford L. Nichols. USDA/SEA Children's Nutrition Research Center, Department of Pediatrics, Baylor College of Medicine, Houston, TX. 77030.

The concentrations of protein nitrogen (PN), non-PN (NPN), energy (Cal), fat (F), sodium (Na), calcium (Ca), phosphorus (P), magnesium (Mg), and zinc (Zn) were determined in human milk from mothers giving birth to infants classified as preterm appropriate-for-gestational age (PAGA, n=5); preterm small-for-gestational age (PSGA, n=4); term AGA (TAGA, n=5); and term SGA (TSGA, n=6). Samples were collected under controlled conditions at 2 week intervals for 12 weeks postpartum. PN concentrations did not differ significantly except between PSGA and TSGA. Overall PN means were 206 and 157 mg%, respectively. No other differences in nutrient concentration were observed between the 4 groups. Concentrations of PN, NPN, Na, P, and Zn decreased over time. The concentration of Mg increased slightly. The content of F, Cal, and Ca did not change. These data indicate that the concentrations of some potentially limiting nutrients do not differ in milk from mothers delivering term and preterm infants.