† 715

PARENTERAL FAT AS NITROGEN SPARER IN LOW BIRTHWEIGHT (LBW) INFANTS. Marjolain Pineault, Philippe Chessex, Suzanne Bisailon, Gilles Brisson, Louis Dallaire, Hôpital St. Justine, Dept. of Ped. & Pharmacy, Univ. of Montreal.

The nitrogen sparing effect of calories has been documented, however the influence of the quality of these calories has not been studied in LBW infants. The aim of this study was to compare the metabolic response of glucose and fat in parenterally fed LBW infants. In a paired design, 6 LBW infants (mean $\pm$ SD, birthweight: 2055 $\pm$ 586; gestational age: 34 $\pm$ 2wk; age: 19 $\pm$ 20d) received 2 isoprotein (Travasol C: 2.8 $\pm$ 0.1g/kg.d) and isocaloric (67 $\pm$ 13kcal/kg.d) regimens over 12 days. During a high glucose phase (CHO) 77 $\pm$ 3% of nonprotein energy was infused as glucose, versus 56 $\pm$ 10% as fat during a high lipid phase (LIP). Nitrogen retention (N₂ Ret), triglycerides (TG), plasma phenylalanine (PHE) and tyrosine (TYR), insulin (INS), pCO₂ (n=4, free of RDS) were compared:

	N ₂ Ret (mg/kg.d)	TG (mg/dl)	PHE (TYR)	INS (μ U/ml)	pCO ₂ (mm Hg)
CHO	180 $\pm$ 54	70 $\pm$ 36	2.2 $\pm$ 0.2	13 $\pm$ 5	46 $\pm$ 6
LIP	237 $\pm$ 48	113 $\pm$ 38	1.5 $\pm$ 0.3	9 $\pm$ 2	40 $\pm$ 7
p<	0.005	0.05		n.s.	0.01

No significant plasma amino acid imbalance was noted. Lipogenesis, a NADPH dependent process, was suggested by the higher PHE/TYR ratio found during CHO. Free fatty acids provided by a high fat (3g/kg.d) fuel mixture, produced a better N₂ Ret without compromising the respiratory function. The results emphasize the relation between the composition of infused energy and the quality of growth in parenterally fed infants as opposed to adults.

716

BACTERIOSTATIC QUALITIES OF HUMAN MILK. W Pittard, D Anderson, E Cerutti, B Boxerbaum. Case Western Reserve Univ, Depts of Peds & Nutr, Cleve, OH.

We have previously reported no increase in bacterial colony forming units/ml (BCFU/ml) in human milk (HM) after 48 hours of refrigeration. The bacteriostatic quality of HM without the benefit of refrigeration is a practical concern of working mothers. Therefore, we investigated the relationship between the number of BCFU/ml of milk vs timed room temperature (19-26°C) incubation (storage). Quantitative cultures of milk stored at room temperature were performed at 0, 2, 4, 6 and 24 hours post expression. Milk from 10 mothers less than six days postpartum (colostrum) and from 10 mothers 7-42 weeks postpartum (mature milk) was studied.

	0 ^a	6	24
Colostrum ^b	8	2.5	2.5
Mature milk ^b	0.7	1.6	86 ^c

a=hours room temperature incubation; b=BCFU $\times$ 10³; c=p<.005

The number of BCFU/ml at 0 time did not significantly increase in mature milk after 6 hours nor in colostrum after 24 hours of storage at room temperature. However, the BCFU/ml in mature milk was significantly greater (p<.005) at 24 hours than after 0 and 6 hours of incubation. Thus, mothers who express milk at work for their own infants may assume that the bacterial contamination of their milk will not increase significantly for up to six hours post expression even if they have no access to refrigeration.

717

THE EFFECT OF SELENIUM (Se) ON THE GROWTH OF SUCKLING RAT PUPS. Ester Ponce, Jean Cacciabaud, Shang-Yao Chen, Platon J. Collipp, Mehmet Y. Dincsoy. Health Sciences Center, SUNY at Stony Brook, Nassau County Medical Center, Department of Pediatrics, East Meadow, NY.

The optimal dose for health and the toxic dose of Se are not widely separated. Very little information is available about the toxic effects of Se during perinatal period, particularly on growth. We studied 13 group (A) and 15 group (B) suckling rat pups by providing sodium selenite in the drinking water of their corresponding mothers, dam A and dam B, at the concentration of 0 and 3 ppm Se, respectively. After the first 3 weeks of exposure, 6 of the dam B pups were adopted by dam A who had no Se in drinking water (C). Experiment was carried out during the first 6 weeks post partum. Percent change in wt from the baseline values (A₀ and B₀) follows:

	0	1	2	3	4	5	6 wks
A/A ₀ %	100	250*	380*	660*	980*	1480*	2110*
B/B ₀ %	100	190*	320*	470*	700	1000	1670*
C/B ₀ %	100			510*	860*	1400	2370*

t vs initial wgt: *p<0.001 : t B/B₀ vs C/B₀: +p<0.001

Se concentrations were higher in every tissue of B compared to A. Two of the B pups died although their dams were not intoxicated. Se obtained through breast milk may have a toxic influence on suckling rat pups including a retarding effect on growth despite the absence of an effect on the corresponding dam which may be indicative of a relative increase of susceptibility. The effect on growth seems to be partially reversible.

718

ABNORMALITIES IN FAT-SOLUBLE VITAMIN STATUS AT THE TIME OF DIAGNOSIS IN INFANTS WITH CYSTIC FIBROSIS IDENTIFIED BY NEWBORN SCREEN. Mary C. Reardon, Keith B. Hammond, Linda J. Jacobson, and Ronald J. Sokol. (Spon. by Ronald W. Gotlin). Univ. of Colorado School of Medicine, Department of Pediatrics, Denver.

We have previously reported evidence of early protein malnutrition in some infants with cystic fibrosis (CF) identified by the newborn screening method using serum immunoreactive trypsinogen. We now report very early abnormalities in the status of fat-soluble vitamins in 6 of 10 infants (mean age, 5.7 weeks; range, 3-8 weeks) with CF identified by screening in 1984. Plasma retinol (PR) and γ and α -tocopherol (α -Toc) levels were measured by HPLC. Retinol binding protein (RBP) levels were measured by radial immunodiffusion. Total serum lipids, serum albumin, calcium, and phosphorus were measured by standard methods. Four infants had low levels of serum albumin (<3.2 g/dL), low levels of α -Toc (<3.0 μ g/ml), and low total tocopherols/total serum lipid ratios (<0.6 mg/gm). Three of these infants had RBP levels of 1.5 mg/dL (normal, 1.4-3.3 mg/dL). PR levels were low in 5 infants (<20 μ g/dL). PIVKA-II assays (by plasma immunoelectrophoresis before and after BaCO₃ absorption, representing noncarboxylated prothrombin specific for Vitamin K deficiency) were negative in all infants. Serum calcium and phosphorus levels were not low, suggesting adequate Vitamin D status. We conclude that as early as 6 weeks of age, some infants with CF have biochemical deficiencies of the fat-soluble vitamins A and E. However, these infants, all of whom had parenteral Vitamin K prophylaxis at birth, were not Vitamin K deficient.

● 719

PRESERVATION OF BRUSH BORDER MEMBRANE ALANINE TRANSPORT IN ACUTE VIRAL DIARRHEA. Marc Rhoads, John MacLeod, Richard Hamilton, Div. Gastroenterology, Dept. Ped., Univ. Toronto, Research Inst., Hosp. Sick Children, Toronto, Ontario, Canada.

To further characterize mechanisms of viral diarrhea, we assessed ³H-alanine uptake into small intestinal brush border membrane vesicles (BBMV) from piglets after experimental infection with transmissible gastroenteritis (TGE) virus. With a 100mM NaCl gradient, accumulation ratios (alanine uptake from 5 sec to 4 min $\div$ equilibrium uptake at 4 hrs) were equivalent in control & TGE BBMV. Maximal "overshoots" were equivalent (1.7 $\pm$ 0.1 x in control & 1.9 $\pm$ 0.3 x in TGE BBMV). ³H glucose accumulation ratios, as before (Gastro. 80:1191, 1981), were blunted (p<.01) in TGE BBMV. These results agree with our Ussing chamber data suggesting more than 1 co-transporting BBM system in TGE epithelium. Short-circuited TGE jejunum demonstrated a greater increment (p<.05) of net Na absorption after alanine (50mM) plus glucose (30mM) (Δ Jnet=3.3 $\pm$ 0.4 uEq/cm²/hr) than after optimal concentrations of either alanine (50mM), (Δ Jnet=0.8 $\pm$ 0.6 uEq/cm²/hr) or glucose (30mM) (Δ Jnet=1.7 $\pm$ 0.5 uEq/cm²/hr). We conclude a) Na gradient-dependent BBM alanine transport is relatively preserved in crypt-type epithelium characterizing viral enteritis and b) the blunted response of net Na flux to alanine in TGE tissue in Ussing chambers (Gastro. 86:128, 1984) is not a brush border phenomenon. Since TGE closely resembles human rotavirus enteritis, we suggest that our findings are relevant to the formulation of improved oral rehydration treatment solutions for infant diarrhea.

RESPONSE OF Na ABSORPTION TO DIPEPTIDE IN ACUTE VIRAL DIARRHEA. Marc Rhoads, John MacLeod, Emile Katona, Richard Hamilton, Depts. Ped. & Biochem., Univ. Toronto, Research Institute, Hosp. Sick Children, Toronto, Ontario.

Because dipeptides may be faster absorbed than constituent amino acids *in vivo*, we compared effects of L-alanine (ala) and alanyl-alanine (ala-ala) on jejunal Na transport in piglet transmissible gastroenteritis (TGE), an acute viral enteritis resembling human rotavirus enteritis. In Ussing chambers, control pig jejunum responded to ala (20mM) with an increase in net Na absorption (p<.05) over basal period; this response did not differ from that to ala-ala (10mM). At peak of diarrhea, Na transport didn't respond to ala (20mM) or to ala-ala (10mM).

	Control	TGE
Na	basal	-1.5 $\pm$ 0.7 (5)
Jnet	alanine(20mM)	1.7 $\pm$ 1.1*
(μ Eq/cm ² /hr)	basal	-2.5 $\pm$ 0.5 (8)
(*p<.05 vs basal)	ala-ala(10mM)	0.2 $\pm$ 1.2*
		-1.6 $\pm$ 0.5 (9)
		-0.3 $\pm$ 0.9

Hydrolysis of added dipeptide appeared complete by 10 min in control Ussing chambers (mucosal side) & 86% complete in TGE chambers. TGE tissue was characterized by crypt cell-type epithelium with $\downarrow$ disaccharidases (sucrase 2.5 $\pm$ 0.5 vs 53.1 $\pm$ 6.5 U/mg) & $\uparrow$ thymidine kinase activity (72.2 $\pm$ 7.2 vs 9.4 $\pm$ 1.0 U/mg) (p<.001). We conclude that a) ala-ala stimulates jejunal Na absorption no better than its constituent amino acid in viral diarrhea and b) control jejunal response to ala-ala seems due to efficient release of alanine at brush border surface. These findings are potentially important to formulation of an optimal oral rehydration solution for infant diarrhea.