† 636 THE CLOSE ASSOCIATION BETWEEN ACCELERATED RATES OF WHOLE BODY PROTEIN SYNTHESIS(S) AND BASAL METABOLIC RATE (BMR) IN CHILDREN WITH NEWLY DIAGNOSED ACUTE LYMPHOCYTIC LEUKEMIA (ALL). Craig L. Kien and Bruce M. Camitta, Medical College of Wisconsin, Midwest Children's Cancer Center, Milwaukee Children's Hospital, Departments of Pediatrics and Biochemistry, Milwaukee, WI.

Using a single dose [^{15}N]-glycine technique in 15 newly diagnosed ALL patients, we confirmed our previous data which showed increased rates of S and whole body protein breakdown in comparison to healthy controls (independent of prior prednisone treatment; 8 so treated) (Cancer Res 43:5586). In 8 patients we assessed basal oxygen consumption (BMR; assume 4.83 kcal/l O_2); there was a significant linear regression between BMR (kcal/d) (Y) and S (g protein/d) (X): Y=3.7 X + 850 (R=0.925, p<0.001). Individual values (Y,X) for the 8 patients were: 835, 36; 1085, 87; 1252, 121; 1273, 134; 1614, 124; 1551, 179; 2087, 394; 2212, 308. Excluding the 2 highest values for Y and X, there was still a significant correlation (R=0.87, p<0.05), and there was a positive rank correlation for all 8 values (R=0.905, p<0.01). There were also significant positive correlations between BMR and body weight (Wt) (R=0.75, p<0.05) or age (R=0.83, p<0.05) and between S and Wt or age (both, R=0.86, p<0.01). Multiple regression analysis revealed that BMR was much more highly related to S than to Wt. These data suggest that increased energy costs of S account, at least in part, for increased energy requirements in patients with ALL. (Support: Nutrition Foundation, Inc.; Leukemia Soc. of America, Inc.; MACC Fund).

637 EFFECT OF pH on RECOVERY OF ENERGY (E) DERIVED FROM SHORT CHAIN FATTY ACIDS (SCFA) IN FECES: RELEVANCE TO STUDIES OF CARBOHYDRATE ENERGY (CE) ABSORPTION IN PREMATURE INFANTS (PI). Craig L. Kien, Medical College of Wisconsin, Milwaukee Children's Hospital, Departments of Pediatrics and Biochemistry, Milwaukee, WI

Our previous studies of PI suggested that there is minimal fecal excretion of CE derived from lactose or glucose polymer (Am J Clin Nutr 36:910). To further assess our methodology (loss of SCFA via volatilization), the following SCFA were added to fecal homogenates in sufficient quantities to raise the energy density by 18-27%: acetic (A), propionic (P), valeric (V), and butyric (B). The pKa's of these acids are respectively 4.75, 4.87, 4.82, and 4.81. Fecal samples were then either alkalinized (Alk) (pH 7.9-8.7), acidified (2.8-3.2) or left unchanged (UNC) (4.0-4.8). After storage on dry ice for 24 hrs, the samples were lyopholized and bomb calorimetry performed. There was an approximate 20% loss of SCFA in the Alk and UNC groups (Table). The potential clinical significance of this error during E balance studies will be small (< 5% CE intake) unless the actual fecal excretion of SCFA exceeds 24% of CE intake. (Support: NIH Grant HD17401).

	pH Group (% Recovery)		
SCFA	ALK	AC	UNC
A	99.8	79.1	79.1
P	102.7	78.6	79.1
V	99.8	80.0	82.2
B	100.9	77.6	78.8

638 HUMAN MILK FORTIFIER (HMF) AND VERY LOW BIRTH WEIGHT (VLBW) INFANTS. Eun H Kim and Walter C Boutwell, Santa Clara Valley Medical Center, Dept. of Pediatrics, San Jose, Ca. (Spon. by Ron Ariagno).

In order to maintain the advantage of breast milk (BM) feedings in VLBW infants without concurrent slow growth, a proprietary supplement of BM, HMF (by Mead Johnson) has been recently developed. We selected 4 VLBW infants for study and 5 for control with birth weights <1.6 kg (1.28 ± 0.22 v 1.26 ± 0.10 kg), all appropriate for gestational age. Study infants received banked BM with HMF; control received banked BM with the usual doses of Calcium (Ca) and Phosphorous (P) - 60 and 30 mg/kg/day respectively. Both received the same fluid intake (177.6± 11.2 v 176.4 ± 6.5 ml/kg/day) and Vitamin D (400 IU/day). Study group received significantly greater amounts of protein (3.2±0.2 v 2.0 ± 0.1 gm/kg/day), Ca (165.1 ± 10.4 v 118.6 ± 1.5 mg/kg/day), P (85.2 ± 5.3 v 56.4 ± 0.8 mg/kg/day) and zinc (1.8 ± .08 v .25 ± .05 mg/kg/day) compared to the control group.

Both groups tolerated the feedings to the same degree without development of necrotizing enterocolitis, clinical laboratory or radiological evidence of ricketts of prematurity. In spite of the small number studied, the study group gained weight significantly faster than the control group (Av. 16.3 v 14.1 gm/kg/day: p≤ 0.032 using the Manning-Whitney Test).

Conclusion: VLBW infants fed banked BM grew faster on HMF than on mere supplementation with Ca and P.

● 639 LONGITUDINAL STUDIES OF SOMATOMEDIN-C (SM-C) IN GROWTH-RETARDED CHILDREN WITH CROHN'S DISEASE (CD). Barbara S. Kirschner and Marjorie M. Sutton (Spon. by Lawrence M. Gartner). Pritzker Sch. of Med., Wyler Children's Hosp., Department of Pediatrics, Chicago, IL.

Our previous studies demonstrated that mean Sm-C levels were significantly lower in growth-retarded children than normally-growing children with IBD (Gastroenterology 80:1192, 1981). We now report longitudinal data in 10 previously untreated growth-retarded children with CD, followed $\bar{x}$=17.7 mos. Patients: 5F and 5M, $\bar{x}$ age 13.2 yrs., all ↓ > 1 major height %ile line with 6 of 10 pts. ≤ 5th %ile for age, Tanner stage I or II. Seven of 10 pts. received daily prednisone ($\bar{x}$=2 mos) after the initial tests. Methods: Measurements of growth velocity (cm/mo), Sm-C by RIA, calorie intake (72 hr. food diaries) and serum albumin were obtained at the onset of therapy and avg. of 5 times during the follow-up period. Sm-C levels were drawn ≥ 24 hrs. after the previous prednisone dose.

Results:	Growth Vel. (cm/mo)	Sm-C U/ml	Cal. Intake kcal/day	Cal. Intake kcal/kg	Alb. gm/dl
Initial Visit	0.14 (0.00-0.30)	0.71 (0.14-1.8)	1555 (1200-2000)	53 (37-66)	3.3 (2.6-4.5)
Follow-up Period	0.56 (0.35-0.86)	2.45 (0.74-4.8)	2500 (1900-3400)	75 (52-104)	4.1 (3.7-4.6)

Conclusions: Pts. with ↓ growth had Sm-C levels < those observed during periods of normal growth (p < 0.002). Sm-C rose by 345% and preceded changes in growth velocity & pubertal stage. Concurrently, cal. intake ↑ from 44% to 102% of RDA for ht. age. Fluctuations in Sm may contribute to changes in growth in IBD pts.

640 BILIRUBIN PHOTOISOMERIZATION UNDER GREEN LIGHT. Isabella Knox and John F. Ennever (Spon. by William T. Speck), Case Western Reserve University, Rainbow Babies and Childrens Hospital, Dept. of Pediatrics, Cleveland.

Recent clinical studies have shown that green fluorescent light is more effective in reducing serum bilirubin (BR) than is broad-spectrum white fluorescent light. During phototherapy BR is converted to more polar isomeric structures which are excreted principally in the bile. The most rapidly formed photoproducts are configurational isomers, principally Z,E-BR, which accumulate in the serum and are slowly excreted with first-order kinetics. The other major photoproduct is a structural isomer of BR called lumirubin (LR) which is formed more slowly but excreted more rapidly than the configurational isomers. The relative contribution of these two photochemical reactions to the efficacy of phototherapy is not known. In this study, we measured the steady-state serum concentrations of these two classes of photoproducts in premature infants treated with either green or white fluorescent lamps.

(mean ± SEM)	N	Mean BW	Mean GA	% Z,E-BR	% LR
Green light	8	1.5±.5kg	31±3wks	8.86±.42	1.67±.24
White light	11	1.9±.7kg	32±4wks	15.05±1.34	0.72±.13
		N.S.	N.S.	(P<.01)	(P<.01)

The concentration of Z,E-BR in the serum of infants treated with green light was significantly less than in infants exposed to white light. In contrast, the concentration of LR was greater in the serum of infants treated with green light. These data suggest the clinical efficacy of green phototherapy may be the result of increased production (and elimination) of lumirubin.

641 URINARY EXCRETION OF LUMIRUBIN DURING PHOTOTHERAPY. Isabella Knox and John F. Ennever (Spon. by William T. Speck) Case Western Reserve University, Rainbow Babies and Childrens Hospital, Dept. of Pediatrics, Cleveland.

Lumirubin (LR) is a stable photoproduct of bilirubin (BR), formed by an essentially irreversible intramolecular cyclization reaction. Unlike other BR photoisomers, LR is detected in both urine and bile in infants under phototherapy (PT). Clinical studies have suggested that the production and excretion of LR may contribute to the reduction of serum BR levels produced by PT. We therefore sought to determine the urinary LR excretion. We measured urinary LR clearance (clr) rate in 9 preterm infants under PT studied at a mean age of 4 days (range 1-6). Mean birthweight was 1.8 kg (range .7-2.9); mean gestational age (GA) was 32 wks (range 25-37). Urine and a serum sample obtained during the 24 hour collection period were analyzed for BR photoproducts by HPLC. Creatinine (Cr) clr was measured on the sample.

Mean LR clr was .16±.19 ml/min (mean±S.D.) which is equivalent to 8±4% of Cr clr (2.6±3.2 ml/min). LR clr increased with GA in parallel with Cr clr. The amount of LR excreted per 24 hours was 1.4±1.5 mg (range .9-4).

Daily BR production far exceeds the amount of LR excreted in the urine of preterm infants, so this cannot account for the efficacy of PT. However, were the clearance rate of LR to be increased to that of Cr through pharmacologic means (i.e. by blocking tubular reabsorption), urinary clearance of LR could become quantitatively important. As the urinary excretion of LR does not account for the decrease in serum BR with PT, the bile is presumably the major site of excretion of BR photoproducts.