673 THE EFFECT OF ZINC SUPPLEMENTATION ON THE VITAMIN A STATUS OF PRETERM INFANTS. Virginia A. Hustead, Janet L. Greger, Gary R. Gutcher, (Spon. by Richard D. Zachman). U. of Wisconsin, Dept. of Peds/Nutrition, Madison

Twenty-four preterm infants were randomly assigned at birth to receive 400 mcg/kg/day of I.V. zinc beginning on the first day of life or no trace elements. All infants received daily I.V. multivitamins and weekly I.M. retinyl palmitate (5,000 IU/kg), starting on day 1. Parenteral amino acids were begun on day 3. All I.M. or I.V. nutritional supplements were discontinued when the infant was tolerating enteral feedings. Plasma concentrations of zinc, retinol and retinol-binding protein (RBP) were measured on cord blood and days 2, 7, 14 and 21. Both groups were similar for: gestational age, birth weight, sex, major diagnoses, and nutritional intake except the test group received more zinc in the first 7 days. After day 7, the difference in zinc intake lost significance. Day 0 values for retinol, RBP and zinc were not significantly different between groups. Zinc levels were not significantly different between groups at any time, and changes in zinc concentrations did not correlate with intake. However, retinol values in the first 7 days increased more in the zinc supplemented group (Δ=10.0 vs 0.9 mcg/dl, p<.01). Furthermore, zinc intake over the first 7 days correlated with the change in plasma retinol concentrations (r=0.56, p<.01). RBP also increased more in the test group, but did not reach statistical significance (Δ=1.2 vs 0.4 mg/dl). We conclude that zinc supplementation was associated with an increase in plasma retinol levels, possibly due to zinc's regulatory effect on the synthesis of RBP.

674 CHOLINERGIC INFLUENCE ON GASTRIC ACID SECRETION IN PRETERM INFANTS. Paul E. Hyman, Candy Abrams, (sponsored by Rosemary D. Leake), Harbor-UCLA Medical Center, Department of Pediatrics, Torrance, California.

In healthy preterm infants, gastric acid is a barrier against bacterial colonization of the upper small bowel, and thus may decrease the risk of infection and neonatal necrotizing enterocolitis. We examined the effect of anticholinergic eyedrops on basal acid output (BAO) and pentagastrin-stimulated (6 µg/kg, s.c.) maximal acid output (MAO). Twenty infants (age 6 ± 4 wk, weight 1.7 ± 0.2 kg, mean ± SD) were each studied by continuous aspiration of gastric contents for 2 hr on 2 consecutive days during a clinically indicated eye exam. On day 1 BAO was measured before and after eyedrops; on day 2 pentagastrin was given on 2 consecutive hr; eyedrops were administered with the second injection. Eyedrops were saline placebo (n=6), cyclopentolate (CPL) 0.25% (n=6), or CPL 0.5% (n=8). Results are the mean ± SEM. Overall BAO = 12 ± 2 µmole/kg/hr; MAO = 38 ± 5 µmole/kg/hr. There were not significant differences among the subgroups. BAO was not altered by placebo or CPL 0.25%, but decreased from 15 ± 3 to 4 ± 1 µmole/kg/hr following CPL 0.5% (p<0.01). MAO was unaffected by CPL, but acid and volume output were each decreased by 50% following the 2nd pentagastrin injection (p<0.01). Thus, in preterm infants 1) cholinergic mechanisms influence BAO, 2) anticholinergic eyedrops do not alter MAO, and 3) repeated injections of pentagastrin result in tachyphalaxis. Anticholinergic eyedrops may reduce the acid barrier against microorganisms. To avoid undesirable gastrointestinal effects in infants, CPL eyedrops must be limited to 0.25%.

675 Effects of Monohydroxy Bile Acids on Bile Acid Transport in Newborn Rabbit Hepatocytes. J-X.Jiang, P.E.Simms, R.Bhat, D.Vidyasagar and M.A.Evans.Departments of Pediatrics and Pharmacology, University of Illinois Health Sciences Center, Chicago and Kunming Medical College, China.

Neonatal obstructive jaundice, neonatal hepatitis, and congenital biliary atresia are thought to be caused by the toxic effects of bile acids, especially toxic monohydroxy bile acids. These studies were performed to examine the effects of lithocolic acid (LCA) and taurolithocholic acid (TLCA) on cellular toxicity, bile acid uptake and secretion in freshly isolated hepatocytes from newborn and 23 day old rabbits. Cellular bile acid uptake and secretion were quantitated using radiolabelled glycocholic acid. Both control and treated hepatocytes were incubated for one hour in the presence of varying concentrations of monohydroxy bile acids prior to kinetic analysis of bile acid transport. A summary of transport data for hepatocytes from 23 day old rabbits is presented in the table.

		LCA (mg/ml)			TLCA (mg/ml)		
	control	10	1	0.1	10	1	0.1
UPTAKE	++++	++++	++++	++++	++	++	++++
SECRETION	++++	0	0	0	0	0	0

Hepatocytes from 4 day old rabbit under control conditions showed only negligible secretion of bile acid. The effects of LCA and TLCA on bile acid uptake in hepatocytes from 4 day old rabbits were similar to those observed with hepatocytes from 23 day old rabbit. Electron microscopy revealed that the most striking effects of monohydroxy bile acids were on the bile canaliculi (BC). The BC were greatly dilated with prominent thickening and fewer and irregular microvilli. It is concluded that BC function is selectively sensitive to disruption by monohydroxy bile acids and demonstrates significant post natal maturation.

676 RELATION OF PROTEIN SYNTHESIS TO PLASMA AND CELL AMINO ACID POOLS IN NEONATES. Carolyn Johnson, Jim Gable, Jack Metcoff. Department of Pediatrics, University of Oklahoma Health Sciences Center, Oklahoma City, OK.

The concurrent relationships of protein synthesis (PS) to birthweight (BWT), gestational age (GA), intracellular (IC) and plasma (P) amino acid (AA) levels and glycolytic enzyme activities are unknown, but relevant to nutrition of the neonate. Neutrophils, used as the cell model, were isolated from 1-2 ml blood of 63 infants 27-44 weeks post-conceptual age. PS (^{3}H-leucine incorp., pmoles/hr/mg DNA), pyruvate kinase (PK) and phosphofructokinase (PFK) enzyme activities, and 19 AA in the leukocytes (nmoles/mg DNA) and plasma (nmoles/ml) were quantified (HPLC, fluorometric detection). The differences in PS between SGA, LGA and AGA infants were not statistically significant (p>0.05), so were pooled. Stepwise multiple regression (SMR) analysis selected only two PAA (ILE, ALA) to account for a significant (p=0.04), but small proportion, 11%, of the variance (R^2) in PS, but R^2 for 6 ICAA (LEU, MET, LYS, HIS, GLY, ALA) was 32%, (p=0.001). Further SMR selected sets of 4-6 plasma AA which predicted the levels of each ICAA predictor of PS (R^2=0.2-0.5, p<0.04-0.0001). PK and PFK activities also correlated with PS (p=0.005, and p=0.0003, respectively). PFK, the major regulating enzyme in glycolysis, and PS correlated negatively with BWT and GA. The smaller and more preterm the infant the higher the rate of PS and PFK activity. Further, PS was predicted by a combination of ICAA, each of which in turn was predicted by specific sets of PAA levels. These data suggest that it may be feasible to indirectly regulate ICAA and the rate of PS, and possibly glycolysis, in neonates by selective alteration of PAA composition.

† **677** SPECIFIC IgA AND IgG INTERFERE WITH G. MURIS ADHERENCE TO INTESTINAL EPITHELIUM. Barbara Kaplan, Dawn Altmanshofer (Spons. by William Speck), Case Western Reserve Univ., Dept. of Pediatrics, Cleveland, Ohio.

Mucosal adherence may contribute to the pathogenicity of Giardia. Factors implicated as mediators of adherence of this pathogen to the mucosal surface include lectins and antibodies. We have developed a method to examine adherence of G. muris trophozoites(TR) to intestinal epithelium to evaluate the role of anti-Giardia milk and serum antibodies. Uninfected CF1 mice were anesthetized, and a 2 cm segment of small intestine isolated. The ends were ligated and resulting sac injected with TR (5 x 10^5) and 200 µl of normal(NM) or immune(IM)mouse milk (13% V/V), hyperimmune(IRS) or normal rabbit serum(NRS)(40% V/V) and their IgG fractions. Following one hour of incubation, the animals were sacrified by intracardiac infusion of Ringer's lactate 30mM EDTA. The sac was removed, inverted and agitated with liberation of epithelial sheets. Adherence was assessed microscopically by counting the number of TR adherent to 10 villi isolated from each animal studied. NM decreased the number of adherent TR from 21.8 ± 3.5/10 villi in media alone to 13.4 ± 3.2(p<.01). IM further decreased the number of adherent TR to 6.6 ± 2.5 (p<.001). Addition of NRS had no effect on adherence. IRS decreased the number of adherent parasites to 8.2 ± 2.1(p<.001). A decrease was also observed in the presence of the IgG fractions of IRS 13.2 ± 7.9, compared to the IgG fraction of NRS 23.7 ± 2.5 (p<.05). These findings suggest that specific anti-Giardia antibodies interfere with parasite adherence to the mucosal surface. This may represent an important mechanism, resulting in clearance of Giardia infection by antiparasite antibodies.

678 THE VALUES OF ABDOMINAL GIRTH MEASUREMENT. Martin S. Katzenstein, Marvin Glasser, Stuart Berezin, Leonard Newman, Harry S. Dweck. New York Medical College, Westchester County Medical Center, Valhalla, New York.

The clinical value of measuring neonatal abdominal girth is not well established although it is frequently recorded. We studied 43 newborns with gestational ages ranging from 28-40 weeks. Measurements were obtained shortly after birth and before feeding by encircling the abdomen such that the lower border of the tape measure was directly above the umbilicus and the two iliac crests. The data were analyzed by standard regression analysis techniques. The relationship of abdominal girth was greater with weight (r=.90) than with age (r=.83) although both were significant (P<0.05). The regression line for mean abdominal girth as a straight line function of weight is given by: Abdominal girth (cm)=18.90 + 3.5 (kg). The standard deviation of points around the line equals 1.54 cm. (i.e.standard error of estimate). The following chart shows, at four selected weights, the estimated mean girth as given by the above regression equation.

Wt.	Mean Girth
1,000	22.47
1,500	24.26
2,000	26.04
2,500	27.82

Preliminary data show that abdominal measurements outside the 95% prediction limits indicate possible gastrointestinal and abdominal pathology. Frequent abdominal girth measurements may be a useful screening procedure for gastrointestinal and abdominal pathology in pre-term and full term newborns.