● **564** JEJUNAL MUCOSAL FUNCTION DURING INFUSION OF Na-DEOXY-CHOLATE (DC) INTO THE MESENTERIC ARTERY IN SITU IN DOGS. M. Berant, E. Diamond, Technion-Faculty of Med. Haifa, Israel, sponsored by F. Lifshitz.

Studying 16 children (9 mos. to 3 yrs.), with protracted diarrhea and malnutrition, we found that unconjugated bile salts (UBS), were not clearly elevated in the jejunal luminal contents, whereas UBS in their serum was high (DC $14.7 \pm 8.3 \mu\text{M}$), and not detectable in sera of healthy controls. We, therefore, studied the effects of DC in the circulation on the jejunal mucosal handling of water, sodium, glucose, and glycine. We perfused *in situ* the lumen of a 30 cm segment of proximal jejunum in dogs, using phenol red as a non-absorbable marker. The supplying mesenteric arterial branch was infused with DC solutions in normal saline, calculated to reach tissue level at successive concentrations of 0, 7.5, 15, 30, and 60 μM . For each concentration of DC infused a 30-minute equilibration period was allowed and, thereafter, four 15-minute aliquots of effluent perfusate were collected. **Results:** The addition of DC to the arterial supply of the jejunal segment was associated with a significant decrease in the absorption rates of water, sodium, glucose, and glycine; the magnitude of this effect correlated with the concentrations of DC employed. Mucosal activity of $\text{Na}^+ - \text{K}^+ - \text{ATPase}$ was practically abolished by infusion of DC at 30 μM . No structural abnormalities of the mucosa were seen on light microscopy. Our experiments indicate that UBS (e.g. DC), in the circulation are detrimental to small intestinal mucosal function, and may, thus, contribute to the perpetuation of diarrheal disease.

565 INTRAESOPHAGEAL pH MONITORING IN SEVERE APNEA AND CYANOSIS OF INFANCY. WE Berquist, N Akhanjee, ME Ament, UCLA Med Center, Dept Peds., L.A., CA

Since gastroesophageal fundoplication has improved apneic symptoms in some infants, presumably by preventing aspiration or acid triggered vagal reflexes, 12-24 hour intraesophageal pH monitoring was performed to quantitate gastroesophageal reflux (GER) in all 20 infants referred for severe apnea/cyanosis requiring resuscitation. Group (Gp) A (controls) consisted of 11 infants (5 male) who proved asymptomatic in hospital and on follow-up. The 9 infants (5 male) in Gp B had apneic episodes in hospital all requiring resuscitation except one. Mean age $\pm$ SD was not different in A (3.0 ± 2.5 months) from B ($1.6 \pm .5$ months). pH monitoring results were compared for frequency (episodes of $\text{pH} < 4.0$ per hour), duration (percent reflux time of time monitored) and longest episode in minutes. These variables were studied during intervals of sleep, 2 hour postprandial and total time monitored. With the exception of duration and frequency of postprandial reflux, and frequency of sleep reflux, patients in Gp B had significantly ($P < .05$) greater reflux than Gp A by Kruskal Wallis rank sum test. Lower esophageal sphincter pressure was normal in both groups. Barium swallow was positive for GER in 6 of 9 patients in Gp B. 8 of 9 patients in Gp B had fundoplications with subsequent resolution of symptoms (mean follow-up of 23 months). All patients in B had apnea/cyanosis within 2 hours postprandially and 5 of 9 had positive correlation with intraesophageal $\text{pH} < 4.0$. We conclude that GER probably through aspiration is the major cause of severe postprandial apnea/cyanosis in infancy and recommend pH monitoring in all evaluations.

● **566** TARGET CELL ASSAY FOR HUMORAL TROPHIC FACTORS AFTER ABDOMINAL SURGERY. J. Biller, R. Montgomery, R. Grand, M. Klagsbrun. Div. Pediat. Gastroenterol., New England Medical Center, Dept. Surgery, Children's Hosp., Boston, MA.

Incorporation of ^3H -thymidine (Tdr) into DNA in 3T3 cell culture system is a reproducible assay for growth factor activity. To document existence of circulating factors involved in small intestinal growth after resection, we assayed in this system platelet-free plasma from rats subjected to abdominal surgery, and compared results to changes in intestinal DNA synthesis (S.A.), measured by Tdr incorporation into remaining ileal mucosa. CD rats (20 per group) were studied: C-Unop: controls-no surgery; C-Op: peritoneum incised; R: 80% proximal resection and anastomosis. At 24h and 2 wk, rats were sacrificed 1h after intraperitoneal Tdr. **RESULTS:**

Time	Assay	C-Unop(*)	C-Op	R
24h	3T3 (U/ml plasma)	3.2 ± 1.1	10.4 ± 2.8	12.9 ± 2.2
	DNA (S.A.)	29.8 ± 4.7	65.5 ± 10.2	80.3 ± 7.3
2wk	3T3 (U/ml plasma)	10.1 ± 1.3	13.4 ± 1.2	13.9 ± 1.4
	DNA (S.A.)	43.1 ± 5.4	61.1 ± 5.3	72.3 ± 5.6

*For all groups, $p < .025$; C-Unop vs C-Op and C-Unop vs R.

CONCLUSIONS: Growth factor activity assayed in the 3T3 cell system increases after both abdominal incision alone and intestinal resection. Simultaneously, DNA S.A. increases dramatically over control levels in remaining ileal mucosa. The production of a trophic effect on the ileum after abdominal incision alone supports the presence of circulating trophic factors. The 3T3 cell assay will be useful in further characterization of humoral factors regulating intestinal adaptation.

567 IMPORTANCE OF COLONIC MUCOSAL BIOPSIES IN THE DIAGNOSIS OF INFLAMMATORY BOWEL DISEASE (IBD) IN CHILDREN AND ADOLESCENTS. Ellen L. Blank and Steven L. Werlin, Med Col Wisc, Department of Pediatrics, Milwaukee, WI.

The diagnosis of IBD is usually based on historic, radiologic, endoscopic, and histologic evidence of mucosal disease. 8 children (ages 7-17 yrs; 2M, 6F) evaluated for abdominal complaints [abdominal pain (7), diarrhea (6), bloody stools (3), fever (1), perianal rash (1), abdominal distention (1), anorexia (1)] were found to have abnormal rectal biopsies but normal hemograms (8/8), serum albumin and total protein (7/7), and contrast radiographs of the upper and lower intestinal tracts (8/8). Sigmoidoscopy, abnormal in 5/8, showed mild friability (3/8) and a single superficial ulceration (1/8). Mucosal biopsies showed edema, chronic inflammatory changes, or focal hemorrhage in the lamina propria. The 6 treated with sulfasalazine (SAS) (mean 7.4 mos) improved. When SAS was discontinued, 4 relapsed with recurrence of initial symptoms (mean 9 mos). At the time of relapse chronic ulcerative colitis was diagnosed in 2, 1 had normal barium contrast studies and colonoscopic biopsies, and 1 is undiagnosed. Of the untreated patients 1 is well and 1 has chronic ulcerative colitis radiographically and histologically. 3 have not relapsed during followup (mean 13.3 mos). **Conclusions:** 1) Abnormal colonic mucosal biopsies in patients with recurrent abdominal pain and diarrhea, even with normal laboratory, radiographic, and sigmoidoscopic studies, suggest the presence of IBD. 2) Mucosal biopsies should be part of the evaluation of patients with recurrent abdominal pain even if sigmoidoscopy is normal.

568 THE EFFECT OF GESTATIONAL AGE, MATERNAL DIET, AND SAMPLING TIME ON HUMAN MILK MINERAL CONTENT. Linda S. Book, Gary M. Chan, and M. Rita Thomas (Spon. by M. Simmons). Dept. of Pediatrics, School of Medicine and Division of Foods and Nutrition, College of Health, University of Utah Medical Center, Salt Lake City, Utah.

Mineral concentrations were determined in milk of mothers of preterm and term infants. Fore and hind milk samples were collected 3 times a day from 19 mothers of term and 15 mothers of preterm infants. Milk was collected at 3, 12, and 30 days postpartum and diet records were completed on all mothers for 2 days at 3, 12, and 30 days postpartum. Calcium, phosphorus, potassium and sodium concentrations were measured in milk samples and calculated from the diet records. Sodium concentration was significantly different between the term and preterm groups for all days (preterm: 3 days, $17.9 \pm 6.6 \text{ mg/dl}$; 12 days, 15.2 ± 7.9 ; 30 days, 10.6 ± 4.3 ; term: 3 days, $14.2 \pm 7.3 \text{ mg/dl}$; 12 days, 10.3 ± 4.5 ; 30 days, 8.5 ± 3.9) whereas calcium, potassium and phosphorus were different between groups for only one of the three days sampled. Calcium concentration of preterm milk and calcium and phosphorus concentration of term milk differed significantly between fore and hind milk samples (calcium: preterm fore: $25.9 \pm 5.1 \text{ mg/dl}$, hind: 24.5 ± 5.7 ; term fore: $27.9 \pm 5.7 \text{ mg/dl}$, hind: 26.8 ± 4.7). Calcium and sodium concentration of milk of mothers of term and preterm infants correlated for only one day with dietary intakes of the respective mothers. With the variation of milk mineral concentration due to gestational age, sampling times and diet, it remains difficult to quantitate the dietary calcium, phosphorus, potassium and sodium intakes of infants.

● **569** DEVELOPMENTAL MATURATION OF JEJUNAL PHOSPHATE (P) TRANSPORT BY BRUSH BORDER MEMBRANE IN THE RAT. Stephen M. Borowitz, Faye K. Ghishan, Dept. of Pediatrics, Vanderbilt University Med. Ctr, Nashville, TN.

Neonatal animals require large amounts of P to induce skeletal mineralization. To determine if this P accumulation is due to developmental changes in intestinal transport of P, we examined P transport in isolated jejunal brush border membrane (BBM) vesicles from 14 and 42 day old rats. The BBM vesicles were prepared, and the transport system validated and studied using previously published techniques.

P uptake was sodium dependent at both ages, being significantly enhanced at 20 seconds, 1, 2, and 5 minutes in the presence of a sodium gradient, as compared to potassium gradient conditions ($p < 0.001$). P uptake at all time points was remarkably greater in the younger animals ($p < 0.001$). At both ages, valinomycin had no effect on sodium dependent uptake ($p < 0.001$) implying that P uptake is electroneutral. Kinetics of uptake were determined at P concentrations of 0.01 to 2.5 mM. The K_m value for uptake was similar at both ages (0.210 vs 0.171 mM) however V_{max} for the 14 day old animals was five times that of the 42 day old animals (4673 vs 963 picomoles P/mg protein). Trans-stimulation studies indicate that the increased transport in young animals is due in part to an increase in the number of P transporters.

These studies suggest P transport is similar in 14 and 42 day old rats in that uptake is sodium dependent and electroneutral. The increase in transport in the younger animals can be explained in part by an increase in P transporters.