632 Oral Therapy of Acute Watery Diarrhea (AWD) in well-nourished Children (WNC) in USA and Panama (P). M.Santosham,L.Dhilman,R.B.Sack,R.Daum,B.Russel from Baltimore City Hospitals,The Johns Hopkins Univ.School of Medicine,Social Security Hosp., Panama and Charity Hosp.,Tulane Univ. Medical Center. Oral rehydration solutions (ORS) containing 90 m.mol/L of Na have been successfully used in the treatment of dehydration secondary to AWD among undernourished children in many parts of the world;however, little data are available on the use of ORS in WNC. We evaluated the use of two ORS (A&B) compared to standard intravenous (IV) hydration (Group C) among 134 (40 in USA and 94 in P) hospitalized WNC (height & weight above 3rd percentile),aged 3 mths to 2 yrs with AWD.Solutions A & B differed only in their NaCl content. Solution composition was (m.mol/L): glucose 111;Na+90 (A) or 50 (B); Cl- 80 (A) or 40 (B);K+ 20;and HCO_3- 30. Intake and output measurements and serum electrolytes were monitored serially until discharge. 16, 14, 11 in USA and 30, 33 and 31 in P were randomized to Groups A,B & C respectively. The mean weight gain after hydration in US was 3.6% and 6.6% in P All the ORS patients (including 2 that presented with serum Na of 155 & 157 m.Eq/L in Groups A & B respectively) were successfully hydrated with ORS alone,with one exception. This patient in Group A (US) who required additional IV hydration had a high stool output (11.25 ml/kg/hr). None of the patients experienced hyper- or hyponatremia, hyper- or hypokalemia after commencing treatment. The mean volume of ORS ingested during the illness was 244 and 267 ml/kg ($p>0.05$) in Groups A & B respectively in U.S. and 103 and 82 ml/kg ($p>0.05$) respectively in P.We conclude that both ORS A & B can be successfully used for the hydration of WNC with AWD.

633 TECHNETIUM SCAN FOR NECROTIZING ENTEROCOLITIS. J.B. Schick, M.A. Swanson, K.L. Cox, L.E. Smith and B.W. Goetzman. Univ. of California, Davis Sch. of Med., Depts. of Pediatrics, Nuclear Medicine and Radiology, Davis, CA.

Studies in animals have shown that parenteral technetium pyrophosphate ($Tc^{99m}PYP$) is localized in infarcted intestinal tissue. We are reporting the use of this radiopharmaceutical agent in 13 infants with suspected necrotizing enterocolitis (NEC). A Picker portable camera with high-resolution columnator was used to obtain 250,000 count images in the anterior and both lateral projections 2-1/2 hrs after 500 microcuries of $Tc^{99m}PYP$ were injected intravenously. A positive scan was defined as a curvilinear focus of increased uptake anterior to the spine and kidneys seen on one or more projections. NEC was clinically staged using the scoring system of German et al. Three clinical Stage III infants had positive scans. One had free air on X-ray; all died. One positive scan was found in 6 Stage II infants. This infant had a prolonged course of NEC. One Stage II infant progressed to Stage III, requiring surgery 3 days after the scan when his ductus arteriosus opened. No positive scans were found in 4 Stage I infants who had other diagnoses to explain NEC-like symptoms. A positive scan was significant ($x^2 = 5.29$; $p < 0.25$) as a predictor of requirement for surgical intervention. The $Tc^{99m}PYP$ scan for bowel infarction may be a more sensitive tool than serial abdominal X-rays to identify infants with transmural infarction at risk for perforation with comparable radiation exposure. With further experience, this technique may be predictive of mortality and useful in making therapeutic decisions.

634 EFFECT OF INTRALUMENAL CATION-EXCHANGE RESIN ON EXCRETION OF AMMONIA IN RAT ILEUM. Kathleen B. Schwarz, Irene E. Karl, & David H. Alpers (Spon. by Patricia Monteleone), St. Louis Univ. School of Medicine, Cardinal Glennon Memorial Hospital for Children, Department of Pediatrics, St. Louis, and Washington Univ. School of Medicine, Department of Medicine, St. Louis. Ammonia excretion was studied in rat ileal segments during perfusion of the animal through the saphenous vein. Average net change in lumenal ammonia in the first 10 mins following intravenous infusion of L-glutamine (116 mg/kg to double arterial glutamine concentration) was 13 ± 8 nmol NH_3/min/g ileum. Average net change in ileal venous ammonia post-glutamine was 28 ± 9 nmol NH_3/min/g ileum. Average net change in total ammonia (lumen + ileal vein) post-glutamine was 41 ± 13 compared to -5 ± 10 nmol/min/g ileum for animals infused with saline $p < 0.025$. These data suggest that ileal metabolism of arterial glutamine liberates ammonia to both ileal venous blood and intestinal lumen. When a cation-exchange resin which binds ammonia was infused intralumenally, average net change in lumenal ammonia in the first 10 minutes following intravenous infusion of 116 mg/kg L-glutamine was 415 ± 156 nmol NH_3/min/g ileum ($p < 0.01$ compared to value during perfusion of Earle's solution alone). During the first 10 minutes following glutamine infusion net change in ileal venous plasma ammonia was -8 ± 14 when resin was being perfused through the lumen compared to 28 ± 9 nmol/min/g ileum during perfusion of Earle's solution alone without resin $p < 0.05$. Thus resin in the small intestine can trap very large amounts of ammonia & may be useful in treating hyperammonemia.

635 SODIUM BALANCE IN THE INFANT ILEOSTOMATE. Kathleen B. Schwarz,* James P. Keating, Martin J. Bell, and Jessie Ternberg. Washington Univ. School of Medicine, St. Louis Childrens Hospital, Dept. of Pediatrics & Surgery, St. Louis. *Now of St. Louis Univ. School of Medicine, (Spon. by Patricia Monteleone). Sodium balance was assessed in infant ileostomates to learn if a sodium intake of approximately double the normal infant's requirement would be adequate to protect the infant against anticipated ileal Na losses. Six infants were studied just prior to ileostomy closure, at 3½-11 months of age. During the three-day balance study infants were maintained on 3/4 strength Pregestamil with total Na intake adjusted to 6 mEq/kg/day. Ileal excreta contained 80-119 mEq Na/1000g stool (4-30 mEq Na/day). Mean urine Na was 8±6 (S.D.) mEq/day and mean net sodium balance was +7±5 mEq/day. Mean plasma renin was 8.8±9.6 ng/ml/hr (normal 6.3±3.9) and mean plasma aldosterone was 82±37 ng/100 ml (normal 60±35). Sodium balance was again assessed in three of these infants 1 wk. following reanastomosis when sodium intake was 3 mEq/kg/day. Mean fecal sodium excretion was 2.2 mEq/day ($p < 0.05$ compared to the ileostomy balance period. Urinary sodium excretion was 4±4 mEq/day. Mean net sodium balance +5±3 mEq/day was similar to the ileostomy balance data but renin 2.9±1.2 ng/ml/hr aldosterone 49±17 ng/100 ml were decreased. Conclusion: six mEq Na/kg/day probably provides less than optimal sodium intake for the infant ileostomate resulting in increased serum aldosterone and avid sodium retention. One wk. after reanastomosis colonic absorption of sodium is sufficient to reduce the sodium needs of the infant.

636 MECHANISMS FOR SEX DIFFERENCES IN ANTACID-INDUCED PHOSPHATE DEPLETION. Kathleen B. Schwarz, Debra C. Zimmerman, Max Zahn, David H. Alpers, & Louis V. Avioli. (Spon. by Patricia Monteleone) St. Louis Univ. School of Medicine, Cardinal Glennon Memorial Hospital for Children, Dept. of Pediatrics, St. Louis, & Washington Univ. School of Medicine, Dept. of Medicine, St. Louis. Six wk. old male & female rats were gavaged daily with either Basaljel (1ml/100gm body wt.) or distilled water for 3 wks. Baseline, 1 wk. & 3 wk., values for serum phosphorus (Pi) in 10 Basaljel-treated females (BTF) were 7.4±0.1, 6.4±0.3, & 6.3 mg/dl respectively; corresponding values for 10 Basaljel-treated males (BTM) of 8.2±0.1, 7.3±0.2, & 7.4±0.2 mg/dl were significantly higher ($p < 0.05$). By 1 wk. of therapy, serum Pi of BTF was lower than that of 10 female controls ($p < 0.025$); serum Pi values of BTM and 10 male controls were similar even after 3 wks. of therapy. Serum calcium of the BTF after 3 wks. was higher than female controls 10.5±0.1 vs 9.9±0.2 mg/dl ($p < 0.025$); values in BTM did not differ from male controls. After 3 wks. of treatment BTF had significant elevation in urinary calcium ($p < 0.005$) & decreases in urinary cAMP ($p < 0.025$) when compared to BTM. In vitro ($^{32}PO_4$) absorption by isolated duodenal and jejunal loops during Pi depletion was similar in BTF & BTM whereas initially absorption into mucosa was higher in BTM compared to BTF ($p < 0.05$). Summary: In contrast to the male, phosphate depletion in female rats results in hypercalcemia, hypophosphatemia, & decreased urinary cAMP. These findings are probably dependent on sex differences in parathyroid hormone secretion and vitamin D metabolism.

● **637** FURTHER STUDIES OF COLOSTRUM-STIMULATED ENTERIC MUCOSAL GROWTH. Steven M. Schwarz & William C. Heird. Columbia Univ. Col. of Phys. & Surgs., Dept. of Peds. and Inst. of Human Nutr., New York.

To determine the nature and duration of colostrum-induced enteric mucosal growth, jejunal mucosal weight as well as protein, DNA and RNA content of beagle puppies were determined at birth and after 24, 72 and 120 h of either natural (suckling) or formula (Esbilac) feeding. Mucosal hydrolase activities of all animals were also determined. Jejunal mucosal weight, protein, DNA and RNA of suckled animals were 80%, 200%, 200% and 200% greater at 24 h than at birth ($p<0.05$); values at 72 and 120 h were similar to those at 24 h. In formula-fed animals, neither jejunal mass, protein, DNA nor RNA at 24 and 72 h was different from birth; at 120 h, however, all were similar to those of suckled animals. Lactase specific activity of suckled animals at 24 and 72 h was only 67% that at birth ($p<0.05$) whereas sucrase, leucine aminopeptidase and alkaline phosphatase activities were not different. In formula-fed animals, enzyme activities at 24 and 72 h were similar to those at birth; at 120 h, however, lactase and alkaline phosphatase activities were lower ($p<0.05$).

These data confirm earlier studies showing that colostrum stimulates hyperplasia of enteric mucosa. They demonstrate also that this effect is limited to the first 24 h of life and that formula feeding exerts a similar effect but only after at least 72 h. The hydrolase data suggest that this rapid mucosal proliferation results in a relatively immature villus cell population.