● 643 MODULATION OF ROTAVIRUS ENTERITIS VIA ALTERATIONS IN THE INTESTINAL BACTERIAL FLORA: A MAJOR MECHANISM OF BREAST FEEDING MEDIATED ANTIVIRAL IMMUNITY. Linda Duffy, Marie Riepenhoff-Talty, Leonard LaScolea, Tim Byers, Pearay L. Ogra, SUNY at Buffalo, Children's Hospital, Department of Pediatrics, Buffalo, New York.

The effects of breast feeding on the outcome of rotavirus (RV) infection were studied prospectively in groups of infants fed exclusively with mother's (breast) milk, commercial (bottle) formula, or combination of both, before, during and after naturally acquired infection with RV. The antibody activity to RV in the serum and milk was determined by an ELISA assay, and sequentially collected fecal specimens were tested for the presence and quantitation of RV and bifidobacteria species by ELISA, electron microscopy, gram staining and gas-liquid chromatography. The observed frequency of RV induced diarrhea was significantly lower in breast fed compared to bottle fed infants. However, the recovery rates and quantitation of RV in feces of breast or bottle fed infants were remarkably similar. All breast fed infants exhibited pronounced degree of intestinal colonization with bifidobacteria. Such colonization was not observed in bottle fed infants. Significantly, the severity of diarrhea in patients with RV infection correlated better with lack of colonization with bifidobacteria than with magnitude of RV replication. These observations suggest that although, breast feeding is beneficial against development of diarrhea during RV infection, this effect is mediated more by alterations in the bacterial flora of the intestine than by limitation of virus replication.

● 644 EFFECT OF METOCLOPRAMIDE (MC) ON FALTERING MILK PRODUCTION BY MOTHERS OF PREMATURE INFANTS. Richard A. Ehrenkranz and Barbara A. Ackerman (Spon. by I. Gross). Yale Univ. Sch. of Med., Dept. of Ped., New Haven, CT.

MC treatment has been shown to augment milk production and stimulate prolactin (PRL) secretion in women who develop defective lactation after a full-term normal delivery. We have studied the effect of oral MC treatment in 7 women who had delivered premature infants (BW 1127±191 gm, GA 29.0±1.5 wk, mean ± SE) and who were having difficulty maintaining lactation by regular milk expression with an electric and/or hand pump. Each woman had noted a gradual decrease in the total daily volume of expressed milk during the first several weeks of lactation. MC therapy (10 mg every 8 hrs for 7 days) was begun after increases in the number of expressions/day and dietary suggestions failed to increase milk production; it was initiated at 42±6 days postpartum (range 17-67 days). Daily milk volume increased in each patient between the first and seventh day of therapy; from 75±18 ml/day to 182±24 ml/day respectively ($p<0.001$). Serum PRL levels were measured by RIA in 4 of these women on 2 occasions. Basal PRL levels were 29±10 ng/ml (range 29 to 56 ng/ml) and were obtained prior to onset of MC therapy and prior to milk expression (laboratory normal for non-lactating women ≤ 20 ng/ml). After 5 to 7 days of MC, serum PRL levels were 123±35 ng/ml (range 70 to 225) 30 min after milk expression. These data demonstrate that the faltering milk production noted in some mothers of premature infants can be successfully treated with MC, and suggest that stimulation of PRL secretion by MC accounts for the significantly increased daily milk volume.

645 NUTRIENT BALANCE STUDIES IN VERY-LOW-BIRTH WEIGHT (VLBW) INFANTS WITH ILEOSTOMIES. Richard A. Ehrenkranz, Mildred A. Chamberlin, Patricia A. Gettner, Catherine M. Nelli (Spon. by I. Gross). Yale Univ. Sch. of Med., Dept. of Ped. & Children's Clin. Res. Ctr. New Haven, CT.

We have compared the findings of 8 metabolic balance studies performed on 5 enterally-fed VLBW infants (BW 1048±130 gm, GA 29.4±0.7 wks, M±SE) who had ileostomies created during surgical management of necrotizing enterocolitis (n=4) or of an in utero GI perforation (n=1) with the findings from 13 similar studies on 12 VLBW control infants (BW 1173±80 gm, GA 29.2±0.7 wks). 4 ileostomy patients were fed a casein hydrolysate-based formula; the other, mineral-fortified preterm human milk (PTHM). 6 controls were fed a premature formula; 6 mineral-fortified PTHM. Urine and fecal output were collected separately in a 72 hr interval bracketed by carmine red. Transit times were 3.1±0.4 hrs and 23.7±2.5 hr respectively. The % net nutrient absorption (A%) and apparent balance (units/kg/d) are shown below. (*$p<0.02$ **$p<0.001$)

	Group	Intake	A (%)	Balance
Fat (gm)	Ileostomy	5.6±0.4	58±7	3.2±0.3
	Control	6.2±0.2	92±3**	5.8±0.3**
Nitrogen (mg)	Ileostomy	654±47	88±1	357±28
	Control	511±22*	93±1*	402±21
Calcium (mg)	Ileostomy	135±9	34±8	43±10
	Control	137±6	74±3**	90±4**
Phosphorus (mg)	Ileostomy	96±6	74±3	42±8
	Control	71±3**	84±2*	55±3
Zinc (µg)	Ileostomy	1288±160	-283±76	-3508±928
	Control	1579±91	8±14**	153±194

646 PREFERENTIAL FORMATION OF LUMIRUBIN BY GREEN LIGHT. John F. Ennever (Spon. by William T. Speck) Case Western Reserve U. School of Medicine, Rainbow Babies and Childrens Hospital, Dept. of Pediatrics, Cleveland.

Green light is useful in the treatment of neonatal jaundice, and has been reported to be as effective as narrow-spectrum, high-intensity blue light and more effective than standard white light. These reports have been met with skepticism because fluorescent green lights have a spectral output with limited overlap with the absorption band of bilirubin and are less effective than either white or blue lights in producing the configurational isomer of bilirubin (E-bilirubin). Recent studies indicate that the formation and excretion of lumirubin, a structural isomer of bilirubin, is more important than E-bilirubin for pigment elimination in jaundiced infants receiving phototherapy. To assess the effectiveness of green light in producing the structural isomer, I have measured the action spectrum for the formation of lumirubin. I have found that the quantum yield for lumirubin formation (lumirubin production per photon absorbed by bilirubin) is wavelength dependent. The quantum yield was constant for blue light between 430 and 470 nm. Green light at 500 nm had a quantum yield more than twice that of blue light, while 510 nm light had a quantum yield nearly four-fold higher. This unexpected wavelength dependence for lumirubin formation suggests that green light is preferentially absorbed by that half of the bilirubin molecule which undergoes the photochemical reaction to lumirubin. The higher quantum yield for lumirubin formation provides an explanation for the observed clinical efficacy of green fluorescent lights. These results suggest that phototherapy lights with high intensity in the spectral region above 490 and no irradiation in the genotoxic region below 450 nm may prove both safer and more effective than any lamp now in use.

● 647 WHERE DOES THE BILIRUBIN GO WHEN YOU TURN ON THE LIGHTS? John F. Ennever, Andrew T. Costarino, Isabella Knox, Richard A. Polin, and William T. Speck. Case Western Reserve U. School of Med., Rainbow Babies and Childrens Hospital, Cleveland; U. of Pennsylvania School of Med., Children's Hospital of Philadelphia, Dept. of Pediatrics

Phototherapy has been used to reduce bilirubin levels in jaundiced infants for more than 25 years. In vitro and in vivo studies have shown that bilirubin is converted to more polar isomeric forms when exposed to light. There are two types of isomers formed, configurational (E-bilirubins) and structural (lumirubins). The relative contribution of these two photoproducts to the response of neonates to phototherapy has not previously been established. The E-bilirubins are formed more rapidly than the lumirubins; however, the decline in plasma bilirubin depends not only upon formation but also upon excretion. In a previous study we found that the excretion of the E-bilirubins in premature infants is too slow (serum half-life = 15 hours) to account for observed reduction in bilirubin levels. We report here evidence that excretion of lumirubins is the principal route of pigment elimination during phototherapy. The study population consisted of nine premature infants with a mean gestational age of 31 ± 2 weeks (± S.D.). Bile samples were obtained during phototherapy and analyzed by high pressure liquid chromatography for bilirubin and its isomers. We found that the major pigment, and in some infants the only pigment, present in the bile was lumirubins. Five serum samples were obtained from each infant during the first 90 minutes after stopping phototherapy, and the measured serum half-life of lumirubins was 120 ± 25 minutes. This is the first demonstration that lumirubins are more important than E-bilirubins to the efficacy of phototherapy.

648 EFFECTS OF CONSTANT NASOGASTRIC INFUSION ON PERIPHERAL BLOOD FLOW IN NEONATES AT RISK FOR NECROTIZING ENTEROCOLITIS. Ferrentino, FL, LaGamma, EF, Ostertag, SG, & Reisen, C. Perinatology Ctr., Cornell Medical Center, New York 10021 (Spon: PAM Auld).

Bolus feedings cause wide variations in peripheral blood flow. Insufficient flow to non-vital peripheral organs may be undesirable in critically ill, VLBW neonates. To determine whether constant nasogastric infusion is a suitable alternative, we monitored cardiovascular function in 26 neonates selected from 112 NICU admissions ≤ 1500g at birth. These patients were prospectively matched for severity of illness and randomly assigned to be held NPO for 7 days (n=12) or fed within 24 hours of birth (n=14, see related abstract). Vital signs were monitored for 1 hour on days 1, 3, and 7 of life, as were peripheral blood flow and resistance, measured by impedence plethysmography. Peripehral blood flow, peripheral vascular resistance, heart rate, and mean arterial pressure, were not significantly different between the two groups. The incidence of necrotizing enterocolitis was 25% (3/12) and 29% (4/14) in NPO and fed groups, respectively. We conclude that peripheral blood flow in critically ill VLBW neonates, receiving early constant nasogastric infuison, is not significantly different from those infants held NPO. Thus, constant nasogastric infusion may avoid the adverse effects of bolus feedings on peripheral blood flow in sick neonates and therefore, may help lower the risk of NEC due to variable or inadequate blood flow to non-vital organs.