596 INTESTINAL MOTILITY IN COCKAYNE'S SYNDROME. S McDiarmid, JH Vargas, ME Ament. Department of Pediatrics, UCLA Medical Center, Los Angeles, CA.

A 3 yr old boy with Cockayne's syndrome (CS), a neurodegenerative disease, presented with malnutrition secondary to vomiting and diarrhea. Anatomic, mucosal and infectious etiologies were ruled out. Symptoms recurred independent of the strength or volume of an elemental formula given by bolus or continuous drip despite a fundoplication, gastrostomy and jejunostomy. To determine the defect in motility, manometric studies were performed in the antrum, duodenum and jejunum with a water perfused multi-lumened catheter. Abnormal fasting motility was characterized by the complete absence of the migrating motor complex and a predominance of Phase 1 activity. After a bolus feeding, the typical fed pattern of random contractions was not seen. Phase 1 activity still predominated. In contrast, intravenous metoclopramide (MCP) given 5 minutes before a bolus feeding induced high amplitude, normal frequency contractions of 3/minute in the antrum and 11/minute in the duodenum and jejunum. In 1 study, Phase 1 activity occupied 32% of the first 60 minutes after feeding when MCP was given, compared to 87.5% when no drug was administered, suggesting that the intestinal muscle is capable of reponse to a chemical stimulus. Other pathologic descriptions of abnormal neurons and myelination in both the peripheral and central nervous system and recent work demonstrating abnormalities of the myenteric plexus in CS support this observation. As part of a widespread neurodegenerative process also affecting the neural plexi of the intestine, CS patients have intestinal dysmotility. This is a previously unreported association.

●597 TIN-PROTOPORPHYRIN DECREASES BILIRUBIN PRODUCTION AND HYPERBILIRUBINEMIA IN OBSTRUCTIVE JAUNDICE. James J. McMillan, Hendrik J. Vreman, David K. Stevenson, Stanford Univ. Sch. of Med., Dept. of Pediatrics, Stanford, California.

Hemolysis is a major factor contributing to increased bilirubin production and hyperbilirubinemia during biliary obstruction in the rat [Salomon, et al. J Pediatr Gastroenterol Nutr 5:806-810, 1986]. Tin-protoporphyrin (TP) inhibits heme oxygenase, which catalyzes the first step in the degradation of heme to bilirubin, derived from red blood cell breakdown. Therefore, we studied TP's effect on the elevations in the excretion rate of CO (VeCO), an index of bilirubin production, and the plasma total bilirubin level ([B]), caused by ligation of the common bile duct in adult Wistar rats. At post-operative t=72 h and 96 h, experimental rats were injected SQ with 50 umoles TP/kg body weight.

	Pre-op.	72 h post-op./pre-TP	120 h post-op.
VeCO (ul/kg/hr) §#			
Saline (n=6)	18.4±2.8	24.6±5.3	22.4±2.2 †
TP (n=5)	16.6±2.8	24.7±5.1	18.9±2.6 †
[B] (mg/dl) §			
Saline (n=6)	0.5±0.2	12.7±1.4	12.9±1.5 ††
TP (n=5)	0.6±0.2	12.5±0.8	8.5±0.4 ††

§ mean ± SD #STPD † $p < 0.025$ †† $p < .0005$

By 120 hours after surgery, the VeCO had fallen by 23% and the [B] by 32% in TP-treated animals compared to no significant changes in the saline-treated controls. The inhibition of bilirubin production by TP in adult rats with surgically-created obstructive jaundice is an important factor in decreasing the hyperbilirubinemia of cholestasis in this model.

† 598 THE LIPID-LADEN MACROPHAGE AS A MARKER OF ASPIRATION IN NEONATES WITH CHRONIC LUNG DISEASE. J. Roberto Moran, Steven M. Block, Anne Lyerly, Linda Brooks, Robert G. Dillard (Spon. by Jimmy L. Simon). The Bowman Gray School of Medicine of Wake Forest University, Dept. of Ped, Winston-Salem, NC

The diagnosis of aspiration secondary to gastroesophageal reflux is difficult unless it is massive. In order to determine whether the presence of lipid-laden macrophages in tracheal aspirates is useful diagnostically we prospectively evaluated samples stained with Oil-Red-O in ventilator-dependent neonates fed orogastrically. By grading the amount of intracellular Oil-Red-O per 100 macrophages we computed a semiquantitative index. NPO infants served as controls. Measurement of lactose in the aspirates was used as the index of aspiration and was considered positive when lactose value was >mean+2SD of controls. Forty three aspirates were obtained from 25 neonates. Eleven infants had at least one value of lactose suggestive of aspiration. The mean macrophage index for aspirators of 194±14 was greater than the index of nonaspirators (122±5, p<0.001). The testing characteristics of lipid indexes were:

	≥100	≥150	≥175	≥200
Sensitivity	91	78	78	42
Specificity	17	86	93	100
Pos Predict value	32	73	85	100
Neg Predict value	83	89	90	78

We conclude that the sole presence of lipid-laden macrophages in lower respiratory secretions is a nonspecific marker of lung disease. However, a computed lipid-laden macrophage index ≥175 is a rapid and specific test that may be helpful in diagnosing aspiration in chronic lung disease.

† 599 COLON SHORT CHAIN FATTY ACID (SCFA) PROFILE IN THE NEWBORN. Robert D. Murray, H. Juhling McClung, B Ulysses K. Li, Anton Ailabouni, Spon. by Grant Morrow, Ohio State University, Columbus Children's Hospital, Department of Pediatrics, Columbus, OH.

Carbohydrates are fermented by anaerobic colon flora to gas (CO_2, H_2, CH_4) and SCFA (acetate, propionate, and butyrate) in human adults. SCFA absorption is critical to normal colon function. Human neonates rely on colon bacteria to retrieve over 50% of lactose (LAC) calories. Yet SCFA pathways are unlikely to be significant in neonates since the colon at birth is sterile and only gradually acquires an anaerobic flora. Fecal SCFA levels were profiled over the initial 21 days of life. Methods: York piglets, n=38, 0-21 day, had feces removed surgically from cecum, right and left colon sites. Samples (n=111) were centrifuged and supernate analyzed for electrolytes (EL:sodium, potassium, bicarbonate and chloride), SCFA, osmolality, and pH. Results: Newborns showed early production of SCFA (mmoles/kg stool). Levels stablized between days 5 and 14,with an abrupt accumulation in the cecum following day 14. Acetate predominated early, with propionate and butyrate responsible for later peak levels in total SCFA. Production and assimilation of SCFA is nearly complete proximal to the left colon. By two-way analysis of variance, age and colon site are significant factors, $p < .001$. The combined osmolar contributions of EL and SCFA account completely for luminal mOsm after day 16. Prior, there is an "osmolar gap", suggesting that LAC or its fermentation products are present in the lumen and are removed by pathways other than SCFA.

●600 CHOLESTEROL AND PHOSPHOLIPIDS IN RAT MICROVILLUS MEMBRANE (MVM) CHANGE WITH MATURATION AND WITH GLUCOCORTICOID ADMINISTRATION. Josef Neu, Mira Sankar. Spons. by Donald V. Eitzman. University of Florida College of Medicine, Gainesville, FL 32610

Alterations in small intestinal MVM lipid composition may have profound effects on biophysical properties, such as fluidity and hydrophobicity. We prepared MVM using $MgCl_2$ precipitation of small intestine from rats ranging in age from late fetal life to adulthood. In addition, the effects of glucocorticoid administration (dexamethasone at 0.2 mg/Kg to pregnant mothers and hydrocortisone 50 mg/Kg to postnatal rats) were analyzed. Phospholipids were measured by 2-dimensional thin layer chromatography and cholesterol by colorimetry. Results:

MVM Phospholipid/Protein (ug/mg)

	21 day fetus	14 day infant	23 day weanling	Adult	ANOVA p-value
S	493±67 (4)	254±43 (7)	274±78 (6)	103±13 (4)	< .0005
G	447±108 (3)	301±54 (7)	346±138 (6)	112±8 (4)	< .0015

Cholesterol/Phospholipid Molar Ratio

S	.48±.29 (4)	.82±.28 (7)	.60±.06 (6)	1.33±.26 (4)	.00037
G	.50±.25 (3)	.59±.17 (7)	.49±.04 (6)*	.78±.2 (4)**	N.S.

Mean ± S.D., n = ( ), *$p < 0.01$, **$p < 0.02$ (saline [S] vs. glucocorticoid [G])

Cholesterol/protein ratio did not change with maturation or with glucocorticoid. These results indicate: 1) a decrease in phospholipid to protein ratio with maturation, which is not altered by exogenous glucocorticoids, 2) cholesterol to phospholipid ratios increase with maturation, which is modulated by glucocorticoids in weanling and adult rats. Since the ratio of cholesterol to phospholipid is known to alter membrane molecular packing, these maturational changes may be related to the ontogeny of membrane fluidity, hydrophobicity and permeability.

601 HUMAN LACTOFERRIN FORTIFICATION OF FORMULAS PROMOTES THYMIDINE UPTAKE INTO DNA OF RAT INTESTINAL CRYPT CELLS. Buford L. Nichols and Kathy McKee. USDA/ARS Children's Nutrition Research Center, Department of Pediatrics, Baylor College of Medicine, Houston, TX.

Previous investigations have demonstrated that lactoferrin in human colostrum stimulates thymidine uptake into the DNA of harvested mature rat intestinal crypt cells. The effect of cow milk- and soy-based infant formulas on thymidine incorporation into DNA of rat intestinal crypt cells was studied. Crypt cells were harvested from adult male rats using the method of eversion and vibration. The cells were incubated in Trowell's T-8 medium with 10% fetal calf serum in a Dubnoff shaking water bath at 37°C gased with 95% O_2 and 5% CO_2. Each 50-ml incubation tube contained 4-5 x 10^5 cells in 1 ml of medium. When the skim fractions of the cow milk- and soy-based formulas were added to the incubated cells, ^3H-thymidine incorporation into DNA was inhibited. This inhibition was reversed with the addition of human lactoferrin in amounts comparable to those found in human colostrum.

Formula	Lactoferrin concentration	% Stimulation*
negative control	0	100 ± 8 †
positive control	200 µg/ml	159 ± 7
Cow milk-based	0	75 ± 5
Cow milk-based	200 µg/ml	110 ± 13
Soy-based	0	66 ± 7
Soy-based	200 µg/ml	106 ± 14

*n = 4 or 5. †Mean ± SD. CONCLUSION: Cow milk- and soy-based infant formulas inhibit thymidine uptake into DNA of rat intestinal crypt cells. Addition of human lactoferrin to the formulas reverses the inhibition.