●1399 NASAL ELECTRIC POTENTIAL DIFFERENCE AND RESPONSE TO AMILORIDE SUPERFUSION IN NEONATES. C.W. Gowen, Jr., E.E. Lawson, J.Gingras-Leatherman, R.C. Boucher, M.R. Knowles. The Department of Pediatrics and Medicine, The University of North Carolina at Chapel Hill.

Pulmonary epithelium changes after birth from Cl^- secretion to Na^+ absorption. To evaluate this transition, the maximal potential difference (PD) and the voltage response to superfusion with 10^{-3}M amiloride (Am), an inhibitor of Na^+ absorption, were recorded between a Ringer perfused bridge placed on the nasal mucosa and a subcutaneous reference electrode. The PD was sequentially measured during the first 72 hrs of life across the nasal epithelium of healthy term neonates, healthy preterm neonates (29.7±0.3wks), neonates (30.2± 1.2wks) with Respiratory Distress Syndrome (RDS), and neonates (37.6± 1.1wks) with Transient Tachypnea of the Newborn (TTNB). PDs (mean±SEM) and Am inhibition (%; at<24h) were:

	N	POTENTIAL DIFFERENCE (mV) <24 hr	48 hr	72 hr	AMILORIDE INHIBITION
Term Neo.	10	-23.7±1.5	-22.3±1.2	-22.9±1.2	40.1±3.7%
Preterm Neo.	3	-23.8±0.6	-23.3±2.3	-20.0±1.1	32.0±4.0%
RDS Neo.	10	-16.1±0.5	-16.3±0.3	-17.0±1.0	33.7±1.1%
TTNB Neo.	8	-37.0±2.7	-25.8±2.4	-20.4±0.8	41.0±2.6%

The PDs of RDS and TTNB neonates (<24h) were different ($p<0.001$) than healthy term and preterm neonates and term disease controls (e.g. PFC;-21.9±0.4mV;n=4). During the first 72h, only the PD of TTNB neonates changed; this change paralleled clinical improvement. PDs of healthy older children (3-36mo;-31.8±0.6mV;n=6) and adults (-31.6±0.8mV;n=90) were higher than the 72h neonatal values ($p<0.001$). The PD change following Am was not different between all groups. We conclude 1) nasal PD is lower in term healthy neonates than in older children and adults; 2) Na^+ absorption contributes to the PD in the early postnatal period; 3) the PD of RDS neonates is lower than healthy term and preterm neonates; and 4) the PD of TTNB neonates is higher than healthy and disease term controls. These findings suggest that discrete dysfunctions of respiratory epithelial ion transport are pathophysiologic components of RDS and TTNB.

1400 FREQUENCY AND TIDAL VOLUME CHANGES IN HIGH RISK INFANTS IN RESPONSE TO INHALED CARBON DIOXIDE. Michael Graff, Robert Novo, Cathy Smith, Magaly Diaz, T.Mark Hiatt, Thomas Hegyi, Division of Neonatology, Department of Pediatrics, Monmouth Medical Center, Long Branch, N.J.

We examined the ventilatory response to carbon dioxide in 58 infants at risk for disturbances of ventilatory control. Eight siblings (BW 3285±410g) were tested at 11.6±14.0 weeks, 25 near-miss infants (BW 3220±680g) at 13.0±12.0 wks., 10 preterm infants (BW 1780±750g) with prolonged apnea at 14.3±10.8 wks., 9 term infants (BW 3120 ±81.0g) with cyanosis at 6.2±6.0 wks., and six infants (BW 3370±820g) with reflux at 12.0±7 wks. The responses from baseline (B) to 4% carbon dioxide are shown below:

	Ve(% increase)	f(% increase)	Vt (% increase)
Siblings	35	0	35
Near-miss	48	9	36
Apnea	57	15	37
Cyanosis	58	0	59
Reflux	48	12	34

There were no differences in the Ve changes among the groups, however, the frequency response was significantly decreased in the sibling and cyanotic infants. These results point to the heterogeneity of infants at risk for abnormalities of ventilatory control, whereby different mechanisms may be responsible for responses to physiologic stimuli.

1401 DERMAL BILIRUBIN KINETICS UNDER BLUE AND GREEN LIGHT. Michael Graff, Victor Zapanta, I. Mark Hiatt, Thomas Hegyi. Division of Neonatology, Dept.of Pediatrics, Monmouth Medical Center, Long Branch, N.J.

We investigated the efficacy of green light phototherapy in reducing dermal bilirubin concentrations with the transcutaneous bilirubinometer (TcB). Nine infants (BW 3375±370gms)were treated with green light at a mean age of 55±20 hrs, and five controls (3210±530gms) were exposed to blue light at 73±28 hrs. The intensity of the green (13.5±0.8uw/cm2/nm) and blue (12.8±0.1uw/cm2/nm) lights were comparable. An opaque patch covered a 2.5 cm. area of skin, the source for TcB control values. Seventeen simultaneous measurements were recorded from patched and exposed areas every 15 minutes over a period of four hours and rate of TcB change was calculated for each hour of phototherapy.

In both light groups TcB remained unchanged under the skin patch over the four hour period. Data from exposed skin showed that the rate of TcB change in the blue light group was -3.3 in the first, -1.6 in the second, -0.4 in the third, and -0.3 TcB units/hr in the fourth hour. In the green light group this change was -1.9, -1.4, -0.8, and -0.4 TcBU/hr in the respective time periods. At the end of the four hours the absolute decrease was comparable in both groups. These results suggest that these lights are equally effective in reducing dermal bilirubin levels, but may differ in their mode of action.

1402 CAPILLARY ALBUMIN PERMEABILITY IN RESPIRATORY DISTRESS SYNDROME. TP Green, DE Johnson, JL Bass, BG Landrum, TB Ferrara, TR Thompson. Pediatric Critical Care, Clinical Pharmacology, and Neonatology, U. of Minn., Mpls.

Systemic edema accompanies respiratory distress syndrome (RDS). Improvement in pulmonary function in RDS is accompanied or preceded by a diuresis. To test the hypothesis that increased capillary albumin permeability (CAP) occurs in this disease, we studied 50 infants (birth weight <2500 g) with RDS requiring ventilator support. Severity of respiratory disease was measured by AaDO2 and mean airway pressure (MAP) required to maintain oxygenation. Plasma volume and CAP were assessed at 48 and 96 hours of age by pharmacokinetic determination of central compartment distribution volume and intercompartmental clearance, respectively, of the albumin tag, Evan's blue.

Plasma volume did not correlate with either MAP or AaDO2. Contrary to the hypothesis, patients with severe respiratory disease were found to have low CAP: AaDO2 and MAP were inversely correlated with CAP at 96 hours of age (r=-.56, P=.001 and r=-.54, P=.001, respectively). Improvement in respiratory disease was accompanied by an increase in CAP: infants with MAP<6 cm H20 at 96 hours had CAP of 7.0±3.4 ml/gk/h vs. 4.1±2.6 ml/kg/h in those with MAP<6 (P<.02). CAP had increased between 48 and 96 hours of age by 2.6±2.7 (P<.01) in the former group but was unchanged in the latter (+0.6±2.3;P=ns). These data do not support the hypothesis that a generalized increase in CAP occurs in RDS, but suggest that permeability or perfused capillary surface area is low in the acute stages of this disease.

† 1403 COAGULASE-NEGATIVE STAPHYLOCOCCUS-ASSOCIATED ENTEROCOLITIS. Jeffrey Gruskay, Soraya Abbasi, Endla Anday, Stephen Baumgart, Jeffrey Gerdes. (Spon: Lois Johnson). Univ. of Pa. Sch. of Med., Dept. of Pediatrics, Pa. Hosp., Hosp. of Univ. of Pa., and Children's Hosp. of Philadelphia

Coagulase-negative staphylococcus (CNSC) is an increasingly important pathogen in neonatal intensive care units, and is the causative agent for both bacteremia and focal infections (meningitis, pneumonia, osteomyelitis, UTI, septic arthritis, and shunt infections). Acute enterocolitis was the presenting symptom in 19 infants ($\bar{x}$GA 29.9 weeks±2.2 SD; $\bar{x}$BW 1281gm±530 SD) who, on evaluation for infection, were found to have CNSC sepsis. This CNSC-associated enterocolitis constituted 47% of the 40 cases of enterocolitis and 23% of the 81 cases of CNSC sepsis during the retrospective study period (April 1982-Aug. 1984). CNSC-associated enterocolitis was defined as 1)positive blood and stool cultures for CNSC, and 2)clinical acute enterocolitis syndrome with abdominal distension (19/19), bloody stools with mucus (gross blood 12/19, hematest + 7/19), abdominal tenderness (18/19), and gastric residuals (18/19). Abdominal x-rays showed markedly abnormal bowel gas patterns with distended bowel loops and bowel wall edema. Only one infant had pneumatosis intestinalis, and none had portal venous or free peritoneal gas. None of these infants required surgical intervention or ventilatory support. Although bloody stools often persisted for weeks, none of the neonates had prolonged feeding intolerance or development of stricture. We conclude that CNSC is a common cause of enterocolitis in the neonate, and that this association should be considered when selecting antibiotics for therapy.

† 1404 IN-VIVO BRAIN OXIDATIVE METABOLISM IN THE VENTILATOR AND NONVENTILATOR DEPENDENT LOW BIRTHWEIGHT INFANTS. Ronnie Guillet, Savitri P. Kumar, Barry Lawson, Donald P. Younkin, Eileen Donlon, Britton Chance and Maria Delivoria-Papadopoulos. Univ. of PA., Depts. of Pediatrics, Neurology, Biochemistry and Biophysics, Phila., PA 19104

Thirty-four in-vivo measurements of phosphorus-containing compounds were obtained by 31-P nuclear magnetic resonance (NMR) in low birthweight (LBW) appropriate-for-gestational-age infants (GA 24-35 wks, $\bar{x}$ BW 1150 g). Two infants, 590 g and 1120 g, intubated and ventilated, were studied without complication. Surface coil 31-P NMR spectra, ATP, phosphocreatine (Pcr), phosphodiester (PD), inorganic phosphate (Pi), phosphomonoester (PME), were obtained 1-9 times in each infant. Pcr/Pi, a measure of bioenergetic reserve and PME/β ATP, a precursor of membrane biosynthesis, in normal full term infants are: $\bar{x}$ Pcr/Pi=1.01 (range .64-1.38) and PME/β ATP=1.67 (range 1.64-2.46). In LBW infants, $\bar{x}$ Pcr/Pi increased as a function of postnatal age (1-14 d: 0.82; > 14 d: 1.06) and of postconceptual age (< 32 wks: 0.82; 32-34 wks: 0.93; 35-37 wks: 0.95; ≥ 38 wks: 1.14). Mean PME/β ATP decreased as a function of postconceptual age (< 32 wks: 2.02; 32-34 wks: 1.77; 35-37 wks: 1.76; ≥38 wks: 1.76), but not of postnatal age (0-14 d: 1.84; > 14 d: 1.80). Mean PD/β ATP increased as a function of postconceptual age (<32 wks: 1.75; 32-34 wks: 2.05; 35-37 wks: 2.23; ≥ 38 wks: 3.34). The ventilator-dependent infants fell well within their postnatal and postconceptual distribution. Regardless of postconceptual age, oxidative metabolism (Pcr/Pi) increased with duration of extrauterine life, possibly as a result of the difference between intrauterine and extrauterine PO_2. However, brain growth potential (PME/β ATP, PD/β ATP) was more dependent on stage of postconceptual development.