1207 NEBULIZATION OF SONICATED PHOSPHOLIPIDS (PL) FOR TREATMENT OF RESPIRATORY DISTRESS SYNDROME (RDS) OF INFANCY. Hallam Ivey, Stephen Roth and John Kattwinkel (Spons. by Robert Blizzard), Univ. of Va., Dept. of Peds, and The Johns Hopkins Univ., Dept. of Biology.

RDS is associated with a decrease in pulmonary PL including dipalmitoyl phosphatidyl choline (DPPC) and dipalmitoyl phosphatidyl glycerol (DPG). In vitro studies have shown these compounds to fuse readily with biologic membranes after the compounds are mixed and extensively sonicated. Previous studies using aerosolized surfactants for treatment of RDS may have been unsuccessful because of failure to add anionic PL to DPPC, failure to sonicate the PL, or failure to administer the material with CPAP.

In a pilot study, sonicated DPPC/DPG(9:1) was nebulized to 13 infants on respirators. In general, the mean changes in A-aDO₂ in mmHg(MCDO₂) were proportional to the duration of exposure to PL.

Six other infants, also on respirators for RDS but without PL treatment, showed a MCDO₂ of +0.2 over 24 hrs.

GROUP	# INFANTS	EXPOSURE TO PL	MCDO ₂
I	2	1 hr	-26
II	4	3 hrs	-73
III	7	20-30 hrs	-123

Eight additional infants have been treated with PL in a controlled study. Two 6-hr PL treatment periods were alternated with two 6-hr treatments with saline alone. Determination of material for initial treatment was made by simple alternation.

Treatment order:	Saline	PL	PL	Saline
MCDO ₂	+3	-54	-64	-30

Preliminary results of the controlled study suggest that the improved MCDO₂ is a result of the PL treatment and not a coincidental improvement in the disease.

1208 IMPLICATIONS OF NEWBORN LUNG LECITHIN METABOLISM. Alan Jobe and Louis Gluck. University of California, San Diego, Department of Pediatrics, La Jolla.

Premature and term newborn and adult rabbit lungs were pulse labeled *in vivo* with lecithin precursors choline, palmitic acid, and phosphate. Lecithin was isolated from parenchyma, alveolar wash, lamellar bodies and microsomes from the lungs of each group of animals. Time of appearance and biological half-life of lecithin in each fraction was monitored by changes in lecithin specific activity with time. All animals rapidly incorporated isotopic precursors into microsomal lecithin. Radioactive lecithin appeared after a 3 hour delay in premature and term newborn lamellar bodies; no delay was noted in appearance of labeled lecithin in lamellar bodies isolated from adult lung. Maximal specific activity in alveolar lecithin was reached by 6 hours in adult rabbits and in about 20 hours in premature and term newborns. Biological half-life values for lecithin in the lung fractions of premature and term newborn rabbits were greater than 3 times longer than comparable half-life values determined for the adult. The long delay (3 hours) before *de novo* synthesized lecithin begins to reach the alveolar space suggests that synthesis does not contribute to alveolar stability until many hours after birth. Significant lecithin synthesized *de novo* is not present at the alveolar space of the newborn for at least 20 hours. Premature and term newborn rabbits must rely on lecithin stored in anticipation of birth to maintain alveolar stability at birth. The prolonged half-life argues against lecithin degradation contributing to RDS.

1209 VENTILATORY MUSCLE TRAINING IN CYSTIC FIBROSIS. T.G. Keens, I.R.B. Krastins, E.M. Wannamaker, A.C. Bryan H. Levison and D.N. Crozier, Research Institute, Hospital for Sick Children, Toronto, Ontario, Canada.

Ventilatory muscles (VM), like other skeletal muscles, can fatigue, and respiratory failure can result from inadequate VM power to overcome increased respiratory loads. Improving VM endurance may benefit chronic lung disease patients by making these muscles less susceptible to fatigue. Four Cystic Fibrosis (CF) subjects, with mean FEV₁ 68±12% predicted, participated in a specific VM endurance training program consisting of 25 min/day maximal normocapnic ventilation 5 days/week for 4 weeks. They improved their VM endurance 51.6±18.8% (P<0.02). Seven CF subjects, with mean FEV₁ 67±13% predicted, participated in a 4-week physical activity training program consisting of 1½ hours/day of swimming and canoeing, without specific VM training. They increased their VM endurance 56.7±26.7% (P<0.005). However, four normal subjects, on the same specific VM training program, increased their VM endurance only 22.1±7.3% (P<0.005). The increased response of the CF subjects to training suggests either that they had reduced VM endurance initially, or that the training program superimposed on their increased respiratory load was a greater training stress. We conclude from these results that VM endurance can be rapidly improved in CF patients. Furthermore, a rigorous program of upper body endurance exercise is equally effective in improving VM endurance as specific endurance training.

1210 FAILURE OF PRETREATMENT WITH WR-2721 TO PROTECT RABBIT LUNG FROM IRRADIATION DAMAGE. Robert V. Kotas, Barbara Grogg, Caryl L. Wiles, and Linda M. Makres, W. K. Warren Medical Res. Ctr. and St. Francis Hosp., Tulsa OK.

Radioprotective drugs such as S-2 [3-Aminopropylamino] Ethylphosphorothioic acid (WR-2721) have been suggested for use to prevent radiation pneumonitis complicating radiotherapy of primary and metastatic tumors of lung, mediastinum, and chest wall. Juvenile female New Zealand White rabbits (R) between 9 and 12 months of age were either given saline or WR-2721 (36.5 mg/Kg) intravenously 15 minutes before irradiation. Low dose R (n=7) received 250 rads x 4 days to the thorax while high dose R (n=7) were given 375 rads x 4 days. Two, four and six weeks after initiating irradiation, animals were killed and pulmonary pressure volume studies performed. No significant differences between treated or control R (n=7) were seen in body weight change, food intake, water consumption, respirations, PaCO₂, WBC, Hct, rectal temp, lung weight, lung distensibility, lung compliance, minimal surface tension or histologic changes. Pretreatment with WR-2721 does not seem to protect juvenile rabbit lung from irradiation damage.

1211 COMPARISON OF NON-INVASIVE METHODS OF ESTIMATING OXYGENATION IN INFANTS: TCQ₂ vs EAR OXIMETRY. Krauss, A.N., Waldman, S., Frayer, W.W., Auld, P.A.M. New York Hospital-Cornell Med. Cent. Perinatology Center, Dept. of Pediatrics, New York, N. Y.

Two non-invasive methods of estimating arterial oxygenation in newborn infants were compared: ear oximetry (Hewlett-Packard 47201A) and transcutaneous oximetry (TCQ₂) (Roche 5301). 33 infants ranging in weight from 870 to 4000 gm, age from 6 hours to 28 days were studied. In one group of 15 infants, TCQ₂ was compared with simultaneously determined PaO₂ sampled from a temporal or umbilical artery. These values were highly correlated (r=.75, p<0.001, Syx=15.5). In a group of 18 infants SaO₂, PaO₂, and saturation by ear oximetry were determined simultaneously. Correlation between these values was also high (r=.84, p<0.001, Syx=8.2). Deviation of non-invasively determined values for oxygenation vs values obtained by direct arterial sampling did not depend on systolic pressure, pH, or length of time the sensor was applied to the subject. Similar results were found in a group of 6 infants where both non-invasive methods were used together. While the ear oximeter gives more precise data and exhibits a less "damped" signal than TCQ₂, it is more difficult to maintain contact between sensor and subject for long periods of time and is therefore less practical in its present form for use in neonates. Both methods are accurate and practical, and are clinically useful in (1) unstable patients during the onset or recovery from illness, and (2) patients with apnea who lack an umbilical artery catheter.

1212 PULMONARY FUNCTION IN LARYNGOTRACHEOBRONCHIAL PAPILLOMATOSIS. Lourdes R. Laraya-Cuassay, Harold W. Lischner, Myles G. Turtz, and Nancy N. Huang. Temple Univ. Sch. of Med., Dept. of Pediatrics and Otolaryngology. St. Christopher's Hospital for Children, Philadelphia, PA

A 13 year old female(S) presented with asthma-like wheeze followed 2 months later by easy fatigability, orthopnea with paroxysmal nocturnal dyspnea, weight loss and hoarseness. Upper airway obstruction was suspected when the forced expiratory volume (FEV) tracings showed a "hump" and no flow recorded despite active expiratory efforts. Good attempts at inspiration resulted in an inspiratory capacity of 28% of predicted normal. Chest roentgenograms showed overaeration followed 3 mos. later by the appearance of multiple nodular densities throughout both lower lobes, middle lobe and lingula, and cavitation. The lateral view of the neck showed nodular densities obstructing about 50% of the airway. Endoscopy revealed large papillomas on the anterior half of the left vocal cord, trachea and main bronchi. Spirometry disclosed severe restrictive and obstructive pattern, intrapulmonary gas maldistribution and transit time of 3.25 to 6 seconds. Maximum expiratory flow volumes were all reduced. Diffusing capacity was decreased. Mechanics, ventilation and lung volumes were significantly changed after removal of the papillomas and the FEV curve became smooth. In the past 6 years, S experienced more respiratory obstruction every 2 to 8 months coinciding with enlargement of the papillomas. Repeated removal of the papillomas and chemotherapy have caused subjective relief but no significant change in serial lung function. Supported in part by NIH grant #RR-75