- 1253A** THE PATTERN OF BREATHING OF KITTENS DURING HYPOXIA. C. Blanco, M. Hanson, P. Johnson and H. Rigatto, The Nuffield Inst. Med. Res. and Dept. Physiol. & Biochem., Universities of Oxford and Reading (Spon. by I. Gross). The reduction in (F_{I,O_2}) in preterm infants and in anaesthetized kittens less than 35 days of age produces an increase in ventilation which is not sustained. This has been widely interpreted as respiratory failure. We studied the pattern of breathing during hypoxia in 16, pentobarbitone anaesthetized kittens 5-30 days of age, and have related it to oesophageal pressure, diaphragm (Dia) e.m.g., phrenic activity (PA) carotid chemoreceptor discharge, arterial pressure, expired F_{CO_2} and F_{O_2} P_{aCO_2} , P_{aO_2} , pH, and rectal temp. F_{I,O_2} was reduced from 0.21 to 0.06-0.12, sometimes adding CO_2 . Respiratory frequency (f) and tidal volume (V_T) was increased within 30 sec. Over 5 min f fell to up to 60% below control and arterial pressure fell in 22 of 43 trials in 9 kittens, sometimes preceding the fall in f. Even when f and V_T fell CO_2 was always below control. Adding CO_2 did not prevent this fall. Hypoxia did not change the relationship between V_T and oesophageal pressure or Dia. The ratio of high to low frequencies in the Dia. did not change. PA did not always correlate well with DIA, but this was not altered by hypoxia. Carotid chemoreceptor discharge increased within 15 sec of lowering F_{I,O_2} and at 5 min. it was still much above control. Since the decrease in ventilation was not accompanied by hypercapnia nor muscle fatigue it is not respiratory 'failure'. A specific central effect modulating breathing pattern must be considered. The Wellcome Trust (Grant 9594/1.5).

- 1254** USE OF INTRAVENOUS PARALDEHYDE IN NEONATAL STATUS EPILEPTICUS. Walter C. Boutwell, George P. Giacomio, Peter K. Gessner, Małgorzata Zaleska, University of Oklahoma Tulsa Medical College, Department of Pediatrics, Tulsa Oklahoma and State University of New York at Buffalo, Department of Pharmacology, Buffalo, New York (Spon. by S. Yaffe). Intravenous paraldehyde was used in all infants admitted to an intensive care nursery with status epilepticus over a nine-month period. Nine out of ten infants had been treated unsuccessfully with phenobarbital. Seven had perinatal asphyxia, two had meningitis, and one had a Vein of Galen aneurysm with interventricular hemorrhage. The average gestational age and postnatal age were 39.3 weeks (± 2.1 wk SD) and 3.7 days (± 6.6 days SD) respectively. Calcium and glucose concentrations were normal. Paraldehyde was administered at 3 cc/kg/hr as a 5% solution for 3 hours. Six of ten responded during the infusion with complete cessation of seizures. The calculated average concentration of paraldehyde at the time of cessation was 40.5 $\mu g/cc$ (± 35.0 $\mu g/cc$ SD). The initial $T_{1/2}$ was 7.3 hr (± 2.8 hr SD). The peak paraldehyde concentration in responders versus non-responders was not different, (223.0 $\mu g/cc$ v. 254 $\mu g/cc$). Five out of seven infants with perinatal asphyxia and one out of two infants with meningitis responded. No azotemia, metabolic acidosis, hepatitic toxicity or hemorrhagic/thrombotic episodes were initiated by paraldehyde. Leucocytosis occurred in one infant with meningitis. We conclude that paraldehyde is a safe, effective and predictable drug in the treatment of neonatal status epilepticus.

- 1255** PRECEDING SPONTANEOUS LABOR (PSL), ELECTIVE REPEAT CESAREAN SECTION (RCS), AND IATROGENIC RESPIRATORY DISTRESS SYNDROME (IARDS), Susan K. Bowers, Hugh M. MacDonald, Eugene D. Shapiro (Spon. by R.H. Michaels) Univ. of Pittsburgh Sch. of Med. Magee Womens Hosp (MWH), Depts. of Ob-Gyn & Peds. Pittsburgh. All deliveries by RCS at MWH from 1970-79 were reviewed to assess the relationship between PSL at term and IARDS in infants delivered by elective RCS. Infants of diabetic mothers, of Rh-sensitized mothers, with congenital anomalies, or with perinatal asphyxia (5 min Apgar <7) were excluded. The results for pregnancies of ≥ 38 wks gestational age (GA) by obstetrical estimate (OE) were:
	PSL	NO PSL	
# of RCS at ≥ 38 wks	300	1649	
# of infants with IARDS	0 (0%)	71 (4.3%)	($\chi^2=13.5$; $p<0.001$)
- The 71 infants with IARDS could be divided into 2 groups by assessment of GA by physical exam (PE) of the infants. Infants in gp A (42/71-59%) with mean BW of 2700 gms had OE of GA > 2 wks more than the GA by PE. Infants in gp B (29/71-41%) with mean BW of 3200 gms had OE=GA by PE within 2 wks. Mean hospital stay was 11 days for both gp. Infants in gp A presumably were premature. The rate of IARDS for this gp might be reduced by improved OE of GA. Infants in gp B were at term by both OE and PE, so for this gp the rate of IARDS (1.7%) is unlikely to be affected by better OE of GA. Children born at term by elective RCS are at risk for IARDS. PSL at term in these mothers seems to be a reliable indicator of fetal pulmonary maturity (FPM). Women scheduled to undergo elective RCS should either be allowed to go into labor or should have an L/S ratio to confirm FPM prior to RCS.

- 1256** RESPONSE TO MILD HYPOXIA DIFFERS IN SIBLINGS OF SIDS. June P. Brady, Colin Partridge, and Manuel Durand, Children's Hospital, Dept. Ped. Cardiovasc. Res. Inst. Univ. Ca., San Francisco. To find out whether an abnormal response to mild hypoxia is related to sudden infant death syndrome (SIDS) we studied the respiratory response to 17% O_2 in 30 infants (2-25wk). All were term and healthy at the time of study. Twelve had had a prolonged apneic spell requiring resuscitation (A), 8 were siblings of SIDS victims (SS) and 10 were normal (C). We measured end-tidal PO_2 and PCO_2 , respiratory rate, pattern and heart rate during sleep, 5 mins breathing 21% and 10 mins 17% O_2 . The incidence of periodic breathing (PB) and the number of apneas ≥ 3 sec were compared among the 3 groups. Before 6 wk of age, all 3 groups tended to breathe periodically with 17% O_2 . However, in infants > 6 wk, there was a dramatic difference in SS compared to C. The difference in respiratory rate in 21% vs 17% O_2 (ΔRR) was significant in both A and SS but not C.
- | | PB in 17% O_2
(mean #/min) | Apneas in 17% O_2
(mean #/10 min) | ΔRR
(mean) |
|----|---------------------------------|--|-----------------------|
| C | 0 | 0.5 | 3 (NS) |
| A | 1 (NS) | 5 (NS) | 8 ($p<0.01$) |
| SS | 4 ($p<0.05$) | 20 ($p<0.05$) | 11 ($p<0.01$) |
- We conclude that in infants > 6 wk the response to mild hypoxia is markedly different in siblings of SIDS and may identify infants at risk for significant apnea.

- 1257** STORAGE OF TERM PLACENTAL BLOOD FOR AUTOTRANSFUSION. Joseph M. Brandes, Eugene F. Roth, Jr., Charles G. Zaroulis, Laszlo Sarkozi, Paul D. Berk (Spon. by Blanche P. Alter), Department of Medicine, Division of Hematology, Mount Sinai School of Medicine, New York, New York. Autologous blood might reduce both the risks and costs of the transfusions required by approximately 1% of neonates (mainly prematures) during the first week of life. Most neonates ultimately requiring transfusion can be identified at birth, and the small quantities of blood they may require (ca. 15 ml/kg per transfusion) easily obtained from their placentas. We examined the storage properties of placental blood in citrate-phosphate-dextrose (CPD) (6.3 ml CPD per 46 ml blood) maintained at 4°C for up to 14 days. Eight separate samples were obtained, and the following parameters were measured by standard methods:
- | | Red Cells
($\mu moles/gm$ Hb $\pm$ S.D.) | Plasma
K^+ (mEq/L $\pm$ S.D.) | Na^+ (mEq/L $\pm$ S.D.) | % Hemolysis | |
|--------|--|------------------------------------|---------------------------|--------------|------|
| Day 0 | 4.67 $\pm$ 0.42 | 15.1 $\pm$ 1.80 | 6.2 $\pm$ 2.1 | 196 $\pm$ 20 | - |
| Day 2 | 5.15 $\pm$ 0.62 | 12.5 $\pm$ 1.85 | 9.7 $\pm$ 2.1 | 196 $\pm$ 23 | - |
| Day 14 | 3.38 $\pm$ 0.65 | 1.8 $\pm$ 1.60 | 21.0 $\pm$ 5.8 | 182 $\pm$ 24 | < 1% |
- The interval between delivery of the placenta and the drawing of blood (0-30 min) did not affect the results, which are similar to those in comparably stored adult blood. Because of high plasma K^+ , both adult and placental stored red cells may require washing prior to administration to infants. These data indicate that storage of placental blood for autologous transfusion into neonates is feasible and deserves further investigation.

- 1258** BODY WATER SPACES IN BABOON NEONATES. Y.W. Brans, T.J. Kuehl and D.L. Shannon. University of Texas Health Science Center, Department of Pediatrics and Southwest Foundation for Research and Education, San Antonio, Texas. Body water spaces were estimated within 2 hours of birth in 15 baboon neonates delivered by cesarean section. Birthweights ranged from 495 to 1001g, gestational ages ranged from 134 to 174 days and all animals were normally-grown for gestational age. Total body water (TBW) ranged from 503 to 803 ml, extracellular water (ECW) ranged from 201 to 496 ml and intracellular water (ICW) ranged from 225 to 330 ml. All values were within 1 SD of the mean expected for human neonates of similar weights. In proportion to body weight, mean ($\pm$ SD) TBW for term (764 $\pm$ 59.4 ml/kg) and preterm (853 $\pm$ 79.3 ml/kg) animals were quite similar to mean TBW reported for human neonates (753 and 816 ml/kg respectively). Mean ECW (460 $\pm$ 38.6 and 531 $\pm$ 142.7 ml/kg) were somewhat higher than in humans (388 and 431 ml/kg) but most values were within the human range. Mean ICW (318 $\pm$ 16.3 and 423 $\pm$ 129.6 ml/kg) were again similar to human means (43 and 46 ml/kg), and so were mean blood volumes (89 $\pm$ 13.2 and 85 $\pm$ 13.7 ml/kg vs. 98 and 88 ml/kg). These data suggest that the body composition of baboon neonates at a given gestational maturity is quite similar to that of equally mature human babies. Baboon neonates may therefore constitute an adequate animal model for studies of intrauterine growth and development.