●290 ARTIFICIAL PLASMA VOLUME EXPANSION IN DAMS. EFFECT ON FETAL GROWTH. Claude Sansaricq & Myron Winick. New York University Medical Center, Dept. of Pediatrics, 550 1st Ave., New York, N.Y. 10016. Columbia University College of Physicians and Surgeons, NY, NY.

Although inadequate plasma volume expansion (PVE) and decreased fetal weight have been shown to occur following maternal malnutrition in rats, whether this association is one of cause and effect is unknown. By artificially expanding blood volume in malnourished animals on the 14th or 17th day of gestation with a single IV injection of whole rat blood we have been able to examine this relationship. Results demonstrate that when pregnant rats are restricted to a 5.5% protein diet throughout pregnancy but injected with 5 ml of virgin rat blood on day 14, plasma volume expands to levels seen in nonrestricted animals and the pups are of normal weight at term. By contrast if the PVE is performed at 17 days gestation growth failure will occur. Thus the growth failure attendant to maternal protein restriction can be prevented by artificially expanding blood volume early in pregnancy. These data suggest that a causal relationship exists between lack of maternal plasma volume expansion and fetal growth failure in dams subjected to protein malnutrition.

291 PULMONARY BLOOD FLOW (Qp) AND BREATHING MOVEMENTS IN FETAL SHEEP. Renate D. Savich, Francisco A. Guerra, Chu-Ching H. Lee and Joseph A. Kitterman. University of California, San Francisco, Cardiovascular Research Instit. and Dept. of Pediiatrics, San Francisco, CA.

Post-natally, Qp is influenced by respiratory movements, but little is known of the relationship between Qp and fetal breathing movements (FBM). To define this relationship, we studied 6 chronically instrumented fetal sheep (gest. 125-143 d) for a total of 2602 min. Each fetus had an electromagnetic flow probe on the left pulmonary artery (LPA), electrocortical (ECoG) electrodes, and catheters in the trachea (to evaluate FBM), main pulmonary artery, carotid artery and amniotic cavity. Mean Qp to LPA showed a wide range and was similar during high and low voltage ECoG and in the presence or absence of FBM (Table).

		Total	High Voltage ECoG	Low Voltage ECoG+FBM	Low Voltage ECoG noFBM
% time		100	42.3	35.4	22.3
Qp to LPA (ml/kg/min)	Mean	27	26	27	26
	Range	4-95	4-73	4-95	4-95

Fluctuations in mean Qp did not relate to arterial pH, PCO_2 or PO_2,or to changes in ECoG activity, or onset or cessation of FBM. In contrast, phasic Qp consistently changed with FBM. During the inspiratory phase, Qp increased while pulmonary and carotid arterial blood pressures decreased; during the expiratory phase, Qp decreased while blood pressures increased. We conclude that in fetal sheep: (a) mean Qp shows wide fluctuations not related to FBM, ECoG activity, arterial pH, PCO_2 or PO_2; (b) during FBM phasic Qp increases during inspiration and decreases during expiration.

●292 EFFECT OF MECLOFENAMATE (M) ON FETAL BREATHING MOVEMENTS AND PULMONARY BLOOD FLOW. Renate D. Savich, Francisco A. Guerra, Chu-Ching H. Lee, and Joseph A. Kitterman. University of California, San Francisco, Cardiovascular Research Institute and Dept. of Pediatrics, San Francisco.

Prostaglandin synthetase inhibitors (PGSI) increase the incidence and amplitude of fetal breathing movements (FBM) and increase pulmonary blood flow (Qp) in fetal sheep. To determine if these effects are interrelated or caused by the same mechanisms, we studied 4 chronically instrumented fetal sheep (gestation 134-138d). Each fetus had an electromagnetic flow probe on the left pulmonary artery (LPA) and catheters in the trachea (to evaluate FBM), main pulmonary artery, carotid artery, jugular vein (JV), and amniotic cavity. Studies were done a minimum of 7 d postoperatively. After a control period (48-150 min), the PGSI, M, was infused into the JV at a dose of 8.53 mg.kg over 10 min, then 0.51 mg/kg/hr for 2.5-4.0 h. There were no changes in heart rate, blood pressure or arterial pH, PCO_2 or PO_2. Other results are shown in Table.

		Time after onset of infusion (min)				
	Control	0-30	31-60	61-120	121-180	181-240
Qp to LPA (ml/kg/min)	26	35	49	37	28	22
FBM (% incidence)	41	29	67	82	90	99

Qp did not correlate with incidence of FBM, nor with pH, PCO_2, or PO_2. We speculate that the early rise in Qp was due to constriction of the ductus arteriosus, or possibly to changes in pulmonary vascular resistance. We conclude that M causes an early rise in Qp independent of changes in FBM, and that the later increase in FBM does not lead to an increase in Qp.

●293 ANTIBODY STAINING AND IN SITU HYBRIDIZATION REVEALS THAT A SUBSET OF NEURONS IN THE RABBIT NEONATAL BRAIN PRODUCE INSULIN. Ruben Schechter, Lynn Karycki, Farouk Sadiq, Thomas Hilliard, Arnold Kahn, and Sherin Devaskar. St. Louis University and the Pediatric Research Institute, Cardinal Glennon Children's Hospital. Dept. of Pediatrics. St. Louis, MO.

We have previously shown that insulin is present in whole brain extracts of fetal/neonatal rabbits (BBRC 136:208, 1986). However, the source of this hormone remains controversial. To resolve this issue, glia and neurons from 10 day old newborn rabbits were grown in tissue culture and subsequently analyzed for hormone synthesis by the peroxidase-antiperoxidase (PAP) technique and in situ HYB. Glia and neurons were identified on the basis of morphology and positive staining with enolase (neurons) and fibrillary acidic protein (glia). The monoclonal antibody (1:100) used in the PAP reaction was specific for insulin. In situ HYB was conducted at 37°C under stringent conditions using a biotin-labeled rat insulin cDNA probe (Dr. A. Permutt). Biotinylated pBR322 DNA served as a control. HYB was detected using avidin-Peroxidase. The data show that insulin is present in only ~5% of the neurons but not glia. Pretreating the cells with the ionophore monensin, to block hormone secretion, augmented the PAP reaction but did not increase the number of positive cells. Similarly, in situ HYB revealed insulin mRNA in ~5% of the neurons, with no such transcripts identified in glia. We conclude that insulin detected in fetal/neonatal brain extracts is synthesized locally by a select subset of neurons. The biologic function of this neuronal insulin remains to be determined, but possibilities include neurotransmitter activity and/or growth promotion.

294 EXTRACELLULAR FLUID VOLUME (ECV) CHANGES IN VERY LOW BIRTH WEIGHT (VLBW) INFANTS DURING THE FIRST TWO POSTNATAL MONTHS. SG Shaffer, SK Bradt, VM Meade and RT Hall. Children's Mercy Hospital, University of Missouri Kansas City School of Med., Kansas City, MO

Postnatal natriuresis among VLBW infants may represent physiologic reduction of the ECV or pathologic renal salt wasting. We assessed Na homeostasis between birth and hospital discharge by serial measurements of ECV in 18 preterm infants(mean GA 28 wk, SD 1.8). ECV was estimated as corrected bromide space on postnatal days 1,7,14,21,42 and 63. Results were compared to changes in body weight, Na intake and serum Na concentration.

Mean body weight decreased from 1027 gm (SD 272) on day 1 to 937 gm (SD 217) on day 7, then returned to birth weight by day 14. Mean ECV was 550 ml/kg (SD 116) on day 1 and decreased to 359 ml/kg (SD 66) on day 14. Thereafter body weight and ECV increased proportionally so that mean ECV/kg remained between 336 ml/kg (SD 42) and 349 ml/kg (SD 54). ECV reduction and stabilization was usually isotonic.

Six infants developed hyponatremia(serum Na < 135 mEq/l) between 11 and 31 days of age. Mean ECV/kg was significantly lower in these infants compared with infants in the same age range with serum Na > 135 mEq/l (303 ml/kg, SD 36, vs. 368 ml/kg, SD 56, $p < .01$). Sodium intake was not different in the 2 groups, however total fluid intake was greater in infants with hyponatremia and decreased ECV.

In conclusion, the ECV of the VLBW infant decreases postnatally and is regulated within a range similar to older infants. These findings suggest that the initial postnatal natriuresis in the first 2 wks of life represents physiologic reduction of the expanded ECV of the fetus. Late hyponatremia may indicate excessive sodium loss and ECV depletion.

295 ONTOGENY OF THE TUNICA VASCULOSA LENTIS (TVL) Renee Skapinker, Alan D. Rothberg. Univ of the Witwatersrand, Johannesburg Hospital, Dept of Pediatrics, Johannesburg, So. Africa. (Spon. by Keith H. Marks.)

Previous studies have shown a good correlation between appearance of the TVL at birth and gestational age in 27-34 week premature infants. We studied the effect of postnatal age on the rate of regression of the TVL in premature infants to asssess whether this occurred at a similar rate to that occurring in utero.

Fifty-eight premature infants were enrolled into the study. Gestational age was estimated using the method described by Ballard. Lens examination was by direct ophthalmoscopy within 36 hrs of birth and then on a weekly basis. Regression of the TVL was graded according to the system described by Hittner; Grade IV being the most immature (vascularity covering virtually the entire anterior surface of the lens) to Grade I (vascular regression to a point at which only occasional vessels are visualized).

Results were analysed and compared according to postconceptional age. No significant differences were found in the rate of disappearance of the TVL when infants were studied at equivalent postconceptional ages irrespective of postnatal age. Thus, premature delivery was not associated with accelerated regression of the TVL. These findings may be useful in assessing gestational age of a preterm infant who has not had an assessment of gestational age within the first days after birth or who is transferred to a high care center beyond the stage when other gestational aging systems are considered reliable.