- **247** CLONING OF THE cDNA OF HUMAN PREGNANCY-SPECIFIC β 1-GLYCOPROTEIN. Wai-Yee Chan and Owen M. Rennett. University of Oklahoma Health Sciences Center, Department of Pediatrics, Oklahoma City, OK.

Human pregnancy-specific β 1-glycoprotein (β SP1) is detected in increasing concentration in maternal serum starting from the first 2-3 weeks of pregnancy. Decreased levels of this protein are often associated with fetal distress or ectopic pregnancy. It is not detectable in the healthy male and in the nonpregnant female. The protein has M_r of 90,000. Its structure and function is unknown. Cloning of the cDNA of this protein will permit characterization of its structure and study of its function and regulation throughout pregnancy. Rabbit antihuman β SP1 antibody was absorbed with other placental proteins and affinity purified. The I-125 labeled antibody was used as probe to screen a human placental cDNA expression library in bacteriophage λ gt 11 provided by Dr. Brian Knoll. Six positive clones were identified. Lysates of bacteria carrying these 6 recombinant phage were prepared and analyzed by Western blot. A slow moving protein band hybridizing with the probe was identified in lysates. No such bands were observed in lysates of the host bacteria or the wild type λ gt 11 lysogen. These results confirmed that in all cases the antibody recognized the cDNA translation product and not a phage or bacterial protein. Eco RI digestion of the recombinant phage DNA showed inserts of size varying from 415 to 2803 bp with two internal Eco RI sites in the 2803 bp insert. We thank Dr. Hans Bohn of Behringwerke for the purified β SP1 and Drs. Dominic Chung and Earl Davie for their help and advice. (Supported in part by NIH grant HD 16730).

- † **248** BLOOD SUBSTRATE LEVELS IN OVO: RELATIONSHIP TO FETAL SIZE. Valerie Charlton and Michael Johengen, University of California, Department of Pediatrics, San Francisco. The availability of major nutrients and oxygen in fetal blood was compared to the size achieved by the chicken fetus. 28 White Leghorn eggs, 44-67g, were incubated at 37°C. At 18 days, blood was drawn from an umbilical (chorioallantoic) vein and analyzed for whole blood glucose, amino acids (as α amino N), O_2 sat. and Hgb and plasma total protein and cholesterol. After sacrifice, the fetus and organs were weighed. Chemistry results are given as the mean $\pm$ SEM (range), and no. of fetuses studied. Values were: glucose, 121.6 $\pm$ 4.3 (57.9-157.5) mg/dl, n=24; amino N, 11.1 $\pm$ 0.8 (3.8-18.8) mg/dl, n=23; total protein, 1.2 $\pm$ 0.1 (0.6-1.5) g/dl, n=11; cholesterol, 459 $\pm$ 51 (295-710) mg/dl, n=10; O_2 sat., 59.2 $\pm$ 3.1 (4.5-77.8) %, n=21; and Hgb, 8.2 $\pm$ 0.4 (5.6-14.2) gm/dl, n=21. Fetal weight averaged 13.9 $\pm$ 0.6 g (range 8.0 to 20.3). When substrate concentrations and size were compared, significant correlations were found between the calculated O_2 content and fetal weight ($r=0.463$, $n=21$, $p<0.05$) and between Hgb and weight ($r=0.564$, $n=21$, $p<0.01$). However, the most significant correlation was between amino N and fetal weight ($r=0.686$, $n=23$, $p<0.001$). Amino N levels also correlated inversely with fetal brain/liver ratios ($r=-0.473$, $n=22$, $p<0.05$) and brain/body ratios ($r=-0.473$, $n=22$, $p<0.05$). Both ratios were higher in smaller fetuses. No relationships were found between fetal size and levels of glucose, protein or cholesterol. This study indicates that amino acid availability and maintenance of oxygen delivery are major determinants of growth in the fetal chicken. Studies in the chicken may provide insight into mammalian fetal development, since decreased amino N concentrations, reduced oxygen levels and high brain/liver and brain/body ratios are also found in the growth retarded, fetal mammal.

- 249** DEVELOPMENTAL CONSEQUENCES OF INTRA-UTERINE EXPOSURE TO NARCOTIC VS. NON-NARCOTIC SUBSTANCES. Ira J. Chasnoff, Wm. Burns, Kayreen Burns (Spon. by James Stockman III). Northwestern Univ. Medical School, Northwestern Memorial Hospital, Depts. of Pediatrics and Psychiatry, Chicago.

Although there is a great deal of information regarding the long-term growth and development of infants born to mothers who used and abused narcotic substances during pregnancy, there is little information regarding outcome of nonnarcotic-exposed infants. Two groups of infants born to drug-addicted mothers were evaluated over a period of 2 years and compared to a control group of drug-free infants. Group I infants (N=40) were delivered to mothers on well-controlled low-dose methadone maintenance and Group II infants (N=24) were delivered to poly-drug-addicted women who used Valium, marijuana, PCP, phenobarbital, cocaine and alcohol in various combinations. Group III infants (N=35) were delivered to drug-free mothers. All 3 groups were similar in maternal age, education, cigarette use and socioeconomic class and neonatal gestational age and Apgar scores. Weight and length of Group I infants were significantly smaller through 6 months of age but by 12 months had caught up to control infants' weight and length. Mean head circumference for Group I infants was significantly decreased at birth and continued to be so through 2 years. Group II infants showed no deviation from control infants in all growth parameters except that a subgroup of PCP-exposed infants exhibited a small head circumference. On the Bayley Scales of Infant Development, no differences were found between the 3 groups although all 3 groups exhibited a downward trend by 2 years of age.

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- INDUCTION OF COLLAGENASE SECRETION IN HUMAN FIBROBLAST CULTURES BY GROWTH PROMOTING FACTORS. Chu Chang Chua, Deborah E. Geiman, George H. Keller, Roger L. Ladda. Penn State Univ. Coll. of Med., The M. S. Hershey Med. Ctr., Dept. of Peds., Hershey, PA.

In human foreskin fibroblast (HF) cultures, two proteins with M_r 60,000 and 55,000 were found to be induced about 3.5-fold by EGF, PDGF and β -TGF. The induced proteins were identified as procollagenases by immunoprecipitation of induced medium with antibodies to purified human fibroblast collagenase. Collagenase enzyme activity in the medium from EGF-treated cultures was also induced at least 3-fold compared to control cultures. Induction of collagenase was dependent upon *de novo* protein and RNA synthesis and was observed in the medium 10 hours after addition of EGF. Although they interact with separate membrane receptors, these three growth factors induce the secretion of a common protein. As a result, our study suggests that collagenase may be an important mediator of cell mobilization, a process which is essential for mitogenesis.

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- NUTRITIONAL VARIABLES AND RELEASE OF WATER FROM THE NEONATAL RESERVOIR. David M. Coulter and Timothy R. LaPine, Dept. of Ped., Primary Children's Medical Center, Univ. of Utah, Salt Lake City, Utah

We gavage fed neonatal rabbits for 72 hours, employing differing intakes of H_2O , Na, and calories (cal) and measured skeletal muscle water (ml/gm fat free dry weight) at 72 hours of age.

Formula	H_2O	Calorie	Na	Animals	H_2O (ml/gm FFDW)	
	(% of "normal")				(mean $\pm$ SEM)	
1	100	100	100	31	5.48 $\pm$.07	p < .005
2	50	50	50	35	5.78 $\pm$.08	
3	100	50	50	19	5.68 $\pm$.06	p < .01
4	100	50	100	20	6.25 $\pm$.16	

Reducing H_2O , Na and cal by 50% reduced loss of reservoir H_2O . Reducing just Na and cal intake had a similar effect. However, the greatest retention of reservoir H_2O occurred when only caloric intake was lowered and H_2O and Na were provided in normal amounts.

We have previously shown that postnatal loss of H_2O from the tissue reservoir is inversely proportional to weight gain and, therefore, to milk intake. Of the three milk components we have examined, reduced energy intake appears to be the most important stimulus to retention of reservoir water.

(Spon. by G. Chan)

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- DECREASED NEONATAL RESPONSIVENESS TO CATECHOLAMINES: EFFECT ON GLUCOSE KINETICS. Richard M. Cowett, Brown Univ., Women & Infants Hosp., Dept. of Peds., Prov. RI

Epinephrine (Epi), a catecholamine with both α and β adrenergic effects, may produce hyperglycemia in adults by increasing glucose production and decreasing glucose clearance. To document the degree of sensitivity and characterize maturation of neonatal glucose control, glucose kinetics were measured in 14 term lambs [birth weight 4.5 $\pm$ 0.3 kg (M $\pm$ SEM) and age 4.1 $\pm$ 0.4 days]. Following infusion of 0.9% NaCl at 0.06 ml/kg min plus 100 μ Ci/kg D[6- 3 H] glucose by prime plus constant infusion, R_a (production) and glucose clearance were measured during infusion of variable doses of epinephrine (ng/kg min $^{-1}$). The newborns were compared to 6 adult sheep. All intra group basal kinetic data was comparable. Kinetic data is shown from the experimental period:

(M $\pm$ SEM) Newborn Kinetic Data				Adult Kinetic Data			
Epi N	Pl. Glu	Pl. Ins	R_a	N	Pl. Glu	Pl. Ins	R_a
	mg/dl	μ U/ml	mg/kg min $^{-1}$		mg/dl	μ U/ml	mg/kg min $^{-1}$
0	6	95 $\pm$ 8	10 $\pm$ 2	3	71 $\pm$ 6	6 $\pm$ 1	2.5 $\pm$ 0.1
50	4	129 $\pm$ 18*	16 $\pm$ 3	3	130 $\pm$ 10*	9 $\pm$ 2	7.5 $\pm$ 0.1*
500	4	253 $\pm$ 8*	8 $\pm$ 2				

*p < .0006 *p < .0001 by ANOVA with repeated measures design

Both newborns and adults had a rise in pl. glucose following the lower epinephrine dose but only the adults had a rise in R_a . The newborns required 10x the epinephrine dose as adults to significantly elevate R_a to the same degree (3x the respective basal R_a). Glucose clearance was not changed by epinephrine in either group. After evaluation of glucose kinetics, we conclude that there is decreased neonatal responsiveness to catecholamines.