230 SECONDARY FETAL HYPERINSULINEMIA(SFH) IN RAT: NEONATAL GLUCOSE HOMEOSTASIS AND SUBSEQUENT GROWTH. Chung-Ja Cha, Gracienda Figueira, Nancy L. Gelardi, William Oh, Brown Univ., Women & Infants Hosp., Dept. Ped., Providence, RI

Neonatal macrosomia(NM) in rat induced by primary fetal hyperinsulinemia (PFH) is associated with abnormal oral glucose tolerance and accelerated growth. However, SFH and not PFH is the usual hormonal abnormality in human fetus of diabetic mother. Mild maternal hyperglycemia by streptozotocin (STZ) treatment has been associated with fetal hyperinsulinemia (Cuezva J., et al, Ped Res 16:632, 1982). The aim of this study is to produce SFH by STZ treatment of pregnant rats inducing mild maternal hyperglycemia and examine the glucose and insulin relationship in the first 2 hours and growth rate in the first 4 weeks. 12 STZ treated, 11 controls (C) pregnant rats were studied. Neonatal hyperglycemia of pups was induced by IP injection of glucose in 25 pups at 60 min. of age. At 30 min. post I.P. glucose and with similar plasma glucose levels G/I is 3.7±2.1 vs 8.9±4.5, mean ±S.D., for STZ vs C groups respectively ($p<.05$). The growth rate of female and male NM pups (B.W.>1.7 S.D. of the control) was higher in the first 4 weeks than the C. At 30 days, female NM rats were 113±9 vs.105±6 g for C and male NM rats 139±11 vs.114±6 g for C (both $p<.05$). We conclude that SFH in the rat is associated with abnormal glucose/insulin metabolism in the neonatal period. The macrosomic pups also exhibited accelerated growth during early life that may persist into adulthood as we have demonstrated in those with PFH.

231 UPPER/LOWER BODY GLUCOSE CONCENTRATION DIFFERENCES WITH ADVANCING GESTATION. Valerie E.Charlton and Michael J.Johengen, Department of Pediatrics, University of California, San Francisco

Glucose levels in arterial blood reaching the fetal upper body are greater than in blood supplying the lower body(J Devlop Physiol 6:431,1984).Since fetal body proportions change towards term,we evaluated whether distribution of glucose within the fetus changes.13 sheep were prepared at 103-128 days,with maternal arterial(MA),and fetal carotid(CA), femoral arterial(FA)and umbilical venous(UV)catheters.Studies were done at 110 to 142 days on healthy fetuses(FA>pH 7.30),≥3 days postop and≥2 days before delivery.Whole blood,simultaneously drawn from all vessels,was analyzed for glucose and O_2 content.The results,as mean±SEM,are given in the table.

Glucose mg/dl	110-119	120-129	>130 days
CA	20.6 ±1.3(10)	15.9 ±1.4(14)**	13.3 ±0.6(12)++
UV	24.0 ±1.7(6)	16.6 ±1.6(6)+	15.0 ±1.4(3)**
CA-FA	1.8 ±0.4(10)	1.1 ±0.2(14)*	1.1 ±0.1(12)*

*p<0.05;**<0.02;+<0.01,++<0.001 vs 110-119 days;( )= # of studies

Glucose was 35% lower in older animals,due to lower MA levels(58.5 ±1.8mg/dl at 110-119 days vs 53.4±0.8 at>130,p<0.02).CA glucose was>FA in all studies.While the absolute CA-FA fell,the % difference between vessels was stable at~10%.In contrast,there was no change in fetal O_2 content in any vessel nor in the CA-FA O_2 difference;CA O_2 was 6.23±0.32ml/dl(n=12)at 110-119 vs 5.77 0.50 at> 130 days and CA-FA for O_2 was 0.90±0.76ml/dl(n=12)at 110-119 vs 1.16±0.62 at 130.We conclude:the proportional distribution of glucose is stable over the third trimester,but changes in UV glucose will alter the absolute CA-FA difference.

●232 ISOLATION AND EXAMINATION OF PUTATIVE TYPE II PNEUMOCYTE PRECURSORS. L. Bryan Cheshire, Joseph L. Joyave, Raymond D.A. Peterson, Raymond B. Hester, Gurmukh Singh, Sikandar L. Katyal and Jane D. Funkhouser, Depts. Biochem., Path., Peds., Univ. So. AL, Mobile, AL, Dept. Path., Univ. Pittsburgh, Pittsburgh, PA.

Type II alveolar epithelial cells exhibit a membrane antigen, designated p146, that is not present on other adult lung cells. This monoclonal antibody-identified marker enables these cells to be identified in sections of rat lung and to be isolated from other lung cells by a fluorescence-activated cell sorter (FACS IV). We now have adapted this latter technology to fetal rat lung and in so doing have obtained data supporting the contention that the fetal cells expressing p146 are precursors of Type II cells.

Lungs from fetal rats 15 to 19 days of gestation were isolated and the cells dispersed with trypsin. The cells were incubated with the monoclonal antibody JBR-1, and then with fluorescein-tagged goat anti-mouse immunoglobulin. Analysis by FACS IV revealed a population of p146 positive fluorescent cells at all gestational periods examined. The fluorescent cells from 19 day fetal lungs were sorted and examined. Approximately 30% exhibited lamellar bodies by electron microscopy. Essentially all contained surfactant apoprotein (SAP) as indicated by immunological analysis. The p146 negative cells did not react with antibody to SAP

Because SAP is synthesized at 19 days gestation only in p146 positive cells and essentially all positive cells synthesize SAP we conclude the fetal cells expressing p146 are precursors of Type II pneumocytes.

233 ONTOGENY OF PROLACTIN RECEPTORS IN FETAL RAT LUNG. Ramasubbareddy Dhanireddy, Maad El Ali (Spon. by Pedro Jose). Georgetown University Medical Center, Department of Pediatrics, Washington, D.C.

Prolactin (PRL) is a polypeptide hormone found in high concentration in the fetus. Serum PRL levels are low in infants with respiratory distress syndrome and some studies have proposed a direct role for PRL in fetal lung maturation and surfactant production. PRL, being a peptide hormone, has to bind to cell surface receptors on the target organ before initiating a physiological action. Hence the ontogeny of PRL binding in fetal rat lungs from 18 through 22 days gestation was studied. Fetal lungs from timed (±12 hours) Sprague-Dawley pregnant rats were removed and immediately frozen on dry ice. Fetal lungs from one to three litters were pooled for each membrane preparation. PRL binding to the fetal lung membranes was determined, in duplicate, by incubating the membranes (0.3-0.8mg protein; overnight at room temperature) in the presence of [^{125}I] Iodo-hGH (100x10^3cpm; 1.0 ng) with (non-specific binding) or without (total binding) a 2000 fold excess of non-radioactive ovine PRL. All data are reported as counts per minute (cpm) of hormone specifically bound (total binding minus non-specific binding).

Gestational Age (days)	18	19	20	21	22
Specific PRL Binding (mean±SD)(cpm/mg protein)	2118 ±448	1034 ±277	1356 ±169	959 ±216	645 ±213
Membrane Preparation #	4	4	4	6	5

Specific PRL binding in fetal lungs is high at 18 days gestation and there is a significant decline in hormone binding as gestation nears term (r-0.774; $p<0.0001$).

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234 TWINS DISCORDANT FOR INFECTION WITH HIV: A MULTIDISCIPLINARY STUDY. Gary W. Diamond,Robert W. Marion, Anita L. Belman, Andrew A. Wiznia, Herbert J. Cohen, Arye Rubinstein. Albert Einstein College of Medicine, Department of Pediatrics,Bronx, NY.

Evidence suggests that the human immunodeficiency virus (HIV),an agent that causes immunologic,neurodevelopmental, and craniofacial abnormalities crosses the placenta and infects the fetus during intrauterine life. The effects of infection on these various systems were examined in a pair of dizygotic twins discordant for evidence of HIV infection. The children,a boy and a girl, were the products of a 34 week gestation, born to an IV heroin using woman. At 2 years of age, the girl was found, after an extended illness,to be seropositive for HIV,with radiographic evidence of pulmonary lymphoid hyperplasia. Serologic studies on the boy failed to show evidence of HIV infection.Evaluation at 3 years revealed that both twins were developmentally delayed, but that the seronegative twin had significantly better receptive language, gross and fine motor functioning than did his seropositive sibling. Both children scored in the moderately stigmatized category on the fetal AIDS syndrome rating scale. Neurologic exam was normal in the seronegative twin but revealed generalized hypotonia in his seropositive sibling. Investigation of twins born to HIV infected mothers offers a unique opportunity to examine the virus's natural course in children while controlling for other pernicious environmental factors. Inconsistencies between various measures emphasize the importance of application of a multidisciplinary approach to the diagnosis and follow-up of children with AIDS and the AIDS related complex.

235 ARGININE VASOPRESSIN AND FLUID HOMEOSTASIS FOLLOWING FETAL ALCOHOL EXPOSURE. Diana L. Dow-Edwards, Howard Trachtman, Edward P. Riley, Laurel A. Freed, and Thomas H. Milhorat (Spon. by Audrey K. Brown). State University of New York-Health Science Center at Brooklyn; Department of Neurosurgery; Brooklyn, NY; Schneider Children's Hospital, Long Island Jewish Hillside Medical Center, Department of Pediatric Nephrology, New Hyde Park, NY; and State University of New York at Albany, Department of Psychology, Albany, NY.

Studies involving body fluid homeostasis were carried out in adult Long-Evans rats whose mothers received liquid diets containing 35% of the calories derived from ethanol between the 6th and the 20th day of gestation. Control rats were offspring of pair-fed dams given isocaloric liquid diets containing no ethanol. Plasma levels of arginine vasopressin (AVP), plasma osmolality, urine production and urine osmolality were determined in both the water-sated (WS) and water-deprived (WD) conditions. Fetal alcohol exposure (FAE) induced a seven-fold increase in plasma AVP levels in the WS condition. Water consumption was significantly greater in the FAE animals but plasma osmolality, urine osmolality, and urine production were within the normal range. In the control rats, 24 hours of WD produced the expected increase in plasma AVP, plasma and urine osmolality. The FAE rats, however, showed only an increase in plasma osmolality and no significant change in plasma AVP or urine osmolality with WD.

These data suggest that fetal alcohol exposure causes a long-term disruption in the central mechanisms regulating vasopressin release and therefore fluid homeostatic responses.