▲284 TRANSFER OF GASTROINTESTINALLY ADMINISTERED ^{125}I-EPIDERMAL GROWTH FACTOR INTO SUCKLING RAT BRAIN. Radha K. Rao, Judy Grimes and Otakar Koldovský. University of Arizona College of Medicine, Departments of Pediatrics and Physiology, Tucson, AZ.

Epidermal growth factor (EGF) and its receptors have been detected in developing rat brain (BR). In adult rat, intravenously administered ^{125}I-EGF does not cross the blood BR barrier. We investigated the possibility of transfer of ^{125}I-EGF into suckling rat (SUR) BR after gastrointestinal administration. ^{125}I-EGF (80 ng) was first introduced orogastrically to SUR; 30 min later animals were killed. Blood (BL) and BR were analyzed for total (TR) and immunoreactive (IR) radioactivity. TR detected in brain was 0.09 ± 0.016% (mean ± SEM) of radioactivity fed (28.7 ± 12.1% of TR in BR was IR). A second experiment was performed in which ^{125}I-EGF (16 ng) was introduced to isolated loops of jejunum (J) or ileum (I) of anesthetized SUR. After 60 min, animals were killed; the amount of TR in BR after introduction to I (0.49 ± 0.11% of total administered) was 7 times greater after I administration than that after introduction to J (0.07 ± 0.006%). IR ^{125}I-EGF in BR after administration into J was 46.7 ± 3.4%, and into I was 32.6 ± 3.8%, respectively.

Conclusion: Results suggest that ^{125}I-EGF introduced to the gastrointestinal tract is transferred in SUR to BR in IR form. Furthermore, regional difference in capacity to absorb EGF exists in SUR intestine.

285 FETAL HEMOGLOBIN LEVELS IN CORD BLOOD . Sudha Rao, Peter Noronha.(Spon. by Rosita S. Pildes). University of Illinois College of Medicine and Mount Sinai Hosp. Cook County Hosp., Dept. of Pediatrics, Chgo., IL.

Cord blood electrophoresis normally reveals high levels of Hb F with smaller amounts of Hb A. At the University of Illinois Comprehensive Sickle cell Center, 9,832 consecutive cord bloods were screened since October 1983 by both Cellulose acetae and Citrate agar electrophoreses. These included infants of all ethnic groups. Of the tested infants, 21 had Hb F as the sole detectable hemoglobin. These included 14(66%) preterm infants. Cesarian section was performed for varying reasons in 6 instances. Mothers of 2 infants had gestational diabetes as per glucose tolerance tests; 4 mothers were chronic asthmatics on long-term bronchodilator therapy during pregnancy;4 were habitual drug abusers (heroin and marijuanna) even during pregnancy; three mothers had chronic hypertension, one of these was preeclamptic; and one mother had chronic renal insufficiency requiring hemodialysis 3 times per week and frequent blood transfusions. Almost half the mothers smoked ½-1 pack cigarettes/day. Multiple parameters including expected date of delivery, gestational age of infant per physical exam, placental weight, birth weight,mother's gravida and para status were studied but found to be of no significance. High fetal hemoglobin in cord blood has been well described in infants of mothers with chronic anoxemia during pregnancy as well as in infants of diabetic mothers. As 7 of the 21 mother-infant cases studied in this group had no identifiable factors, we speculate that there might be yet other determinants influencing expression of hemoglobin patterns at birth.

●286 THE CIRCADIAN-GATED TIMING OF BIRTH IN RATS: DISRUPTION BY MATERNAL SCN LESIONS OR BY REMOVAL OF THE FETAL BRAIN. Steven M. Reppert, William J. Schwartz & David R. Weaver, Children's and Neurology Services, Massachusetts General Hospital and Harvard Medical School, Boston, MA.

In rats, the hour of birth is gated over a 36-hr temporal window by the phase of the daily light-dark cycle during pregnancy. We have previously shown that the suprachiasmatic nuclei (SCN), the site of a known circadian pacemaker, are oscillating in phase with the prevailing light-dark cycle in the fetus. Since the onset of parturition is governed by the fetal brain in some species, we have speculated that a possible role of a functioning and entrainable circadian clock during fetal life is that it might be involved in the circadian-gated initiation of parturition. First, we showed the circadian gating of birth in our animals by exposing different groups of dams to lighting cycles of opposite phase during pregnancy. Regardless of the phase of the prenatal lighting cycle, the time of birth was gated over a 36-hr temporal window so that most births occurred during the daytime hours. Next, we found that destruction of the maternal SCN (on day 7 of gestation) eliminated the circadian gating; births occurred in a single distribution that peaked in the middle of the 36-hr window. Finally, removal of all the fetal brains from each litter also disrupted the circadian gating of birth; dams of brain-aspirated fetuses no longer exhibited a daytime preference for births. These results show that the maternal SCN are necessary for the normal circadian gating of birth and are also consistent with a role for the fetal brain (and possibly the fetal SCN) in this process. Support by HD14427.

287 MATURATIONAL CHANGES OF INSULIN BINDING TO FETAL HEPATOCYTES. Robert A. Richman, Mark R. Benedict, and Barbara A. Toly. SUNY Health Science Center, Department of Pediatrics, Syracuse.

To determine if the reported lack of direct insulin metabolic effects in fetal tissues is due to alterations in hormone binding and/or processing, we characterized the binding, internalization, and degradation of insulin by cultured hepatocytes from rat fetuses of 17, 19, and 21 days gestation. When insulin (100 nM) was incubated with fetal hepatocytes, we observed substantial reductions (66%-100%) in immunoreactive insulin. This loss was greatest in cultures prepared from 19 day fetuses. ^{125}I-Insulin binding at 37 C rapidly reached a peak at 30 min. Specific binding was greatest in 19 day cells; 460 fmole/mg protein compared to 150 and 190 fmole/mg protein in 17 and 21 day fetal hepatocytes, respectively. Prior exposure to insulin (100 nM) induced an inhibition of subsequent binding, increasing with gestational age. Only minimal down-regulation was detectable in 17 day hepatocytes. Both internalization and intracellular degradation of ^{125}I-insulin occurred rapidly, following a similar time course for all three ages. Despite the ability of 17 day fetal hepatocytes to bind, internalize, and degrade insulin, we were unable to demonstrate receptor down-regulation. The dissociation of these related processes raises the possibility that these cells have a more rapid rate of receptor turnover than those from 19 and 21 day fetuses.

●288 UPTAKE OF INTRAFETALLY ADMINISTERED ^{3}H-1,25 DIHYDROXYVITAMIN D$_3$ (1,25) BY THE MATERNAL SMALL INTESTINE. Richardus Ross, Jane Florer, Mei Chen, Kevin Halbert (Spon. by R.C.Tsang), U. of Cincinnati Med. Ctr., Dept. of Pediatrics, Cincinnati, Ohio.

Pregnancy is associated with increased maternal calcium requirements that are met by enhanced intestinal calcium absorption. Maternal serum concentrations of total 1,25 are elevated, perhaps in response to a physiological hyperparathyroidism. An alternative explanation is that 1,25 produced by the fetoplacental unit gains access to the maternal compartment and influences maternal 1,25 status and intestinal calcium absorption. To test the hypothesis that fetal 1,25 gains access to the maternal intestine, we gave an intravenous injection of 20uCi of high specific activity (90 Ci/mmol) ^{3}H-1,25 to a chronically catheterized fetal sheep at 138d of gestation (term=145d). Sequential samples of fetal and maternal plasma were obtained during the next 4 hours. Thereafter, samples of fetal and maternal small intestinal mucosa were obtained. Plasma and mucosal homogenates were lipid extracted and analyzed for ^{3}H-1,25 content. There was a rapid disappearance of ^{3}H-1,25 from the fetal circulation and a progressive accumulation of ^{3}H-1,25 in the maternal circulation. Plasma and intestinal mucosal content of ^{3}H-1,25 at 4 hours were as follows:

	Fetal	Maternal
Plasma ^{3}H-1,25 (dpm/ml)	11590	620
% dose in plasma pool	6.21	4.23
Mucosal ^{3}H-1,25 (dpm/g)	8438	261

Conclusion: Intrafetally administered ^{3}H-1,25 crosses the placenta and is taken up by the maternal small intestine.

289 DIURNAL RHYTHM OF β ENDORPHIN IN NEONATES. K. Sankaran, K.W. Hindmrash, L. Tan. Perinatal Research Laboratory, Newborn Services, University of Saskatchewan, Department of Pediatrics, Saskatoon, Saskatchewan. Canada

In an attempt to demonstrate whether β endorphin (BED) diurnal rhythm existed in neonates, 17 infants with mean (+SD) gestational age of 31.7 ± 4.8 weeks and birth weight of 1790 ± 898 grams were studied at a mean postnatal age of 3.3 ± 0.5 days. Plasma samples were obtained from a pre-existing umbilical arterial line at 9:00 a.m., noon and 3:00 p.m. Plasma BED was isolated using Sephadex column chromatography and radioimmuno assay. Sensitivity was between 5 and 500 pg/.1 ml of sample. Recovery was 84%. Mean plasma concentrations of β endorphin were 68.3 ± 27.7 pg/ml, 54.5 ± 13.7 pg/ml and 45.1 ± 10.8 pg/ml respectively. Highly significant (P=0.0002) variation of plasma β endorphin concentration was observed in these neonates using one way analysis of variance with repeated measures with 3 points in time suggesting the presence of a diurnal rhythm of β endorphin in neonates. It is important to specify the time of collection of blood samples for determination of opiates in neonates.