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TRANSFER OF GASTROINTESTINALLY ADMINISTERED 125 I-EPI-
DERMAL GROWTH FACTOR INTO SUCKLING RAT BRAIN. Radha
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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
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 $0.09 \pm 0.016\%$ (mean \pm SEM) of radioactivity fed
($28.7 \pm 12.1\%$ of TR in BR was IR). A second experiment was per-
formed 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
J ($0.49 \pm 0.11\%$ of total administered) was 7 times greater after
I administration than that after introduction to J ($0.07 \pm$
 0.006%). IR 125 I-EGF in BR after administration into J was $46.7 \pm$
 3.4% , and into I was $32.6 \pm 3.8\%$, respectively.

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

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FETAL HEMOGLOBIN LEVELS IN CORD BLOOD. Sudha Rao,
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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 acetate 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. Cesarean 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 marijuana) even during pregnancy; three
mothers had chronic hypertension, one of these was preeclamptic;
and one mother had chronic renal insufficiency requiring hemo-
dialysis 3 times per week and frequent blood transfusions. Almost
half the mothers smoked $\frac{1}{2}$ -1 pack cigarettes/day. Multiple para-
meters 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 sig-
nificance. High fetal hemoglobin in cord blood has been well des-
cribed in infants of mothers with chronic anoxemia during preg-
nancy 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.

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THE CIRCADIAN-GATED TIMING OF BIRTH IN RATS: DIS-
RUPTION BY MATERNAL SCN LESIONS OR BY REMOVAL OF THE
FETAL BRAIN. Steven M. Reppert, William J. Schwartz
& David R. Weaver, Children's and Neurology
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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.

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MATURATIONAL CHANGES OF INSULIN BINDING TO FETAL
HEPATOCYTES. Robert A. Richman, Mark R.
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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.

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UPTAKE OF INTRAFETALLY ADMINISTERED 3 H-1,25 DIHYDROX-
VITAMIN D₃ (1,25) BY THE MATERNAL SMALL INTESTINE.
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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 hyperparathy-
roidism. 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 absorp-
tion. To test the hypothesis that fetal 1,25 gains access to the
maternal intestine, we gave an intravenous injection of 20 Ci 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: Intrafetal administered 3 H-1,25 crosses the
placenta and is taken up by the maternal small intestine.

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DIURNAL RHYTHM OF β ENDORPHIN IN NEONATES.
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In an attempt to demonstrate whether β endorphin (BED)
diurnal rhythm existed in neonates, 17 infants with mean (\pm SD)
gestational age of 31.7 ± 4.8 weeks and birth weight of $1790 \pm$
 898 grams were studied at a mean postnatal age of 3.3 ± 0.5
days. Plasma samples were obtained from a pre-existing um-
bilical 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 $45.1 \pm$
 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 col-
lection of blood samples for
determination of opiates in
neonates.

