307 ERYTHROCYTE (RBC) GLUTATHIONE S-TRANSFERASE: DEVELOPMENTAL PATTERNS IN PRETERM INFANTS. Nathan Rudolph, Shing Wong, Maria Ripalda, Leonard Glass. SUNY, Downstate Med. Ctr., Dept. of Pediatrics, Brooklyn, NY.

The glutathione S-transferases (GST) are a group of enzymes present in a number of tissues, including liver and RBC's. They initiate detoxification of endogenous and exogenous substances by conjugation with glutathione, and might act as storage proteins by binding nonsubstrate compounds such as heme and bilirubin. They also exhibit non-selenium-dependent glutathione peroxidase (GSH-Px) activity. The low activity of Se-dependent GSH-Px in neonatal RBC's compared with those from adults, and comparatively high activity of RBC GST in fullterm (FT) neonates, prompted a study of developmental patterns of RBC GST in preterm (P) infants.

RBC GST was assayed in 23 P infants (birth wt 700-2100gm) and 12 FT infants soon after birth. Results:

Birth Wt. (Kg)	<1.0 (n=6)	1.0-1.5 (n=9)	1.5-2.1 (n=8)	All P (n=23)	FT(>2.5) (n=12)
GST(U/gm Hb) ±S.D.	7.4 ±1.4	5.8 ±1.6	4.5 ±0.8	5.73* ±1.70	4.12* ±1.15

P had significantly higher activity than FT (*p<.01). Within the P group, a highly significant negative correlation was found between birth wt and enzyme activity (r=-0.61; p<.01). We speculate that these developmental patterns might reflect changes in heme &/or bilirubin ligand functions associated with heme turnover rates. They might also indicate a physiological inverse relationship between Se-dependent and Se-independent GSH-Px activity during development, and might require a re-evaluation of the interaction of fetal anti-oxidant protective mechanisms.

● 308 Fetal Lung Cells: Protein Growth Factor Control of Commitment to DNA Synthesis. A.D. Stiles, M. Post, B.T. Smith, Dept. of Pediatrics, Harvard Medical School, Boston, Massachussetts

The effect of protein growth factors on DNA synthesis of primary cultures of Type II epithelial cells, fibroblasts, and endothelial cells from day 19 fetal rat lung was examined. The cells were plated in multiwell plates, then made quiescent in serum-free minimal essential media. The cells were tested using the Balb-C 3T3 cell model of the sequential action of competence (PDGF, 25 ng/ml) and progression (EGF,100ng/ml and SmC,10 ng/ml) factors for G_0/G_1 cells to enter S phase. Single purified growth factors, combinations of these, or 10% fetal calf serum (FCS) were incubated with the fetal lung cells and ^{3}H-thymidine incorporation into DNA determined 18 hours later. For each cell type,10% FCS increased DNA synthesis. A unique pattern of response to the growth factors or their combinations was observed with each cell type. A single growth factor was capable of stimulating DNA synthesis for each cell type, PDGF for the Type II and endothelial cell and EGF for the fibroblast. This suggests that the Type II and endothelial cell are capable of endogenous production of progression factors and that the fibroblast endogenously produces competence and progression factors, each acting in an autocrine fashion. It is possible that the endogenous factors might act in a paracrine fashion, leading to coordinated control of proliferation of specific lung cell types during development.

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† 309 IDENTIFICATION OF NOVEL SURFACE GLYCOPROTEINS SUBSERVING NEURONAL ADHESION IN DEVELOPMENT. Richard J. Riopelle, Ronald C. McGarry, and John C Roder, Queen's University, Departments of Medicine and Microbiology and Immunology, Kingston, Canada (Spon. by Michael W. Partington).

A monoclonal antibody HNK-1 (Leu 7) which recognizes a carbohydrate epitope on myelin associated glycoprotein (MAG) of nervous system has been shown to be present on cultured neurons, astrocytes, and oligodendrocytes. On neurons, the epitope is associated with de novo synthesized protein. Immunoblot analysis of lysates of cultured neurons reveals a family of glycoproteins spanning the molecular weight range 90 to 300 kilodaltons. Some of these neuronal surface glycoproteins participate in adhesion and neurite formation on certain immobilized substrates of growth within the extracellular matrix.

These data interpreted in the light of emerging information on neuronal adhesion molecules suggest that a family of glycoproteins, including MAG, act as cellular receptors for ligands within the extracellular environment.

310 ANTERIOR CEREBRAL ARTERY PULSATILITY INDEX (PI) WITH NON-NUTRITIVE SUCKING (NNS) AND GAVAGE FEEDINGS. P. Sasidharan, E. Marquez, E. Dizon and C. Sridhar, Porter Memorial Hospital, Valparaiso, IN (Spon. by R. Schreiner).

We studied the anterior cerebral arterial flow PI with a doppler over the anterior fontanelle during gavage feeding and gavage feeding with non-nutritive sucking with an 8 mHz doppler transducer. PI was calculated as (Systolic - Diastolic) ÷ Systolic. Initially a baseline PI was obtained and after the orogastric gavage tube was inserted and with NNS with gavage feeding. Eight infants were studied. Their mean birth weight is 1553 ± 344 gms and mean gestational age 32.2 ± 1.5 weeks. A total of 14 studies was performed. The mean postnatal age of study is 14.2± 13.1 days at a mean postconceptual age of 34 ± 2.2 weeks. The mean resting PI is .672 ± .05. The mean PI during gavage feeding is .724 ± .07. The mean PI during gavage + NNS is .687 ± .06. There was a statistically significant change in the PI from baseline to PI during gavage feeding ($p < .05$). There was no significant difference in the PI from baseline to NNS + gavage. Furthermore, NNS has been shown by others to improve oxygenation. Our restuls indicate that during gavage feeding the PI increass and with NNS this decreases. This shows that NNS alters the CBF towards the baseline before gavage feeding. These results indicate that NNS helps to reverse the gavage feeding-induced changes in the cerebral blood flow velocity. We recommend NNS in all infants during gavage feeding.

† 311 EPIDERMAL GROWTH FACTOR IS A MITOGEN FOR FETAL ISLETS AND INFLUENCES SECRETION OF INSULIN AND GLUCAGON. Susan M.Scott, Carmela M. Guardian and Alberto Hayek, Dept. of Peds., University of N.M. School of Medicine, Albuquerque, N.M. and The Whittier Institute, La Jolla, Ca.

To study the role of epidermal growth factor (EGF) in the development of fetal islets, we used 21-day gestational rat pancreases.

After collagenase digestion of the pancreas, islets were isolated and cultured in RPMI 1640, containing 10% FCS, penicillin and streptomycin, at 37°C, in 95% air and 5% CO_2. Then islets were hand picked and separated into 5 islets per well; each well was exposed for two 24-hr periods to one of the following: (A) the above medium alone, (B) the medium plus 0.01 nM EGF, or (C) the medium plus 0.1 nM EGF. The spent media were frozen at -20°C for RIA of insulin (I) and glucagon (G). Other sets of 5 islets, exposed to ^{3}H thymidine for 24 hours, were tested for thymidine uptake into new DNA. Results are expressed at mean ± SEM.

	Thymidine Uptake % of control	Insulin(uU/ml) 24 hrs	Insulin(uU/ml) 48 hrs	Glucagon (pg/ml) 24 hrs	Glucagon (pg/ml) 48 hrs
A	100	140±22	118±18	120±35	60±17
B	146*	185±17*	149±23*	153±38*	78±28
C	182*	153±40	135±40	140±45	80±60

* p<0.05 vs. A.

Conclusions: 1) EGF is a mitogen for fetal islets, 2) EGF increases the secretion of I and G during a 48 hr exposure, 3) at 0.1 nM the increase in thymidine uptake without increases in I and G may indicate a curtailment of I and G biosynthesis.

312 DEVELOPMENT OF SERUM HEXOSAMINIDASE (HEX) IN INFANTS. Karen E. Shattuck, Joan Richardson, David K. Rassin and Thom E. Lobe, Department of Pediatrics, University of Texas Medical Branch, Galveston, Texas.

Serum activity of hexosaminidases A and B has been measured to identify patients with Tay-Sachs and Sandhoff's diseases, and may also be affected in other clinical conditions including neonatal necrotizing enterocolitis (NEC). Data utilizing serum HEX as a marker for NEC is difficult to interpret because normal developmental patterns have not been characterized. We have measured serum activity of total HEX and Hex B in 61 neonates of 27 to 40 weeks gestation who did not have NEC. These infants were followed from birth until 4 to 8 weeks of age. The infants were divided into 2 gestational age groups (≤34 weeks and ≥35 weeks) since enzyme activities were similar within each of these 2 groups. Total serum HEX activity increased with postnatal (PN) age and was greater in the older gestational age group (ANOVA p<0.01). Factors associated with increased total serum HEX include enteral feeding, parenteral nutrition and unexplained hematochezia.

Serum TOTAL HEX in nmol/hr/ml (Mean ± S.D.)

PN Age	0-2 d	2-4 d	1 wk	2 wk	3 wk	4-8 wk
≤34 wks	900±340 n=33	935±389 n=32	1234±375 n=32	1354±478 n=30	1428±560 n=24	1644±781 n=15
≥35 wks	1262±617 n=28	1550±988 n=26	1952±1028 n=23	2343±1167 n=10	2396±705 n=7	2526±942 n=5

Serum HEX activity in infants with clinical conditions that may influence serum activity of this enzyme must be compared to that in normal infants of similar gestational and postnatal ages.