●1553 ROLE OF FREE BILIRUBIN AND BLOOD BRAIN BARRIER IN BILIRUBIN NEUROTOXICITY. Richard P. Wennberg and A. James Hance. Departments of Pediatrics and Pharmacology, University of California, Davis, California

Anesthetized young adult Wistar rats were given either human serum albumin (HSA), 1.5 gm/kg, or saline, intravenously. Ten minutes later the blood brain barrier (BBB) in one hemisphere was opened by carotid artery infusion of hypertonic arabinose. Bilirubin was then infused intravenously over 8 minutes. Serial blood samples were obtained for total bilirubin (TB) and free bilirubin (FB) determinations (peroxidase method) until sacrifice 30 minutes later. Cortical EEGs were recorded continuously.

Osmotic opening of the BBB resulted in yellow coloration of the affected hemisphere in both control and HSA primed animals. EEG changes, ranging from a transient decrease in amplitude to permanent cessation of electrical activity, occurred at a mean TB of 54.8±12.6 mg/dl in HSA primed rats (n=8) compared with a threshold of 30.4±6.4 mg/dl in control rats (n=11) ($p<.001$). At comparable TB levels, FB levels were lower in HSA primed animals. Neither EEG changes nor staining developed in animals with an intact BBB.

These data suggest that yellow "staining" of brains may sometimes represent non-toxic interstitial bilirubin-albumin since neurotoxicity, as measured by EEG changes, was related to the level of FB available for binding to tissue rather than the TB level. Given a critical level of FB variations in BBB permeability to bilirubin or albumin-bilirubin may contribute to the risk for encephalopathy.

†1556 BONE MARROW EXAMINATIONS IN SEPTIC NEUTROPENIC NEONATES. JG Wheeler, JS Abramson, RJ Boyle, AR Chauvenet, CA Johnson, SM Block, RJ Dillard. bowman Gray School of Medicine, Winston-Salem, NC (spons. JL Simon)

Bone marrow neutrophil depletion (BMND) has been suggested as a criterion for white blood cell (WBC) transfusions in neonatal sepsis. To determine the incidence of BMND in neonates presenting with signs consistent with sepsis and the relationship of BMND to clinical outcome, bone marrow aspirates were done in 13 neonates (1010-3845 gms) with clinical sepsis and neutropenia. Neutropenia was defined as an absolute peripheral neutrophil count $< 1500/mm^2$ on 2 occasions $\geq$ 3 hrs apart and BMND was defined as < 7% segs, bands and metamyelocytes per 100 nucleated cells. If BMND was present, patients were randomized to standard treatment (ST) or to ST plus transfusion of irradiated, fresh buffy coat concentrate. 13 of 14 aspirates were interpretable and no complications occurred. Results are as follows:

Blood Culture	BMND	WBC Transfusion	Pts	Lived
+	-		7	6
-	-		3	3
+	+	+	2	1
+	+	-	1	0

These data show: 1) neonates with suspected sepsis and neutropenia had a 23% (3/13) incidence of BMND, 2) if BMND was not present 90% (9/10) of clinically septic, neutropenic neonates survived. Since the incidence of BMND is low and the risks and benefits of WBC transfusions are unknown, bone marrow examinations should be done to properly identify high risk neonates for inclusion in controlled studies of WBC transfusions.

1554 HYPOGLYCEMIA IN LARGE INFANTS OF OBESE NONDIABETIC MOTHERS J. Werthammer and L.A. Wallace (Spon. by Martin R. Klemperer), Marshall Medical School, Department of Pediatrics, Huntington, WV.

To determine the incidence of hypoglycemia in the large infant of the nondiabetic mother, 789 consecutive newborns with birth weight more than 3900 grams were screened at 1,2 & 4 hrs. postnatal age with a heel stick Dextrostix®. A serum glucose was obtained when the Dextrostix® was less than 45mg/dl.17 infants (2.2%) had a serum glucose less than 35mg/dl. One infant had group B streptococcal sepsis and another nesidioblastosis. No etiology for the hypoglycemia was evident in the remaining 15 infants. The average serum glucose of the 15 hypoglycemic infants was 21mg/dl ± 9 with 3 infants less than 10mg/dl. 5/5 infants tested were hyperinsulinemic while hypoglycemic. Only 1 infant was symptomatic. None of the 15 mothers had diabetes mellitus when carefully screened at the first prenatal visit and at 28 weeks gestation.

Each of the 15 hypoglycemic newborns was paired with 2 normoglycemic infants of equivalent birth weight and born the same month, and the groups compared. There were no differences in gestational age, apgar score, temperature, maternal age, maternal height, medications, IV fluids, or route of delivery. Maternal weight, however, at the first prenatal visit was significantly greater in the hypoglycemic group (88 kg ± 18) when compared to the normoglycemic group (65 kg ± 13)($P < .0001$).

In summary, large infants born to obese mothers form a new group at risk for significant hypoglycemia.

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A SOLUBLE SOURCE OF CALCIUM AND PHOSPHATE IMPROVES BONE MINERALIZATION IN PIGLETS FED BY TOTAL PARENTERAL NUTRITION. Robin K. Whyte, Doris E. Yuen, Harold H. Draper, McMaster Univ., Dept. Pediatrics, Hamilton,Ont. and Univ. of Guelph, Dept. Nutrition, Ont. (Spon.by J.C.Sinclair)

Infants of very low birthweight need 5 mmol/kg of calcium and 3 mmol/kg of phosphorus to achieve adequate bone growth and mineralization. Conventional intravenous feeding uses simple calcium and phosphorus salts which precipitate out of solution, limiting intravenous intake to 3 mmol/kg and 2 mmol/kg of calcium and phosphorus respectively. We have demonstrated that calcium glycerophosphate is a much more soluble source of calcium and phosphate and have compared the use of calcium glycerophosphate with that of conventional salts (Ca gluconate, KH_2PO_4 and K_2HPO_4) in a randomized controlled trial in growing piglets. Ten four day old piglets were allocated to receive one week of total parenteral nutrition containing either 15 mmol of calcium glycerophosphate/kg.d or 3.5 mmol/kg.d calcium gluconate and 2.6 mmol/kg.d of phosphate as potassium phosphate. Weight gain (32 g/kg.d sd 1), plasma calcium and phosphate levels were not significantly different between groups. Femoral bone density was significantly greater in the calcium glycerophosphate group (271 mg/cm vs 241 mg/cm $p<0.01$) although humeral densities were not significantly different (272 mg/cm vs 276 mg/cm $p>0.2$). Calcium and phosphate retentions were six times greater in the calcium glycerophosphate treated group ($p<0.01$). We conclude that calcium glycerophosphate is a more suitable source of calcium and phosphate than conventional salts used in total parenteral nutrition.

† 1555 METABOLISM OF VERY LOW DENSITY LIPOPROTEIN (VLDL) BY HUMAN PLACENTA IN VITRO. Dennis Black, Kerry King and Peter Whitington, Department of Pediatrics, Univ. of TN. Ctr. for the Health Sciences and LeBonheur Children's Medical Center, Memphis, TN.

We investigated the potential role of maternal VLDL as a source of fatty acids (FA) for use by the fetus using isolated perfused human placenta. Recirculating fetal and maternal perfusions of 10 cm diameter portions of 5 term placentas were used to determine the fate of ^{3}H-(FA)triolein (TG) incorporated into human VLDL. Perfusates consisted of Kreb's bicarbonate buffer, 4% FA-free BSA, 100 mg% glucose, and 20% human RBC. The model was validated by oxygen uptake, glucose utilization, leucine transport, and BSP exclusion. VLDL was added to the maternal perfusates and circulations maintained for 2 hours. VLDL became TG depleted (62.5 ± 1.6 (SE) % to 49.0 ± 4.2) and phospholipid enriched (25.0 ± 0.9 to 37.2 ± 7.8). Scintillation counting of perfusates revealed the following: the rate of uptake of VLDL-TG by placenta was 0.76 ± 0.14 ug/g placenta/min which represents over the length of the perfusion, 11.7 ± 2.3% of the initial TG mass; of this loss, 10.0 ± 1.3% appeared in the fetal perfusate. TLC of lipid extracts from perfusate and placenta revealed ^{3}H-FA to be distributed as follows: in placenta, monoglyceride (MG)-49.8%, diglyceride (DG)-30.2, FA-10.5, TG-6.5, and cholesteryl ester-2.9; in fetal perfusate, MG-56.7, DG-27.0, FA-14.7, and TG-1.2. We conclude maternal VLDL is metabolized by placenta via TG hydrolysis (presumably by lipoprotein lipase) and liberated partial glycerides and FA are taken up for use by placenta or transport to the fetus.

1557 OUTCOME OF CARDIOPULMONARY RESUSCITATION IN THE NEONATAL INTENSIVE CARE UNIT. L.D. Willett, M.P. Leuschen, R.M.Nelson. Dept. of Pediatrics, Univ. of Nebraska Medical Center, Omaha, Nebraska.

A paucity of data is available on the cardiopulmonary resuscitation (CPR) of newborns. Since predictors of long term outcome following resuscitation would be extremely valuable we undertook a study to help define these variables. All admissions to the Neonatal ICU in a 30 month period (January 1981-June 1983) were reviewed to identify episodes of CPR. Of the 1341 charts reviewed, 83 patients met the criteria for a "code" consisting of CPR with or without medications or procedures. Sixty seven patients (81%) survived the initial arrest however 37 patients (44%) succumbed within 24 hrs. Eighteen patients (22%) died prior to discharge and twelve patients (14%) were eventually dismissed. Prior to arrest, significant predictors of poor outcome were a urine output of <1 cc/kg/hr, sepsis and postnatal age < 24 hours ($p<0.04$). A pH < 7.30 twenty four hours after CPR or the occurance of intraventricular hemorrhage subsequent to the code were significantly associated with ultimate demise. A Chi square analysis indicated that the requirements of intravenous lines or intubation during a code was advantageous ($p<0.04$). Survivors of CPR were more likely to have BPD, to be term gestation and not to have subsequent arrests ($p<0.01$). Six (55%) of the long term survivors (alive 6 months after discharge) were neurologically intact. Four (36%) were abnormal, but two of these infants had congenital anomalies associated with neurologic deficits. One patient was lost to follow-up. The clinical, socio-economic and ethical implications of this study warrant further analysis.