DIFFERENTIAL LEVELS OF DOCOSAHEXAENOIC ACID (DHA) IN FORMULA AFFECT RED BLOOD CELL DHA LEVELS IN TERM INFANTS.

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DHA is an important component of the brain. Red blood cell (RBC) DHA levels are thought to be related to brain DHA content and to visual acuity in infancy. The DHA content of the RBC of infants is determined by the DHA content of the feeding. To assess the effects of different levels of formula DHA on RBC DHA levels of infants, we conducted a multi-center, double-blind, prospective study. Infants were randomized to one of two infant formulas: Formula Higher DHA with DHA at 0.32% of total fatty acids, similar to worldwide mean levels found in breast milk, and Formula Lower DHA with DHA at 0.15% of total fatty acids, similar to lower levels typically found in breast milk in the USA. Infants were fed study formula from 14 through 120 days of age. Fatty acids in blood lipid fractions were analyzed by capillary gas chromatography at 120 days of age. The table summarizes DHA levels in total-RBC lipid, RBC-phosphatidylcholine (RBC-PC), RBC-phosphatidylethanolamine (RBC-PE), and plasma phospholipids (Plasma-PL) at 120 days (% of total fatty acids, Mean ± SE).

Both formulas were well tolerated, and infants in both groups had similar growth. We conclude that infants fed formula containing higher levels of DHA have significantly higher circulating levels of DHA. We speculate that greater incorporation of DHA into brain and retinal tissues may result from higher circulating levels of RBC DHA.

EGR-1 NULL MOUSE EXHIBITS IMPAIRED HEPATIC REGENERATION.

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The EGR-1 null mouse exhibits an impaired hepatic regenerative response. These observations have been made in a variety of models of cellular growth and differentiation, and further support the role of this factor in regeneration. In the studies reported here the functional significance of EGR-1 expression during liver regeneration was examined by comparing the hepatic regenerative response in EGR-1 null mice. The results of these studies showed that liver regeneration in EGR-1 null mice is impaired. Although the early signaling events leading up to the first wave of hepatocellular DNA synthesis occurred normally following partial hepatectomy in EGR-1 null mice, subsequent signaling events and cell cycle progression after the first round of DNA synthesis were delayed. This derangement was characterized by increased activation of the p38 mitogen activated protein kinase and inhibition of hepatocellular metaphase-to-anaphase mitotic progression. Together, these observations suggest that Egr-1 is an important regulator of hepatocellular mitotic progression through the spindle-assembly checkpoint. In support of this, microarray-based gene expression analysis showed that induction of expression of the cell division cycle 20 gene (CDC20), a key regulator of the mitotic checkpoint, was reduced in EGR-1 null mice. Taken together these data define a novel functional role for EGR-1 in regulating hepatocellular mitotic progression during liver regeneration.

INVOLVEMENT OF ENDOTHELIN RECEPTORS IN NEONATAL MORPHINE WITHDRAWAL.

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Purpose: Management of neonatal opioid tolerance and withdrawal symptoms remains a major clinical challenge in NICUs. Numerous treatment modalities are employed in an attempt to prevent withdrawal mechanisms. We have previously shown that central endothelin (ET) receptors are involved in morphine tolerance. The purpose of this study is to investigate the involvement of central ET receptors in morphine withdrawal in neonatal rat pups. Pregnancy rats were used and rendered tolerant to placebo and morphine pellets, respectively, over a 7-day period. On day 8, both placebo and morphine pellets were removed and rats were allowed to undergo withdrawal for 24 hours. Rat pups were delivered by c-section at E21 and treated as described. Changes in G-protein stimulation were determined by using [35S]-guanosine 5’-o-thriphosphate ([35S]GTPγS) binding assay in the brain of neonatal rats undergoing placebo and morphine withdrawal. Results: Morphine produced significant higher (P<0.05) maximal stimulation in neonatal rats undergoing morphine withdrawal (83.60%) when compared to placebo (68.15%). EC50 values in morphine withdrawal group (6.825) were significantly lower (P<0.05) as compared to placebo (72.917μM). A significant increase in maximal G-protein stimulation was observed with ET-1 in the morphine withdrawal group (87.16%, P<0.05) as compared to placebo (74.88%). EC50 values for ET-1 in neonatal rats undergoing morphine withdrawal (93.75μM) were significantly higher (P<0.05) than placebo (62.56μM). ET2 receptor antagonist, BMS182874, did not stimulate GTP binding in placebo brains (EC100μM), but significantly increased (P<0.05) maximal stimulation of G-proteins in morphine withdrawal group (56.07%, EC50=31.26μM). ET2 antagonist, IRL1620-induced stimulation of G-proteins was similar in placebo (73.43%, EC50=13.26μM) and morphine withdrawal (75.08%, EC50=117.9μM), respectively. Conclusion: Morphine-induced G-protein activation is in creased in ET2 induced G-protein expression during morphine withdrawal. ET2 antagonist increases activation of G-proteins during withdrawal in neonates. In conclusion we provide evidence for the first time that central ET2 and not ET3 receptors are involved in morphine withdrawal.

COMBINED POSTER SESSION

EPIDEMIOLOGY OF PERIODONTAL COAGULASE NEGATIVE STAPHYLOCOCCAL BCERMA IN NEWBORN INTENSIVE CARE INFANTS.

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BACKGROUND: Coagulase-negative staphylococcal (CONS) bacteremia is the most common neonatal infection in most newborn intensive care units (NICU). Infected infants have increased mortality, and morbidity compared to uninfected ones. At the University of Utah NICU increasing numbers of infants have developed persistent (culture positive for >7 days) CONS bacteremia. OBJECTIVE: To determine rates of persistent CONS bacteremia in NICU infants in 2002-2003 and to compare risk factors for persistent prolonged persistent CONS bacteremia. METHODS: A computerized microbiology database identified positive NICU blood cultures from 1999-2003. Chart review of infants with CONS bacteremia documented possible risk factors for persistent and prolonged persistent infection in 2002-2003. Discrete variables were analyzed by chi-square for trend. Analysis for normally distributed continuous variables was by t-test, for normally distributed continuous variables by Mann-Whitney test. RESULTS: From 2001-2005, the frequency of bacteremia due to all bacteria has remained stable (0.03/1000 patient days, p=0.9). From 1999-2003, CONS bacteremia increased (0.4/1000 days for 3-9 days, 0.0/1000 days for >36 hours). Significant differences were found in days of antibiotics prior to onset (p=0.03), feeding intolerance at onset (p=0.03), and ventilator days associated with CONS (p<0.001). No difference was found in gestational age, day of life (DOL) of bacteremia onset, DOL to full enteral feeds, birth weight, or association with central vascular catheter at onset. In 2003 CONS bacteremia increased in our NICU from 1999-2001. Significant differences were found between bacteremia < or = 96 hours with respect to prior days of antibiotic exposures, feeding intolerance, and CONS associated ventilator days. Differences were not found in gestational age, DOL onset, birth weight, or central venous catheter at onset. In 2003 CONS bacteremia increased in our NICU from 1999-2001. Significant differences were found between bacteremia < or = 96 hours with respect to prior days of antibiotic exposures, feeding intolerance, and CONS associated ventilator days. Differences were not found in gestational age, DOL onset, birth weight, or central venous catheter at onset.

INCIDENCE OF CATHETER RELATED BLOODSTREAM INFECTIONS AFTER THE REMOVAL OF PERCUTANEOUS INTRAVENOUS CATHETERS IN PRETERM INFANTS.

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The use of PICC lines in preterm infants increases the risk for systemic bacterial infections. The use of PICC lines is widespread, and included total days of PICC life, days of antibiotics through PICC, days of TPN through PICC, BSI within 48 hours of PICC removal, and number of blood cultures obtained within 48 hours of PICC removal. The use of PICC lines in preterm infants increases the risk for systemic bacterial infections. The use of PICC lines is widespread, and included total days of PICC life, days of antibiotics through PICC, days of TPN through PICC, BSI within 48 hours of PICC removal, and number of blood cultures obtained within 48 hours of PICC removal.