oxygenation, which may play a role in the multifactorial pathophysiology of necrotizing enterocolitis (NEC).

The aim of this study is to evaluate by NIRS the effects of bolus and continuous enteral feeding on splanchnic and cerebral oxygenation in preterm infants with normal feeding tolerance.

**Methods**  
Eighteen healthy preterms (GA 27–32 weeks), tolerating at least 100 ml/kg/1/day of fortified human milk or preterm formula, underwent a 6-hours simultaneous monitoring of cerebral and splanchnic oxygenation using NIRS-200 oximeter. Sensors were placed on frontal and sub-umbilical region. During the monitoring they randomly received a 10-minutes bolus meal and a 3 hours continuous meal.

**Results**  
Splanchnic oxygenation significantly decreased (p<0.05) during continuous feeding, from 1.30 hour after the beginning to almost the end of the feed. No differences were found on cerebral oxygenation.

**Conclusions**  
To the best of our knowledge, this is the first study comparing the effect of different feeding techniques on splanchnic and cerebral oxygenation in preterms. A significant reduction in splanchnic oxygenation was observed during continuous enteral. A possible role of these findings on the multifactorial NEC pathogenesis remains to be investigated.

**Abstracts**

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IS FOLIC ACID SUPPLEMENTATION REALLY NECESSARY IN PRETERM INFANTS WITH <32 WEEKS OF GESTATION?  
doi:10.1136/archdischild-2012-302724.0347

**Abstracts**

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EFFECTS OF GLUTAMINE SUPPLEMENTATION ON BRAIN DEVELOPMENT OF VERY PRETERM CHILDREN: A FOLLOW-UP STUDY AT SCHOOL-AGE  
doi:10.1136/archdischild-2012-302724.0348

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EFFECTS OF POSTNATAL ENERGY AND MACRONUTRIENT INTAKES ON GROWTH IN EXTREMELY PRETERM INFANTS: A POPULATION-BASED STUDY  
doi:10.1136/archdischild-2012-302724.0349
sex and baseline anthropometrics. Energy intake was significantly correlated with weight gain \((r=+0.31, p<0.001)\), length gain \((r=+0.20, p<0.001)\) and head circumference growth \((r=+0.26, p<0.001)\). In addition, protein intake was independently positively associated with weight gain, and the effect of macronutrient intakes on growth varied with postnatal age.

Conclusions Extremely preterm infants in Sweden received lower macronutrient intakes than recommended and showed postnatal growth failure. We found significant positive correlations between intakes of energy and macronutrients and growth. This suggests that optimized energy and macronutrient intake is important to prevent growth failure in these vulnerable infants.

**352** LONGITUDINAL INFUSION OF INSULIN-LIKE GROWTH FACTOR-I AND IGF-BINDING PROTEIN-3 COMPLEX TO FIVE PRETERM INFANTS - PHARMACOKINETICS AND SHORT TERM SAFETY

**Abstracts**

1 D Ley, 1 H HansenPupp, 1 A Niklasson, 2 M Domellöf, 3 M Domellöf, 4 L Friberg, 5 J Borg, 2 C Löfquist, 2 G Hellgren, 5 L Smith, 1 AL Hård, 2 A Hellströmm, 1 Lund University, Lund; 2 Gothenburg University, Gothenburg; 3 Umeå University, Umeå; 4 Upsala University; 5 Premacure AB, Uppsala, Sweden; 6 Harvard Medical School, Boston, MA, USA

**Introduction** In preterm infants, low levels of insulin like growth factor-I (IGF-I) and IGF binding protein 3 (IGFBP-3) are associated with impaired brain growth and retinopathy of prematurity (ROP).

Treatment with IGF-I/IGFBP-3 may be beneficial for brain development and decrease the prevalence of ROP.

**Methods** In a phase II pharmacokinetic and safety study, five infants (5 girls) with a median (range) gestational age (GA) of 26+6 (26+0 – 27+2) weeks and birth weight (BW) of 990 (900–1212) g received continuous intravenous infusion of rhIGF-I/rhIGFBP-3. Treatment was initiated during the first postnatal day and continued for a median (range) duration of 168 h (47–168) in doses between 21–111 µg/kg/24h.

**Results** Treatment with rhIGF-I/rhIGFBP-3 was associated with higher serum IGF-I and IGFBP-3 concentrations (p<0.001) than model-predicted endogenous levels. Out of 74 IGF-I samples measured during study drug infusion, 37 (50%) were within target range, 4 (5%) above and 33 (45%) were below. Predicted dose of rhIGF-I/rhIGFBP-3 to establish circulating levels of IGF-I within the intrauterine range in a 1000 g infant was 75–100 µg/kg/24 h. No hypoglycemia or other adverse effects were recorded.

**Discussion** Continuous intravenous infusion of rhIGF-I/rhIGFBP-3 was effective in increasing serum concentrations of IGF-I and IGFBP-3. Administration under study conditions was safe.

**353** PRETERM BIRTH AND THE METABOLIC SYNDROME: A SYSTEMATIC REVIEW AND META-ANALYSIS

**Abstracts**

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**Introduction** Preterm birth is associated with increased cardiovascular disease risk and impaired glucose metabolism during childhood and adulthood. This association may be mediated by low birth weight, catch-up growth, or intrauterine growth restriction, which are associated with increased cardiovascular disease risk factors, higher prevalence of type 2 diabetes, and metabolic syndrome, even in the absence of obesity.

**Objectives** To systematically review the literature evaluating the association of preterm birth and the metabolic syndrome.

**Methods** We conducted a systematic review of studies with prospective, nested case-control, or cohort design, comparing preterm to term births, and the metabolic syndrome in adulthood or childhood. The main exposure was preterm birth before 37 weeks of gestation. The main outcome was the metabolic syndrome at any age. Studies were identified through electronic searches of PubMed, Ovid Medline, and CINAHL databases (1/1971 to 12/2011) and manual searches of reference lists of included studies. Two reviewers independently assessed study eligibility and extracted data.

**Results** Forty-six studies were included, including three prospective cohort studies, seven case-control studies, and 36 cross-sectional studies. The meta-analysis of these studies included 22 studies from 17 studies. The pooled odds ratio for preterm birth and the metabolic syndrome was 1.72 (95% CI 1.42 to 2.07), indicating a higher prevalence of the metabolic syndrome among individuals born preterm. The meta-analysis was not significantly influenced by study design, study quality, or the age of the study population.

**Conclusions** Preterm birth is associated with the metabolic syndrome, which may add to the risk of cardiovascular disease in adulthood.