Background and Aims The amino acid glutamine has been shown to reduce the number of serious neonatal infections in very preterm children (<32 weeks of gestation), which may benefit long-term brain development. The aim of this study was to elucidate potential effects of glutamine supplementation on brain development in very preterm children at school-age.

Methods First, we investigated growth trajectories of head circumference, weight, and length in the first year for 65 very preterm children that originally participated in a randomized controlled trial on enteral glutamine supplementation between day 3 and 30 of life. Second, we measured brain structure volumes and white matter integrity for 52 very preterm children at school-age, using magnetic resonance imaging (MRI) and Diffusion Tensor Imaging (DTI), respectively. Furthermore, differences in functional outcomes were explored. Group differences were tested using ANOVA statistics.

Results Glutamine supplementation was associated with improved growth trajectories of head circumference in the first year of life (d=0.66, p=0.03). Furthermore, glutamine supplementation increased white matter (d=0.54, p=0.03), hippocampus (d=0.47, p=0.02), and brain stem (d=0.54, p=0.04) volumes at school-age. All differences were strongly related with the number of serious neonatal infections (all p<0.02). Glutamine supplementation did not influence measures of motor, cognitive, and behavioral functioning at school-age.

Conclusions We found evidence that reduction of serious infections by neonatal glutamine supplementation improves head growth in the first year of life, as well as brain structure volumes at school-age. This suggests an early programming effect of nutritional intervention with enteral glutamine.

Background and Aims The main goal of this study was to determine the necessity of folic acid supplementation in preterm infants. Methods Infants born ≤32 weeks of gestation were included in the study with parental consent. Blood samples for the determination of serum folate levels were obtained on days 14 and 28 postnatally, as well as 36 weeks postconceptionally (or just before discharge if patients are discharged before 36 weeks) - samples A, B and C, respectively. Infants were divided into three groups based on mode of feeding: human breast milk (HBM), fortified HBM or preterm formula (PF).

Results A total of 162 preterm infants were enrolled in the study, 17(10.5%) of whom received HBM alone, 94(58%) received fortified HBM and 51(31.5%) were fed with PF. Comparisons between groups revealed that preterm infants in the fortified HBM and PF groups have a significant higher serum folic acid levels in samples C compared to those receiving HBM alone (p<0.001 for both). None of the preterm infants included developed folate deficiency during the study period.

Conclusion This is the largest and most comprehensive clinical study to date evaluating the need for folic acid supplementation in preterm infants who were fed using either modern PFs or milk fortifiers mixed with HBM. Our results suggest that fortified HBM use in preterm infants can alleviate the need for further folic acid supplementation. On the other hand, in preterm infants who are unable to receive HBM folic acid support can be provided with PFs.

Background Extremely preterm infants often experience growth failure and adequate nutritional supply may be difficult to achieve. It is still debated to what extent nutrition affects growth at an early stage in life. The aim of this study was to explore associations between energy and macronutrient intakes and growth.

Methods The study population consists of extremely preterm infants born in Sweden during 2004–2007. Detailed data of nutritional intakes and anthropometric measurements were retrieved from hospital records.

Results Infants (n=602) had a mean±SD gestational age of 25.3±1.1 weeks and birth weight 765±171g. From birth to 70 days of age, energy and protein intakes were 119±311.3kcal/kg/day and 3.2±0.4g/kg/day respectively. Infants showed postnatal growth failure: mean standard deviation scores (SDS) decreased by 1.5 for weight, 2.3 for length and 0.8 for head circumference.

The following confounders were included in the multivariate analyses: Gestational age, CRIB-score, duration of mechanical ventilation, days on postnatal steroids and antibiotics treatment, infant