have an unfavourable outcome. Cortical, thalamic and WM tissue labels were generated by neonatal atlas-based automated segmentation of the T2-weighted images [1]. Tissue labels were propagated onto the diffusion maps. FA and MD values were determined. Linear regression was performed to assess the correlation between FA/MD and DQ. Estimation of unfavourable outcome with FA/MD in WM and GM was examined using receiver operating characteristic (ROC) analysis.

Results For multiple comparisons and age at scan significant correlation was found between DQ and FA in WM (p = 0.0002), and MD in thalami (p = 0.0002) and cortex (p = 0.005). ROC analysis to estimate unfavourable outcome showed larger area under the curve (AUC) for FA in WM, than MD in GM (Figure and Table).

Conclusion These data show that FA in WM and MD in GM may be used as biomarkers of outcome following HIE.

REFERENCES
1. Makropoulos et al. 2013

O-055 Table 1 Results of receiver operating characteristics analysis to estimate outcome with FA in WM and MD in thalami and cortex. SE- standard error, CI-confidence intervals

<table>
<thead>
<tr>
<th>Tissue</th>
<th>AUC</th>
<th>SE</th>
<th>Significance</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>White matter FA</td>
<td>0.859</td>
<td>0.057</td>
<td>0.000</td>
<td>0.747-0.970</td>
</tr>
<tr>
<td>Thalami MD</td>
<td>0.775</td>
<td>0.077</td>
<td>0.003</td>
<td>0.625-0.926</td>
</tr>
<tr>
<td>Cortex MD</td>
<td>0.803</td>
<td>0.069</td>
<td>0.001</td>
<td>0.667-0.939</td>
</tr>
</tbody>
</table>

**Neonatal Brain Development, Intervention and Outcome**

O-057 MELATONIN AS A NOVEL NEUROPROTECTANT IN PRETERM INFANTS – A DOUBLE BLINDED RANDOMISED CONTROLLED TRIAL (MINT STUDY)

**Background**
Experimental studies suggest that melatonin is neuroprotective. Preterm infants are deprived of the normal intrauterine exposure to maternal melatonin and may benefit from supplementation to adult physiological levels.

**Aim**
To prove that melatonin supplementation to adult concentrations decreases prematurity associated white matter injury assessed by tract-based spatial statistics at term equivalent age.

**Methods**
The study was a phase 2 exploratory; multi-centre double-blind randomised placebo-controlled 2-arm trial, evaluating the neuroprotective effect of melatonin in preterm infants less than 31 weeks gestation. The 2 study drugs, melatonin (active) and normal saline (placebo) were given as an intravenous infusion once a day for 7 days starting by 48 h after birth. The dose of melatonin (0.1 mcg/kg/hr for 2 h) was derived from our previous pharmacokinetic study. Analysis was by intention to treat. Magnetic resonance imaging (MRI) was done at term corrected age. A 5% difference in the fractional anisotropy (FA) on MRI was taken as the primary endpoint.

**Results**
Fifty-eight preterm infants participated in the study; 30 received melatonin and 28 received saline. Four babies died in each group. The 2 groups did not show any differences in demographic data or in the short term adverse events. Seventeen infants from the melatonin group and 19 from the placebo group had MR images which were analysed. There was no difference in the FA in the 2 groups.

**Conclusions**
Treatment with DHA after severe neonatal hypoxia attenuates lipid peroxidation and brain damage in both grey and white matter tissues. These novel findings add new knowledge on oxidative injury and points at a possible therapeutic intervention after perinatal asphyxia or severe hypoxia in both term and preterm babies.

O-058 BRAIN MORPHOMETRY IN YOUNG ADULTS BORN SMALL-FOR-GESTATIONAL-AGE AT TERM

**Background**
To prove that melatonin supplementation to adult physiological levels during the first week after birth did not alter FA in the preterm white matter at term equivalent age.

**Conclusions**
Treatment with DHA after severe neonatal hypoxia attenuates lipid peroxidation and brain damage in both grey and white matter tissues. These novel findings add new knowledge on oxidative injury and points at a possible therapeutic intervention after perinatal asphyxia or severe hypoxia in both term and preterm babies.
Introduction

Many studies have found impaired performance in executive functions (EF) in children born very preterm (VPT) [1]. EF play a pivotal role for academic achievement and personal autonomy. Demands in both domains and, in parallel, the dependence on EF ability in daily life continuously increase in later childhood and adolescence [2].

Methods

Forty-one VPT children/adolescents between 10 and 16 years with normal general cognitive abilities and 43 healthy term-born (TB) peers were examined. Parents reported on their children’s EF ability in the home and school environment using the Behaviour Rating Inventory of Executive Functions, BRIEF. Additionally, computer-based testing using the CANTAB test battery provided objective measures of executive functioning.

Results

Parents of VPT children rated EF abilities of their children poorer than parents of TB children, with 10–20% of all VPT children experiencing clinically relevant EF problems vs. none of the TB children. In computerised EF tests, an interaction between birth status and task difficulty was found for various EF components: Performance of VPT and TB children was comparable in lower but poorer in higher difficulty levels for VPT children (e.g., Fig. 1 for planning accuracy). 

Conclusions

Executive function difficulties in VPT children and adolescents become more pronounced with increasing task demands. As EF demands in daily life become more complex in later childhood and adolescence, EF deficits may hinder optimal development in former VPT children.

REFERENCES

1. for a review: Aarnoudse-Moens et al., Pediatrics 2009; Mulder et al., Dev Neuropsychol 2009
2. Burnett et al., Early Hum Dev 2013