

exposed in controlled conditions (silent room, active sleep, randomised order) to three odours presented on a Q-tips:

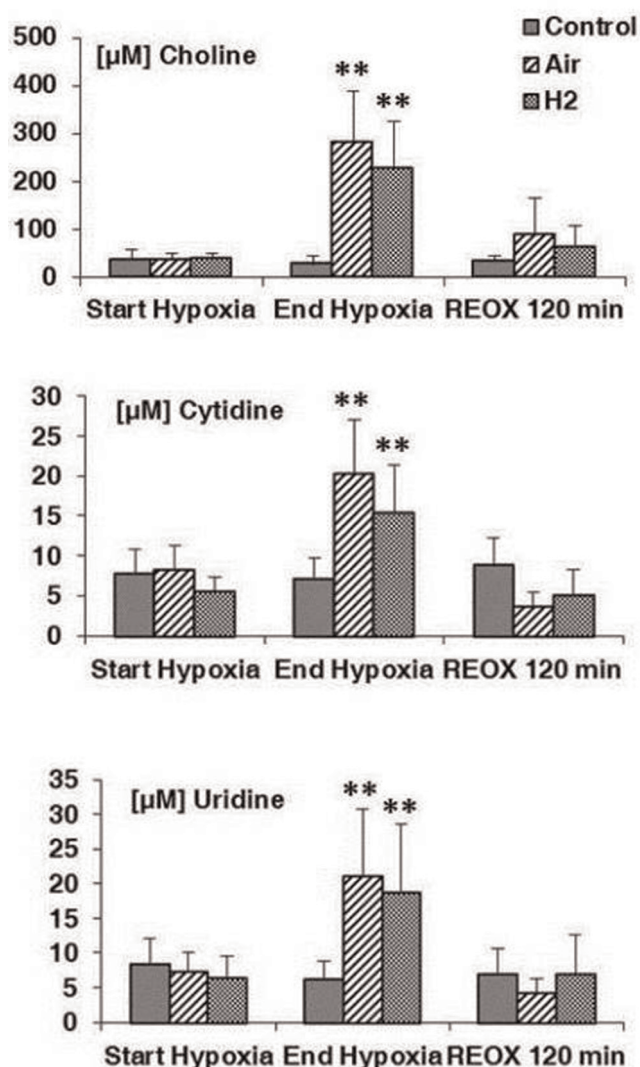
- water (control);
- a hand rub (DES60<sup>®</sup>) diluted to match the odour's intensity released by hands;
- an adhesive remover (Convacare<sup>®</sup>).

We recorded bilaterally cortical activation in orbito-frontal gyri (OFG), prefrontal (PFC) and somatosensory (S1 and S2) cortices during 40s (10s-baseline, 10s-presentation, 20s-post-stimuli) by multichannel-NIRS. HbO<sub>2</sub> changes were analysed from baseline (ANOVA) and by subgroups (Kruskall-Wallis).

**Results** In the whole population, we observed:

- no activations for water.
- cortical activations (HbO<sub>2</sub> increase) for DES60<sup>®</sup> ( $p < 0.001$ ), unilaterally in OFG, PFC, and bilaterally in S1 and S2; whereas only in S1 (unilaterally) for Convacare<sup>®</sup> ( $p < 0.001$ ).

We noticed significant profiles of response for all infant's subgroups, in at least one olfactory and one pain processing areas. The average magnitude of HbO<sub>2</sub> increase from baseline was higher in full-terms vs both subgroups of preterms: 8.5(2.8–12.6)  $\mu\text{mol/l}$  vs 5.9(2.6–10.4) and 5.7(1.8–9.2)  $\mu\text{mol/l}$  for DES60<sup>®</sup> ( $p < 0.001$ ).



**Abstract PO-0414 Figure 1** Choline, cytidine and uridine levels before and after hypoxia as well as after resuscitation

**Conclusion** Full-term and preterm newborns can perceive OS at a cortical level. Exposure to OS can activate trigeminal/olfactory and pain processing areas and may induce discomfort/pain in newborns.

#### PO-0414 PLASMA METABOLOME IN A NEWBORN PIGLET MODEL FOR ASPHYXIA AND RESUSCITATION

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**Background and aims** Post-asphyxia resuscitation with air improves survival. We aimed to find reliable biomarkers of brain injury secondary to hypoxia/ischemia in plasma in a newborn piglet model for asphyxia.

**Methods** Hypoxia was introduced to newborn piglets (standardised model). Plasma metabolomic profiles reflecting the effects of asphyxia and resuscitation were studied, and changes in target metabolites of the Kennedy pathway were analysed by LC-MS.

**Results** A set of metabolites reflecting metabolic changes after asphyxia and resuscitation was identified. Increased levels of choline, cytidine and uridine (Kennedy pathway) during hypoxia were observed (see Figure 1). No differences were found between resuscitation using air and air+2.1% H<sub>2</sub>.

**Conclusions** Untargeted metabolomics enabled the monitorization of changes occurring during asphyxia and resuscitation on a molecular level. A set of candidate biomarkers was identified. In accordance to previous results, alterations in the Kennedy pathway are reported. The performance of candidate biomarkers for clinical grading will be evaluated in further studies.

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#### PO-0415 CORPUS CALLOSUM SIZE AS A PREDICTOR OF VISUAL PROBLEMS AMONG 4-YEAR-OLD VERY LOW BIRTH WEIGHT CHILDREN

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**Background** Correlation between corpus callosum (CC) size and motor performance in prematurely born children has been described. It is speculated that the organisation of CC can be associated with visual acuity in preterm children.

**Aim** To assess the relation between CC size and vision impairment, results of Frostig test of visual perception and Visual evoked potentials (VEP) in a group of VLBW children.

**Methods** 40 children born with a mean birthweight of 1023g (SD 230g) were evaluated at the mean age of 4 years (range 3.7–4.3). The children were examined for clinical signs of vision impairment and were subjected to Frostig test. VEP was recorded after checkerboard pattern and flash stimulation.

Morphological brain changes and CC size were evaluated using standard MRI sequences. The MRI evaluators were not informed about the results of visual examinations.

**Results** Impaired visual acuity was detected in 9/12 cases with abnormal CC (75%) and in 10% of children with normal CC ( $p < 0.01$ ). There was a significant correlation between the CC size and Frostig test results (abnormal CC group vs. normal CC group: 91 vs. 80.7 points;  $p = 0.03$  adjusted for history of ROP). Absence of stereoscopic vision was more frequent in the group of abnormal CC (7/12 vs. 2/20;  $p = 0.03$ ). The frequency of abnormal VEP was similar in the both groups.

**Conclusion** A strong correlation between vision impairment and CC size was observed. This suggests that CC plays important function in integration of visual perception.

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#### PO-0416 2ND TRIMESTER HEAD SIZE IN FETUSES WITH CONGENITAL HEART DISEASE: A COHORT STUDY

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**Background and aims** Congenital heart disease (CHD) is associated with neuro-developmental disorder. The influence of CHD on the brain is believed to begin during pregnancy. The aim of this study is to describe a 2-year cohort of fetuses with major and minor CHD and to investigate if and when during pregnancy cerebral growth is disrupted. We hypothesise that fetal cerebral growth is impaired as early as 2nd trimester.

**Method** Pregnant women in Denmark (more than 95%) attend two publicly funded ultrasound scans; at 12 weeks gestational age (GA) and at 19–20 weeks GA. Fetal biometrics and abnormal ultrasound findings are registered. Fetuses in Western Denmark (2.9 mill inhabitants) screened between January 1st 2012 and December 31st 2013, diagnosed with any structural, non-syndromic CHD either during pregnancy or up to six months after birth, are included in the study.

**Results** 129 fetuses with CHD were identified prenatally. Ninety-eight (76%) were genetically screened, primarily by chromosomal micro-array analysis ( $n = 72$ ). Nineteen pregnant women (15%) declined invasive testing. Twenty-three fetuses (18%) were excluded due to genetic syndromes, mainly aneuploidies ( $n = 14$ ) and seven (5%) were excluded due to extra-cardiac malformations. Ninety-nine fetuses (77%) with presumed non-syndromic CHD were included. Head circumference in week 19–20 was significantly smaller than average with a mean z score of -0.4 (95% CI: -0.7, -0.2) ( $p < 0.01$ ). Analyses are undergoing and results will be presented at the meeting.

**Conclusions** Preliminary unadjusted results suggest that fetal cerebral growth in children with CHD may be disrupted as early as 2nd trimester.

#### PO-0417 WITHDRAWN

#### PO-0418 BRAIN PROCESSING OF MUSIC IN THE NEWBORNS

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In newborns, some basic music processing seems to be present few days after birth (1). Neonatal intensive care units are willing to use music to enrich preterm infant environment. Indeed, researches in neonatal intensive care units showed music impacts on physiological and behavioural responses, caloric intake, and energy expenditure of premature babies (2). The aim of this study is to understand how music is processed in newborns and if premature birth impacts on this processing.

Twenty-four healthy newborns (14 preterm scanned at term equivalent age and 10 full-term infants) have been recruited. Infants underwent functional MRI (fMRI) at 3T during natural sleep or while resting quietly in the scanner without any sedation. FMRI data were realigned; coregistered; normalised to a T2 neonatal template; and smoothed. Random-effect analyses have been done to observe the group activation on all newborns and to compare term and preterm newborns.

At the group level, we observed bilateral activation of auditory regions. At the cluster level, the right auditory cortex ( $p = 0.028$ , corrected for multiple comparison, extent = 70 voxels) was more activated than the left auditory cortex ( $p = 0.067$ , corrected for multiple comparison, extent = 52 voxels) during music. Furthermore, no difference was found between full-term and premature groups.

Our preliminary results show functional asymmetry in auditory cortex already present at 40weeks gestational age. Those results corroborate with those found in adults (3), in processing pitch changes in 3-to-6 month's old children (4) and in full-term newborns (1). More analyses are needed to explore further music processing differences in these two populations.

#### PO-0419 INCIDENCE OF CEREBRAL OXYGEN DESATURATION AMONG NEONATES UNDERGOING GENERAL ANAESTHESIA

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**Background** Cerebral autoregulation (CA) is a physiologic mechanism ensuring constant blood flow to the brain independent of changes (within physiological limits) in mean systemic blood pressures. Compromised CA can lead to ischemia, associated with hypoxic injury and long term sequelae. The efficiency of CA in neonates is not well-known, especially during general anaesthesia. We aimed to determine incidences of significant cerebral desaturation ( $S_cO_2$ ).

**Methods** Observational data were collected from 33 premature and term neonates (up to post-menstrual age 44 weeks), receiving general anaesthesia for surgery. Near-infrared spectroscopy (ForeSight® CerebralOximeter, CASMED, USA) was used to non-invasively measure regional  $S_cO_2$ . When used, invasive arterial pressures were recorded electronically. We then calculated the