an early prognostic marker for later development of the metabolic syndrome. Lack of difference in obstetrical concentrations between LGA and AGA groups could possibly suggest that obstetin may not be directly involved in the regulation of fetal adiposity and insulin sensitivity.

**METHODS**

**Background and aim** To generate ATP production, mitochondria host crucial metabolic pathways that interact continuously. Therefore, pathological interruptions in one process might disturb entire cell metabolism. To investigate a neonatal mitochondrial disorder (GRACILE syndrome), we developed a mouse model with c.232A>G mutation in Bcs1l, resulting in a lethal complex III (CIII) deficiency in homoyogotes. Our aim was to analyze how CIII deficiency affects metabolic pathways by pressing the mechanisms with fasting.

**Methods** Homozygous (Bcs1lG/G) and wild type (Bcs1lA/A) mice were assessed before and after 4-hour fasting with blood glucose, lactate and ketones, and sacrificed. Liver tissue was obtained for histology (H&E, PAS staining for glycogen and ORO-staining for fat) and ATP measurement.

**Results** Before fasting, Bcs1lG/G had lower glucose (4.3±1.3 vs. 6.6±1.2, p<0.01) and higher ketone (0.6±0.3 vs. 0.3±0.1, p<0.01) levels, but similar lactate values (4.0±2.2 vs. 3.7±1.4, p=0.8). Glycogen depletion and microvesicular steatosis present in Bcs1lG/G hepatocytes increased after fasting. After fasting, Bcs1lA/A remained eu glycomic with increased ketone body production, whereas in Bcs1lG/G mice glucose, ketone and lactate were lower. ATP production of Bcs1lA/A mice was lower than that of Bcs1lG/G (58±24%).

**Conclusion** Bcs1lG/G mice switched their metabolism to β-oxidation before fasting and failed to build up compensatory metabolic mechanisms to fasting, resulting in low ATP production. These results elucidate mechanisms explaining the deterioration in Bcs1lG/G mice. The methods used can be implemented as outcome measures in intervention studies aiming at stimulating mitochondrial biogenesis and metabolism in the mouse model.

**RESULTS** Between pre- and postoperative MRI, patients showed significant brain growth, especially in the cortical grey matter (0.25%/day), cerebellum (0.20%/day), and deep gray matter structures (0.10–0.15%/day, all p<0.004). Volume increase of the white matter was 0.05–0.06%/day (left/right; p=0.017/0.003); increase of total brain volume was 0.14%/day (p<0.001).

Compared to healthy controls, the size of all brain structures (except ventricles and right amygdala) was significantly reduced postoperatively. Largest differences were found in deep gray matter structures (15.8–16.8%, p<0.05<0.001), cortical grey (12.1%, p=0.01) and white matter (11.8%, p<0.001). Total brain volumes were reduced by 11.5% (p<0.001).

**Conclusions** In neonates with CHD, significant differences of white and deep grey matter volumes were found postoperatively. Brain growth was high, with notable regional differences. Our results contribute to the knowledge on the timing of cerebral injury in neonates with CHD.

**METHODS** MRI studies in neonates with congenital heart disease (CHD) have demonstrated delayed brain maturation compared to LGA and AGA groups. We compared volumetric measures from pre- and postoperative MRI of patients to healthy neonates.

**Background and aims** MRI studies in neonates with congenital heart disease (CHD) have demonstrated delayed brain maturation compared to LGA and AGA groups. We compared volumetric measures from pre- and postoperative MRI of patients to healthy neonates.

**Methods** Cerebral MRIs of 32 term-born CHD patients, scanned before and after heart surgery (mean age: 6.8 days and 26.8 days, respectively), were manually segmented to measure volumes of total, grey and white matter and of selected brain regions. Results were compared with MRIs of 17 healthy term born neonates (mean age: 23.5 days).

**RESULTS** Our results contribute to the knowledge on the timing of cerebral injury in neonates with CHD.