



Cambridge Baby Growth Study Newsletter

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Cambridge Baby Growth Study II

The Cambridge Baby Growth Study II Update: We wanted to let you know how our new study is going. This study is looking at growth specifically in babies born relatively small and babies whose mothers had diabetes in pregnancy. We are doing very well with recruitment and **we currently have 67 babies on the study** (24 small at birth and 43 whose mothers had diabetes). We will be following all these babies until 2 years of age and will keep you updated with our recruitment and results.

For more information please contact Dr Philippa Prentice at cambridgebabygrowth@medschl.cam.ac.uk



Son of the 50th family recruited to CBGS II

Play and Activities Study

The Cambridge Baby Growth Study team teamed up with researchers in the University's Social and Developmental Psychology group, led by Professor Melissa Hines, to look at how physical growth and hormone exposures in infancy might influence later psychological and behavioural development. Many of you received questionnaires asking about the kinds of toys and activities that your child enjoys and about your child's level of physical activity.

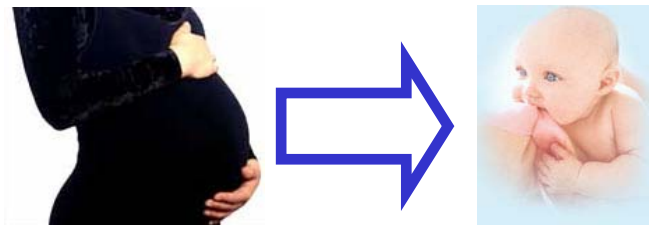
Many parents have already completed these questionnaires and sent them back to us. **If you have not done so, now is still a good time!** The more people participate, the more reliable the results will be. The process of analysing the data has begun, but additional responses could be included, if they are received in the near future. We will summarize the results of this study in a future issue of the newsletter.

How pregnant mothers nourish their growing babies



During pregnancy the growing baby receives a continuous flow of nutrients across the placenta from the mother. Some of you kindly took part in this detailed physiological study to find out how different blood levels and production of glucose and fats by the mothers affect the amount of nutrients that are transferred to the developing baby, and the size of the baby at birth.

The study involved 22 pregnant women, at 35 weeks gestation, and who stayed overnight at the **Wellcome Trust Clinical Research Facility at Addenbrooke's Hospital**. This centre is specially equipped to allow detailed assessments of body metabolism. All women were fasted overnight and then had rates of glucose and fat turnover assessed using stable isotopes. They also had their body composition measured and ultrasound to measure their baby's weight, leg length, body and head growth. The study has been completed and results submitted for publication in the *British Journal of Obstetrics and Gynaecology*.



The study showed that both the amount of glucose produced and the amount of fat broken down in the mother are directly related to their own body weight and amount of body fat, and also to their baby's weight. **Mothers who gained a lot of weight in pregnancy had higher blood sugar levels, and their bodies produced more glucose and broke down more fat than other women. And their babies were bigger.** The amount of fat breakdown in the mother was particularly related to the baby's tummy and head growth, whereas glucose production was related to leg length.

This study provides important information on how mother's metabolism regulates the baby's growth. These findings are relevant to the future understanding and management of mothers who gain a lot of weight during pregnancy and those with diabetes, who often have very large babies, and also to mothers who have particularly small babies.

Study Updates:

Breast Milk Composition and Infant Growth

Thank you to everyone who provided us with breast milk samples!

650 breast milk samples are currently being analysed to identify which factors in breast milk may influence growth in babies. We will measure breast milk composition (carbohydrate, fat and protein contents), metabolites, such as amino acids, and also candidate hormones involved in growth.

Links between Dad's Genes and Mother's Blood Glucose Levels in Pregnancy

Our Cambridge Baby Growth Study paper describing how a copy of a gene called *IGF2* ("insulin-like growth factor-2") that a baby inherits from its father influences its mother's glucose concentrations in pregnancy has been published in the scientific journal "Diabetes." The paper's peer reviewers described how the finding was made possible using "a unique cohort" (i.e. the Cambridge Baby Growth Study!). Using samples collected at birth we went on to show that the baby's *IGF2* gene regulates how much *IGF2* protein is present in the placenta and is also associated with the activities of other placental genes that are involved in the regulation of the immune system in pregnancy. We are now studying how increased activity of these placental genes is linked to maternal glucose levels.

Interestingly, a completely separate study found that immune regulation genes show increased placental activity levels in women with gestational diabetes. Therefore we think that our novel *IGF2* gene findings indicate a new risk factor for developing diabetes in pregnancy.

Dr Clive Petry, Dept of Paediatrics

Abdominal Ultrasound findings:

Our ultrasound results show that both antenatal factors (e.g. low birth weight) and postnatal factors (e.g. infant nutrition) influence the amounts of abdominal fat in infancy. Babies who were thin at birth (who had thinner skinfold thickness at birth) had higher amounts of the fat stored around the abdominal organs ("intra-abdominal fat") at ages 3 and 12 months. We also found that intra-abdominal fat increased by around 20% between ages 3 to 12 months, whereas there was no change in the amount of fat stored under the skin ("subcutaneous abdominal fat"). In addition, breastfeeding appeared to have a protective effect as babies who were exclusively breast-fed at age 3 months had lower intra-abdominal fat at 3 and 12 months compared to other babies.

Ema de Lucia Rolfe will present these findings at the Nutrition and Growth Conference in Paris in March 2012. For further information, please contact Ema at ed219@mrc-epid.cam.ac.uk

And Finally.....

Here is our final participant in the main Cambridge Baby Growth Study, with her sister who also took part in the study.



Picture by Imago

Lynne says: "My two daughters, who are now aged two and four, were part of the CBGS, the first child from 2007 to 2009 and the second from 2009 to 2011. I was approached to take part in the research while attending the antenatal clinic at 12 weeks' pregnancy. I completed a detailed lifestyle questionnaire during my pregnancy and again three months after birth: this covered general health and also products used at home such as food and toiletries. I was given a detailed glucose tolerance test which gave more information than the standard prenatal test and provided some additional blood samples throughout the pregnancy. The girls' father also provided DNA samples. At birth, small samples of cord blood and placenta were taken; a sample of breast milk was also collected over the first three months. At intervals across two years, research nurses measured the girls' growth, took abdominal ultrasounds to measure their fat and blood samples to analyse hormone levels. I kept food diaries recording details of each child's diet at both one and two years of age. I'm keen to see the study continue so that my daughters, and others, can be followed through puberty. The girls will be able to make up their own minds whether they want to take part. I've kept all the newsletters so they will be able to read about the study so far. I hope they will agree to contribute to the continuation of this exciting research."

(note that CBGS II is ongoing! – see above)

Please inform us if your contact details have altered.

SEND US AN EMAIL if you would like to receive the next newsletter electronically.

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Thank you to all those who are taking part or have completed our Studies