

EU CHILDHOOD OBESITY PROGRAMME

Project Title: Childhood Obesity: Early Programming by Infant Nutrition?
Project Number: QLK1-CT-2001-00389

www.childhood-obesity.org

NEWSLETTER 3 - WINTER 2003/4

"The EU Childhood Obesity Programme is investigating whether the protein/fat ratio in infant formula and complementary feeds has lasting effects on obesity risks."

Focus on Work Package Two Development and use of biochemical assays

The study is investigating the effect of high protein intake in infancy on body weight, composition and obesity in early childhood. It also includes various biochemical investigations to try and elucidate the mechanism responsible for any protein intake-body weight relationship. Several hypotheses have been formulated and they refer to the influence of protein intake on growth hormone secretion and insulin action as well as on the recently described hormone of appetite control - leptin. For this purpose several parameters such as serum IGF I, IGF BP2, IGF BP3, leptin, leptin BP and urine C-peptide are being measured. Some concerns have been raised concerning the effect of protein intakes on protein metabolism, renal function and urinary calcium excretion and these will be tested by measuring amino acid serum content, urine calcium, creatinine and orotic acid as well as osmolarity.

Some standard laboratory parameters are included to estimate general health status of the children in the study - for example, blood count, serum ferritin, urine dipstick. The results obtained from routine tests are explained to the parents and can be regarded a clinical evaluation and service for the babies. The samples arrive every 2-3 months from the centers to the central laboratory and most of them are immediately analyzed. So far, we have measured over 900 urine samples for calcium, creatinine and orotic acid and 164 serum samples for IGF I, IGF BP2, IGF BP3, leptin, leptin BP. We have also obtained results of amino acid content for 90 samples.

Focus on Work Package Five Energy Expenditure and Body Composition

The team in Cambridge are measuring energy expenditure and body composition in children from 2 centres, now Spain and Germany. It is expected that a total of 90-120 children, in equal numbers from each centre, will be measured at 6 months of age using the doubly labelled water technique (DLW).

The DLW is a non-invasive tracer method used to determine an estimate of daily CO₂ production. This measurement is then used to calculate daily energy expenditure. Following an oral water dose containing two naturally occurring, non-radioactive stable isotopes, ¹⁸O and ²H, we enrich normal levels within body water. A urine pre-dose sample is collected and then samples are collected daily for approximately 7 days after dosing. Samples are collected by placing 2 or 3 cotton wool balls inside the baby's nappy which once soaked are then squeezed into sampling tubes using a syringe. Over 7 days the isotopes disappear from body water at rates dependant on water turnover (²H isotope) and water plus CO₂ turnover (¹⁸O isotope). The difference between these rates is equivalent to CO₂ production, from which energy expenditure is calculated. The energy expenditure measurements made in this sub-group of infants will be used to validate the 3-day weighed food records documented for all infants. A bonus in these measurements is that body composition can be determined from total body water measurements. This will allow the determination of fat mass and fat free mass in each sub group of babies, which we will then compare with protein/fat ratios in their diet, to investigate the possible relationship between early protein intake and later obesity

The Cambridge team provided training in the techniques needed for dose administration and sample collection using dosing kits sent from Cambridge. Samples are then returned to Cambridge for analysis. As of December 2003, 75 doses have been sent out to centres and 26 samples have been returned and their analyses completed.

Project Progress Meetings

December 2003

This was held in Milan and was attended by representatives from all eight of the partners involved in the project. Dr Peter Richmond, Personal Technical Assistant from the EU for the project, was also present and explained how his role is to help with communication with the Commission, especially with annual reports and cost statements. Other items for discussion included progress in recruiting and retaining babies for the trial, problems with the food database, progress with the analysis of samples (see Focus on WP2 and WP5) and additions to the anthropometric measurements. There continues to be a problem with retention with drop-outs mostly occurring at two to three months. Some of the reasons given include wanting to change from breast feeding to formula feeding or finding the commitment too much.



Project partners at the Milan progress meeting

Left to right: Back row: Dariusz Gruzfeld (PL), Emmanuel Perrin (F), Andy Coward (GB), Jean-Michel Antoine (F), Francoise Martin (B), Sarah Queverue (B), Anne Sengier (B), Ricardo Closa-Monasterola (E), Anne de la Hunty (GB), Margaret Ashwell (GB).

Front Row: Peter Richmond (EU), Marie Françoise Rolland Cachera (F), Bert Koletzko (D), Doris Oberle (D), Sandrine Piredda (F), Carlo Agostoni (I), Silvia Scaglioni (I), Elvira Verduci (I)

Marcello Giovannini (I), Fiammetta Vecchi (I) and Armanda Frasinetti (I) were also present at the meeting.

blédina

DANONE Danone Vitapole

DANONE
DANONE INSTITUTE

Does breast feeding protect against later obesity risk? - a discussion of recent publications

One of the driving forces behind the EU Childhood Obesity Programme was a seminal publication looking at obesity levels in children according to whether they had been breast or formula fed. Von Kries et al (1999), in a retrospective study, found a significantly protective effect of breast feeding after adjusting for potential confounding factors in more than 9000 Bavarian children aged 5-6y. The prevalence of obesity in children who had never been breast fed was 1.6 fold higher than in previously breastfed children. Moreover, a clear dose-response effect was identified for the duration of breast feeding. Three years later, Toschke et al (2002) published another retrospective study which showed a protective effect of breast feeding on more than 33,000 children aged 6 to 14y from the Czech Republic. Nevertheless, the differences were relatively small after adjusting for potential confounding factors.

However in October 2003, two papers were published in the same issue of the British Medical Journal which cast doubt upon the consistency of these earlier findings. Victora et al (2003) studied 2,200 Brazilian boys, now age 18y, and previously enrolled in a birth cohort study. Although a significant trend in decreasing obesity with increasing duration of predominant breastfeeding was seen, there was no relationship with other measures of adiposity and a significant reduction in obesity was only seen in boys breast fed for 3 to 5 months. The authors concluded that breast feeding has no marked protective effect against adolescent adiposity. In the second paper, Li et al (2003) found no significant effect of breastfeeding on obesity in the offspring of the 1958 British Birth cohort (over 2,600 British children aged between 4 and 18 years).

In an accompanying editorial, Clifford (2003) suggested that the explanation for the contradictory findings may be that all the studies 'are observational and therefore subject to several caveats'. When observational studies are inconclusive, only a randomised controlled trial (RCT) is able to prove a causal link, but an RCT of breast milk versus formula milk would be unethical, given the undoubted benefits of breastfeeding. The EU Childhood Obesity Programme is a randomised trial of two different formulas with a breastfeeding cohort alongside. It will follow the growth of breast and formula fed babies over 8 years and will not only monitor their subsequent obesity risk but will also explore one potential mechanism for any protective effect of breast feeding by using formula with different protein/fat ratios. Although still subject to possible confounding, it is hoped that the quality of data that will come out of this study will allow any relationship between breastfeeding and childhood obesity to be clearly seen. Even if the effects are small, given the increasing frequency of childhood obesity, the public health benefits would still be huge.

R. von Kries, B. Koletzko, T. Sauerwald, E. von Mutius, D. Barnert, V. Grunert and H. von Voss. 1999. Breast feeding and obesity: cross sectional study. *BMJ*. 319. 147-50.
A. Toschke, B. Koletzko, R. von Kries and e. al. 2002. Overweight and obesity in 6 to 11 year old Czech children in 1991: protective effect of breastfeeding. *J Pediatrics*. 111. 761-9.
C. Victora, F. Barros, L. RC, B. Horta and J. Wells. 2003. Anthropometry and body composition of 18 year old men according to duration of breastfeeding: birth cohort study from Brazil. *BMJ*. 327. 901-906.
L. Li, T. Parsons and C. Power. 2003. Breast feeding and obesity in childhood: cross sectional study. *BMJ*. 327. 904.
T. Clifford. 2003. Breast feeding and obesity. *BMJ*. 327. 879.

Commission recognises excellence of Childhood Obesity Project website

The Childhood Obesity project website was recognised as being an example of best practice in communication and outreach at a workshop organised by the Commission in December. It was the only project funded by the Food Quality and Safety work programme invited to attend the workshop to share advice and experience in disseminating large-scale research projects.

Relevant meetings

ASO Spring Conference on Diabetes - Institute of Child Health, London, 30 March 2004 - www.aso.org.uk

13th European Congress on Obesity - Prague, 26-29 May, 2004 - www.eco2004.cz

Perinatal Nutrition And Its Later Consequences: New Opportunities - A scientific workshop (organised by the EU Infant Nutrition Cluster) to be held at the Palais des Congres, Paris, 2-3 July, 2004 - www.metabolic-programming.org

2nd World Congress of Paediatric Gastroenterology, Hepatology & Nutrition hosted by Federation of the International Societies of Pediatric Gastroenterology, Hepatology & Nutrition (FISPGHAN), and the European Society for Paediatric Gastroenterology, Hepatology, & Nutrition (ESPGHAN), Paris, 3-7 July, 2004
- www.wcpgn2004.com/gastroenterology.html

ASO Conference: Obesity - Taking theory into practice
- Trinity College, Dublin, 7 July 2004 - www.aso.org.uk

12th International Congress of Endocrinology
- Lisbon, Portugal, 31 August - 4 September, 2004
- www.ice2004.com

14th Workshop of European Childhood Obesity Group - International Symposium, Childhood Obesity: from basic knowledge to effective prevention, Zaragoza, Spain, 23-25 September, 2004

14th European Congress on Obesity
- Athens, May 2005

Editorial Co-ordinator:

Dr. Margaret Ashwell
www.ashwell.uk.com

Design:

Business Presentations
www.business-presentations.co.uk

Printing:

Imprimerie J. Chauveheid
www.chauveheid.com

Partner profile

The Italian Team

The Italian team are the leaders of Work Package 3 and together with the German team, are responsible for surveying consumer parental attitudes and assessing the infant's diet and lifestyle. In addition, the Italian team also works on anthropometrical assessments (WP4) with Dr. Marie-Françoise Rolland-Cachera (Institut National de la Sante et de la Recherche Medicale, Paris France) as a subcontractor.

The group consists of four separate teams, working in four hospital centres, coordinated by Professor Marcello Giovannini (Chairman of the Department of Pediatrics - San Paolo Hospital, University of Milan, Italy) and by his co-workers, Professor Carlo Agostoni and Dr Silvia Scaglioni. Two teams work in Milan (Department of Pediatrics in San Paolo Hospital and Pediatric Unit in San Carlo Borromeo Hospital headed up by Doctor A. Podestà) and two teams work outside Milan (Pediatric Unit in Desio Hospital and Pediatric Unit in Melegnano Hospital headed up by Dr R Besana and Dr G Gargantini respectively). Doctor Elvira Verduci, a pediatrician working in San Paolo Hospital, collates the data from the 4 centres.

In each team a junior paediatrician and one dietician are involved in the project, recruiting and following patients and families. The dieticians (Fiammetta Vecchi, Armanda Frassinetti, Sabrina Tedeschi and Monica Girolì) work half time. They have a major task in following diets, providing milks, collecting food surveys and putting the dietary data into the nutritional program. The team also has the support of local neonatologists and pediatricians in each hospital.

