Welcome!

CASLMU Center for Advanced Studies

Kick-off meeting project EarlyNutrition
21st – 23rd of March 2012 Munich, Germany

This project receives funding from the European Union Seventh Framework Programme (FP7/2007-2013) under grant agreement nº 289346
EARLY NUTRITION
Long-term effects of early nutrition on later health

www.project-earlynutrition.eu
• World‘s largest research project on developmental origins of adult disease

• Key question: influence of diet and metabolism from pre-pregnancy to early childhood on later adiposity and related health outcomes

• Collaboration of a multi-disciplinary team of scientists from 36 partners in 13 European countries, USA and Australia

• Funded under the Food, Agriculture and Fisheries, and Biotechnology Priority of FP7, with an EU contribution of 8,96 mio € towards a total budget of 11,12 mio EUR, cofunded by Australian NHMRC with 440k €

• Project duration 60 months

• Coordinated by Dr. von Hauner Children‘s Hospital, University of Munich (LMU) Medical Centre
International Research Consortium
Builds on EU FP6 Early Nutrition Programming Project (EARNEST)
EARNEST established a variety of different programming effects on different outcomes
Was highly rated by reviewers and EU DG Research
EARNEST, but also other investigators show particularly convincing body of evidence for early nutrition and lifestyle effects on obesity and its associated disorders
Because of the increasing public health importance and the transgenerational nature of the problem, the focus of this project is early programming of adiposity (body fat content, which appears to best predict long term outcomes)
The Early Nutrition Programming Project
Project Number: FOOD-CT-2005-007036

For further information visit - www.metabolic-programming.org

THE POWER OF PROGRAMMING
International Conference on Developmental Origins of Health and Disease
Campus of the University Hospital, Munich-Großhadern
Munich, Germany
6th - 8th May, 2010

www.metabolic-programming.org
How did it come about?

- Since 2007, continued discussions with EU DG Research on future research needs & opportunities on developmental origins of health.
- EU DG Research decides to bring out a call for large project.
- First meeting with potential project partners in Munich, May 2010.
- Preparation of project application from May 2010 to Jan 2011, led by a Steering Group (Berthold Koletzko, Lucilla Poston, Keith Godfrey, Brigitte Brands, Hans Demmelmaier, Margaret Ashwell), in close collaboration with (potential) partners.
Submission of the Grant Application: Jan 2011
Why Research on Early Nutrition ⇒ Adiposity?

WHO: overweight & obesity = 5th leading cause for global deaths

- The growing obesity propels an upsurge of non-communicable diseases e.g. diabetes, hypertension and cardiovascular diseases
- Globally, 44% of the diabetes burden, 23% of the ischaemic heart disease burden and between 7% and 41% of certain cancer burdens are attributable to overweight and obesity.

[Map showing percentage of children with obesity around the world]
Key Hypotheses

Genes and Environment

Fetal Overnutrition
e.g. maternal obesity, high pregnancy weight gain diet in pregnancy, gestational diabetes

Fuel mediated in utero hypothesis

Fetal Undernutrition and Obesogenic Childhood Environment
e.g. maternal nutritional imbalances, placental dysfunction

Mismatch hypothesis

Obesity/Visceral Obesity Metabolic Syndrome Diabetes Hypertension Cardiovascular and other Diseases, Asthma

Accelerated postnatal growth hypothesis

Postnatal Nutrition and Growth
e.g. lack of or short breastfeeding, overfeeding, excessive protein intake

Transgenerational Circle of Obesity

- Maternal Obesity
  - Maternal glucose, insulin, leptin, lipids, inflammatory response
    - PLACENTA MODIFIES MATERNO-PLACENTAL NUTRIENT SUPPLY
    - Fetal Developmental Plasticity
      - POST-NATAL WEIGHT TRAJECTORY
        - Obesity, Cardiovascular and Diabetes Risk

Mismatch between pre- and postnatal Environment

Maternal nutritional environment

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PLACENTA MODIFIES MATERNO-PLACENTAL NUTRIENT SUPPLY

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Impaired fetal nutrition

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Fetal developmental plasticity & appropriate epigenetic changes to nutritional status

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Low nutrition/high physical activity postnatal environment

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High nutrition/low physical activity postnatal environment

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Normal Disease Risk

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Obesity, Cardiovascular and Diabetes Risk

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Postnatal accelerated Weight Gain

High intake of growth enhancing nutrients e.g. protein

- e.g. high plasma and tissue levels of insulinogenic amino acids

Enhanced secretion of insulin & IGF1

- Weight gain up to 2 years
- Adipogenic activity

Long term risk of obesity and associated disorders

modified from Koletzko et al, 2009
Project EarlyNutrition - Structure

Theme 1: Mechanisms
Theme 2: Observational studies
Theme 3: Human intervention studies
Theme 4: Strategic integration & recommendation development
- Systematic reviews & meta-analysis
- Dissemination
- Training
- Recommendations to improve health
- Dietary choices & behavioural modifications

Target Groups
- Pre-pregnant women
- Pregnant women
- Infants
- Children

Horizonal integration

Maternal pre-pregnancy body composition & diet
Maternal diet, lifestyle & pregnancy weight gain
Nutrition in infancy
Diet in early childhood

Hypotheses & mechanisms of early nutrition programming

WP 1 - 5
WP 6 - 10
WP 11 - 14
WP 15 - 19

Theme 5: Databases & data management infrastructure
Theme 6: Project management

Target Groups
Pre-pregnant women
Pregnant women
Infants
Children
Project EarlyNutrition brings together…

† 11 observational cohorts: SWS, DNBC, GenerationR, HUMIS/MOBA, Genesis, LISA, PreventCD, RAINIE, UC Irvine, VIV

and

† 9 interventional studies (RCTs): UPBEAT, SCOPE/Baseline, CHOP, ROLO, LIMIT, new RCT „LGI dietary supplement“, new RCT „low GI follow-on formula“; new RCT „novel nitrogen composition in infant formula“

from 13 European countries, the USA and Australia comprising >470,000 individuals
Expected Impact

• Better evidence for the effects of early nutrition programming on health, well-being and performance, with a focus on reduction of obesity and associated disorders

• Characterisation and validation of biomarkers for early growth patterns and later outcomes

• Demonstration of effects on novel dietary interventions

• Definition of behaviour change approaches to the practical implementation of dietary and physical activity recommendations among consumers
Translational Application

• Few current recommendations on optimal nutrition consider long-term outcomes on early nutrition programming effects

• Better evidence for effects & mechanistic pathways of early nutrition will support recommendations for optimal nutrition and lifestyle

• Four Target Groups, chosen according to critical periods for programming and where recommendations are applicable
  - pre-pregnant women
  - pregnant women
  - infants (including breastfeeding)
  - children

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Practical considerations from behavioural research

Young children

Infants (including breastfeeding)

Pregnant women

Pre-pregnant women

Systematic reviews of scientific evidence

Practical considerations from behavioural research

Optimised infant nutrition

Improved maternal diet & lifestyle

Public health practices

Policies

EarlyNutrition Recommendation Development Panel

Dissemination & Exploitation

EU

USA / Australia

International collaboration through ICAC & ENA

Academia

SMEs

Industry

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Expected Key Benefits

• Contribution towards EU policies on reduction of health inequalities, EU strategies on obesity and ageing, the Europe 2020 strategy and the EU Innovation Union policies

• Economic benefits through prevention of obesity
  ⇒ major reduction of health care and social security costs
  ⇒ enhanced wealth due to increased productivity, and due to development and production of improved dietary products for the target populations

• Attracting and training of new biomedical researchers that will be the innovators of the future
Many thanks to the Grant Writing and the Munich Project Management Team

Lucilla Poston
Brigitte Brands
Project Management

Keith Godfrey

Margaret Ashewll

Hans Demmelmair
Ethics & Financial Issues

Simone Cramer
Project Assistant

Martina Scheer
Financial/ Administrative Issues

www.project-earlynutrition.eu
Thanks to CAS^{LMU} for hosting this welcome event and reception

Join us for dinner at nearby Café Reitschule at 20.00h