

Why is this project being carried out?

Early nutrition programming is the concept that differences in nutritional experience at critical periods in early life, both pre- and post-natally, can programme a person's development, metabolism and health for the future. This has been well-established in animal studies and there is a large amount of data from retrospective observational studies in people that suggest that a similar effect is seen in humans.

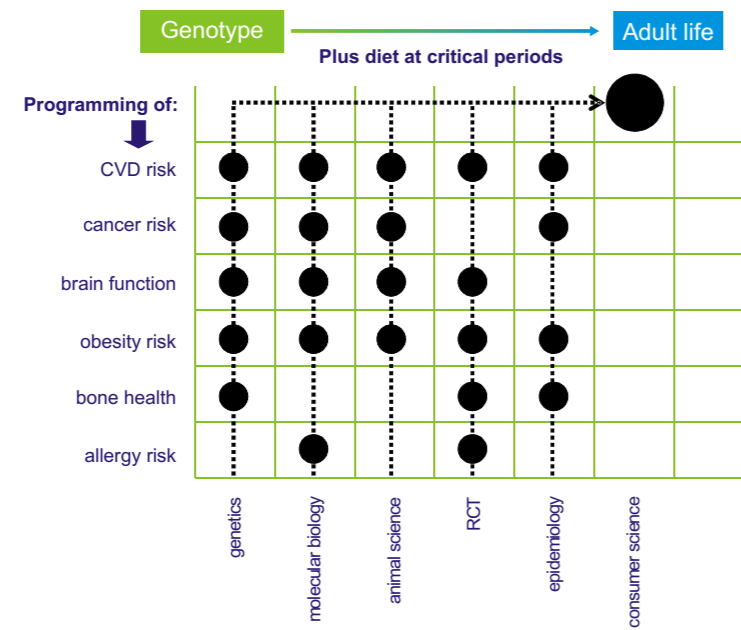
There is less data available from contemporary prospective studies and randomised controlled trials because these studies have not been running for long enough. The Early Nutrition Programming Project will enable the participants of these studies to be followed up into early adulthood in order to see whether the differences seen in childhood persist into adulthood.

The implications of early nutrition programming are huge - differences in risk factors for cardiovascular disease, diabetes and obesity, in immune function and allergy risk, in bone health, and in cognitive, neuro-motor and behavioural outcomes have all been seen in children. The potential for improving the health of future generations is enormous.

The project will also be able to address other areas where not enough is known about early nutrition programming to enable sensible policies to be formulated. It will give an insight into when the critical periods are, how the effects are mediated and whether or not they can be reversed.



Health outcomes addressed by the different experimental approaches



What are the project's key objectives?

- ★ Quantification of the effects of early programming on later cardiovascular diseases, obesity, diabetes, cognitive and mental disorders, bone health and some cancers (Themes 1-3).
- ★ Definition of the relative importance of critical periods in fetal and early life on later disease (Themes 1-3).
- ★ Exploration of the impact of genetic determinants on early programming effects and on subsequent outcome (Theme 3)
- ★ Understanding the role of specific nutrients and their interactions in the maternal and infant diet on programming effects on disease and their risk factors (Themes 1-3).
- ★ Understanding mechanisms for early programming on later disease and their risk factors (Theme 3).
- ★ Development of appropriate strategies for treating and especially for preventing the amplification of adverse programming effects of early nutrition (Theme 1).
- ★ Exploration of the public health impact of how knowledge about early programming affects consumer behaviour (Theme 4).
- ★ Quantification of the impact of early nutrition on the economic burden of adult ill-health (Theme 5).
- ★ Demonstration projects to test the viability of new technologies that offer a potential economic advantage, but which cannot be commercialised directly (Theme 6).
- ★ Improvement of training and enhancement of training opportunities for all including accession countries (Theme 8).

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What are we doing?

The Early Nutrition Programming Project brings together a multi-disciplinary team of international scientists and leaders in key areas of the programming field from major research centres across Europe. We will:

- ★ Test early nutritional programming of adult disease risk in humans by measuring disease markers in early adulthood in well-conducted randomised controlled trials of specific nutrition interventions in pregnancy and infancy. The endpoints will have real and defined predictive value for adult public health. Our studies will enable the health impact of early nutrition programming in European populations to be assessed and will underpin product development, standards of practice and policy development.
- ★ Estimate the importance of nutritional programming in contemporary European populations by examining the associations between early nutrition and later outcome in large well-characterised population-based prospective studies. These observational studies will allow us to identify dietary exposures that can be explored in animal models (Theme 3) and eventually tested in future trials in humans; study mechanism; and confirm whether findings from laboratory studies translate into diet-risk associations in free living humans (Theme 2).
- ★ Use animal, cellular and molecular techniques to study lifetime effects of early nutrition. These studies will seek to refine models of nutritional programming in order to identify mechanisms and critical periods in development. These studies will inform the analyses conducted in the observational studies and help prioritise future trials in humans (Theme 3).
- ★ Use new functional genomic techniques to further explore the basis of early nutritional in programming in clinically relevant model systems and in the prospective cohort studies (all of which have collected biological samples) (Themes 2 and 3).
- ★ Complement and extend this biomedical programme of work with studies of the social and economic importance of programming (Themes 4 and 5).

What will the project contribute?

Achievements

- ★ The best available data from trials and prospective studies in humans
- ★ State of the art laboratory studies of mechanisms and critical time periods
- ★ Classification of the key genes regulating metabolic processes related to programming
- ★ Information on the social and economic costs of programming in Europe

Applications

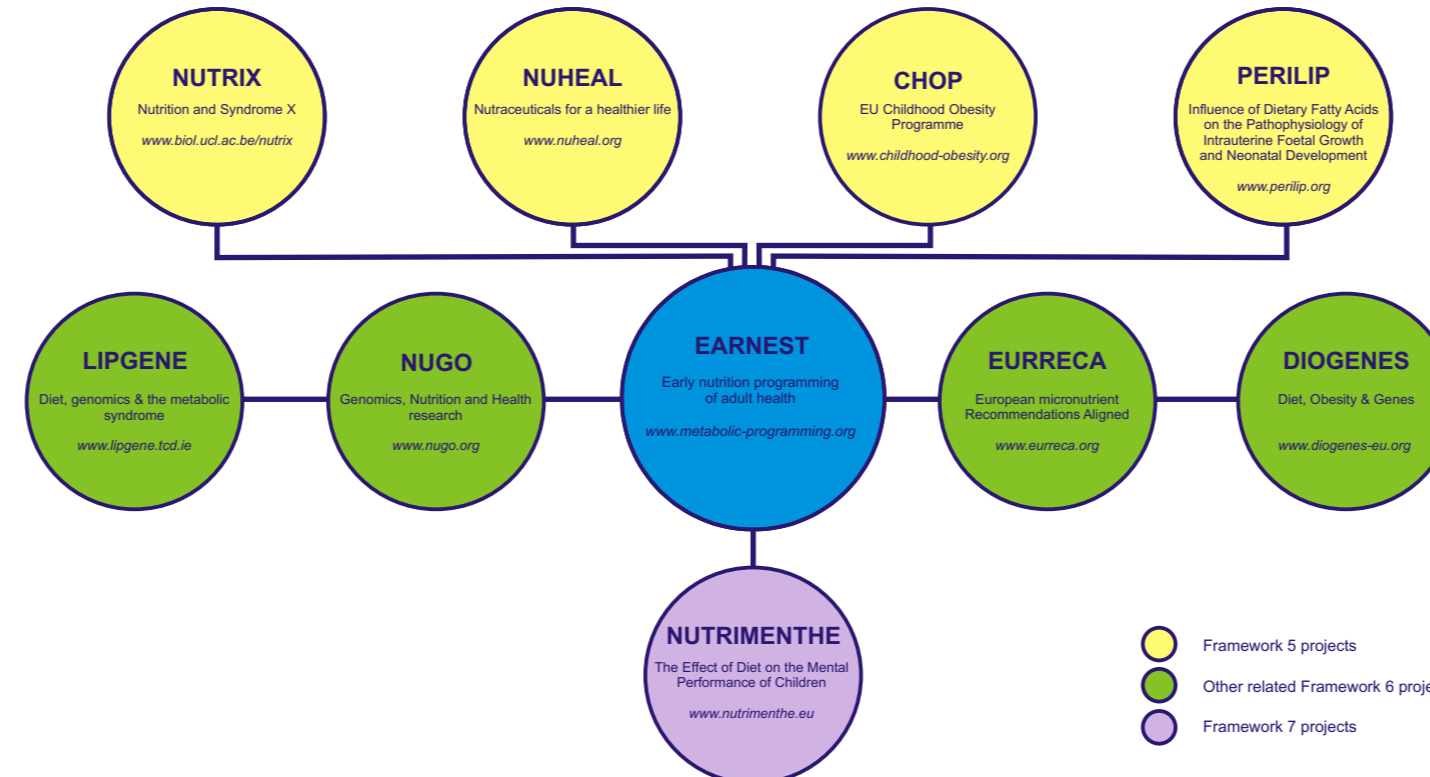
- ★ Evidence to guide improvements in the nutritional value of formula milks
- ★ Data to help formulate policies on composition and testing of infant foods
- ★ Interventions proven to prevent and reverse early nutritional programming
- ★ The potential to develop new products through industrial partnership

Spin-off benefits

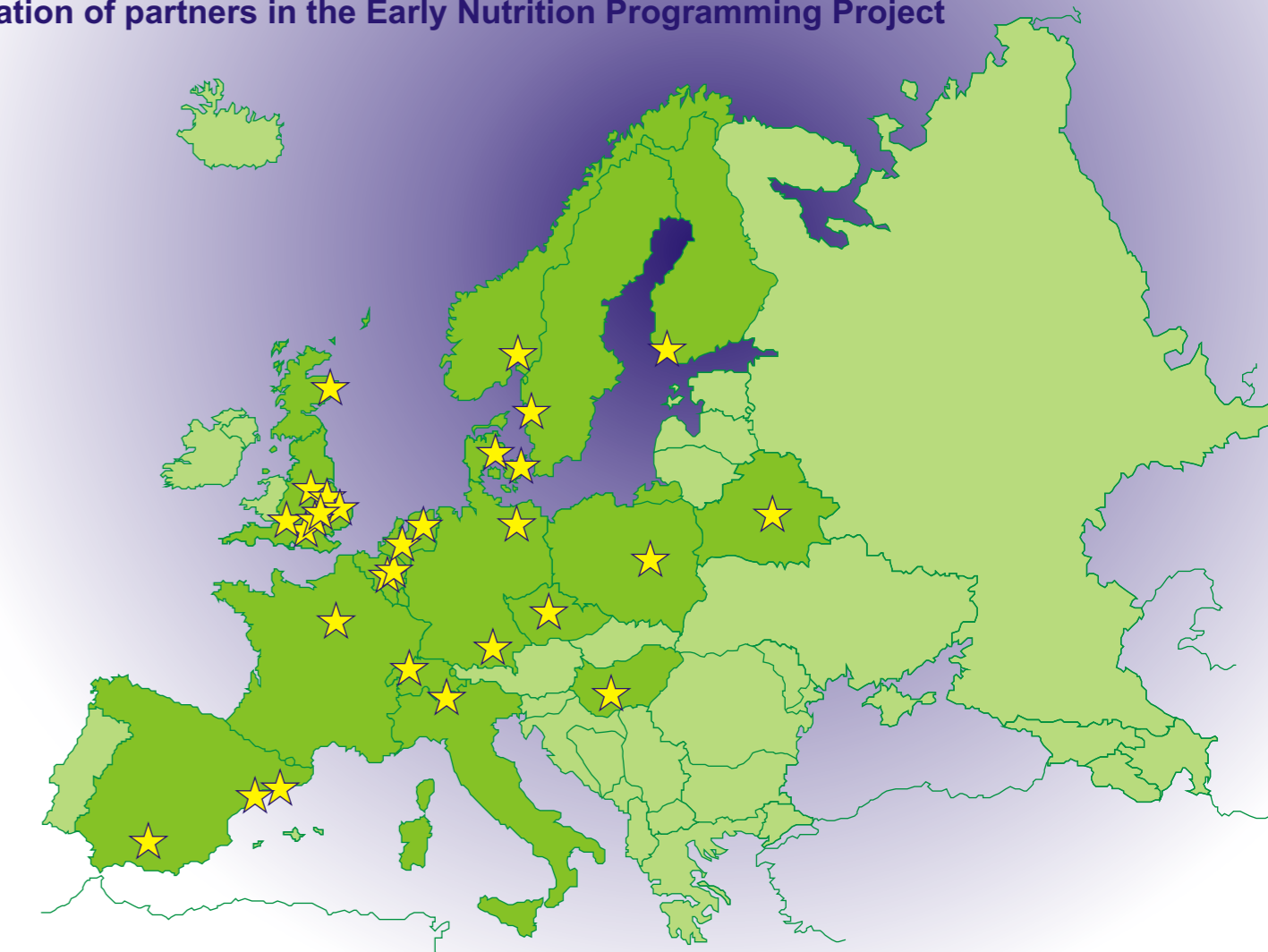
- ★ Creation of a virtual "Institute of Early Nutrition Programming"
- ★ A new generation of internationally respected multi-disciplinary scientists
- ★ Maximal impetus to maintain Europe's lead in this critical area of research.



Other related EU funded projects



Location of partners in the Early Nutrition Programming Project



Further Reading

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