Eur J Nutr (2009) 48 (Suppl 1):S49–S51
DOI 10.1007/s00394-009-0076-0

SUPPLEMENT

# Emerging technologies and perspectives for nutrition research in European Union 7th Framework Programme

**Isabelle B. M. de Froidmont-Görtz**

Published online: 25 November 2009


**Abstract** Nutrition trends in Europe are driven by taste, health and convenience. The possibilities of research using new technologies and tools such as nutrigenomics, imaging techniques, nanotechnology, bioinformatics, cognitive sciences, innovative processes are very promising to support these nutrition trends and in particular their health aspects. This is supported by European Union research. The opportunities offered in the 7th Framework Programme (FP7), among other innovations, will contribute to the general aim of improving nutrition policy as well as improving products from the food industry in accordance with the Lisbon strategy to create employment and improve the quality of life of the European citizens.

**Keywords** Functional foods · Framework Programmes · European Commission

## Introduction

"Tell me what you eat, and I will tell you what you are" wrote a French gastronome Brillat-Savarin in his 19th century tome of "The physiology of taste". This phrase underlines the importance of nutrition in later life. The latest research on early programming shows that the influence of nutrition starts from an early stage and continues throughout life [6, 7].

Please direct all correspondence to: ILSI Europe a.i.s.b.l, Avenue E. Mounier 83, Box 6, 1200 Brussels, Belgium, E-mail: publications@ilsieurope.be

I. B. M. de Froidmont-Görtz (✉)
European Commission, 200, Rue de la Loi, 1049 Brussels, Belgium

Again according to Brillat-Savarin, "The discovery of a new dish confers more happiness on humanity, than the discovery of a new star". That reminds us that we should not forget that food is more than the product itself. Food is more than buying, preparing and eating food. Food is pleasure. Food is social contact, health and well-being. Consumers, governments and the food industry have started to understand this and recognise the need for action in order to change the current situation i.e. the increase of diet-related diseases in Europe.

Achieving good health for all means, not just reacting to ill-health, but proactively promoting health, preventing diseases and helping people make healthy choices. Good food is the major source of health throughout life.

## New challenges for food research

In the last decades, food has become very abundant with a lot of different products in Europe and other parts of the industrialised world. This could be perceived as progress; however, coupled with our increasing sedentary lifestyles, rapid cultural changes, increasing urbanisation and dietary changes, it has generated a huge increase in the morbidity of several chronic diseases, such as obesity, diabetes, and cardiovascular diseases.

In Europe today, six out of the seven most important risk factors for premature death (blood pressure, cholesterol, Body Mass Index, inadequate fruit and vegetable intake, physical inactivity, excessive alcohol consumption) relate to how we eat, drink and move [10]. The basic problem is relatively easy to identify and is a combination of unhealthy diets (too high in fats, sugar and salt) usually coupled with a lack of physical activity [4].

What are the challenges for the future? Why do we have to move from curative to preventive health care? The reason is manifold: the growing and ageing population; the increase of several chronic diseases; the limited resources of raw materials; energy and water and therefore the need to develop a sustainable economy built on bio-based processes. Ageing and obesity are two examples illustrating the necessity to move from the curative to the preventive health care.

### Obesity

Obesity is one of the most serious public health problems in Europe as it significantly increases the risk of many chronic diseases such as cardiovascular diseases, type 2 diabetes and certain cancers. The increase of childhood obesity is particularly worrying, as it is also a strong predictor for adult obesity. Knowing that lifestyle factors, including diet, eating habits, levels of physical activity as well as inactivity, are often adopted during the early years of life, the best time to address the problem is during early life and even pregnancy [3].

### Ageing

The proportion of elderly people over 65 years in Europe is currently around 25% and this is predicted to increase to 40% by 2030. The paradox is that people want to live longer but without getting old. However, the decline of mental health function, cardiovascular health, digestive health, bone density, immunity and muscle mass is still unavoidable. Therefore, the best way to ensure successful ageing is to prolong the active years. Good nutritional health is essential to maintain good health, prevent functional decline and improve quality of life. The influence of diet on the ageing process such as energy intake, protein glycation and antioxidant intake needs to be further studied. It is clear that new foods could be designed to satisfy the elderly specific nutritional needs (e.g. nutrient-dense, rich in taste, familiar foods, available in convenient, easy-to-open packaging and reasonably priced) [9].

These two examples show that instead of being reactive after the problems have occurred; there is a need to invest more into prevention in the future. Both healthy food and a healthy lifestyle are necessary to improve the quality of life for a longer period.

## The evolution of food research

The nutrition science of today has evolved from the classical concept of preventing nutrient deficiency diseases to the concept of optimal nutrition. This latter concept aims at optimising the nutrient intake to promote overall health and well-being, to improve the physical and mental performance and to reduce the risk of diseases such as cancer, obesity, cardiovascular diseases and diabetes. Scientists seek to identify and elucidate the mechanisms of interaction between diet, genes and environment and the synergies between the different components contained in food and their impact on health.

Functional foods offer a great potential for improving health and helping to prevent chronic diseases of the European citizens. Providing scientific evidence that substantiate the health benefits of these products helps to protect the consumers, encourages the innovation of new industrial products by food manufacturers wishing to use health or nutrition claims, and ensures a fair trade. Research collaboration between different disciplines such as nutrition, food technology, cognitive and health sciences provides the scientific basis for successful development of functional foods [8].

New technologies and tools such as nutrigenomics, imaging techniques, nanotechnology, bioinformatics and cognitive science are very promising and are increasingly being used in medicine, the environment, agriculture and livestock research. A convergence of these interdisciplinary activities is a key aspect in Food R&D to improve the quality and safety of foods. Emerging and converging technologies are considered as a highly innovative research area for a European approach. The potential of these new technologies to have an impact on the food sector should be further investigated to generate in the short- and medium-term innovative processes, tools and methods that can be applied along the food chain from the raw material to the final product. The near future will see the commercialisation of personalised nutrition providing food with improved health attributes. Development of foods and nutraceuticals for targeted groups with defined risk factors or diseases (e.g. allergy, diabetes, obesity, cardiovascular diseases) linking diet to treatment will be designed. Even more futuristic, individual genetic information together with the physiological response to food will be compiled to design personalised food and diet.

## 7th Framework Programme (FP7) [2]

In the past Framework Programmes, the European Commission financed a significant number of projects in the nutrition area addressing issues such as obesity, diabetes, allergy, osteoporosis, nutrigenomics, functional foods, etc. [1, 5]. In the FP7, food research will find its place within the specific programme on collaboration, Theme 2 “Food, Agriculture and Biotechnology”. The overall objective of this theme is to build a “European Knowledge Based

Bio-Economy" by bringing together science, industry and other stakeholders, in order to exploit new and emerging research opportunities that address social, economic and environmental challenges in agriculture, food, forestry, aquaculture, and fisheries. The challenge is thus to correctly manage our biological resources and use them for the sustainable production of safe, healthy and diversified food and bio-based materials for industry and energy.

The main research priorities proposed by the FP7 for the pillar 2: "Fork to farm: Food, health and well-being" are the following:

- Consumer, societal and health aspects of food, behavioural and cognitive sciences.
- Nutrition and diet related diseases.
- Innovative food and feed processing technologies.
- Improved quality and safety, both chemical and microbiological, of food, beverage and feed.
- Environmental impacts on food chains and of food chains including the concept of traceability.

The FP7 offers further opportunities in nutrition science. This will involve the development and application of nutrogenomics and systems biology and the study of the interaction between nutrition, physiological and psychological functions. The ingenuity of food technology in food formulation and production will contribute to further advances in the nutrition area. This will increase the opportunities for providing products that will support optimum health.

**Acknowledgments** This article was commissioned by the Functional Foods Task Force of the European branch of the International Life Sciences Institute (ILSI Europe). Industry members of this task force are Ajinomoto Europe, Barilla G. & F. Fratelli, Bayer CropScience BioScience, Beverage Partners Worldwide, Cadbury, Coca-Cola Europe, Colloïdes Naturels International, CSM, Danisco, Danone, Dow Europe, DSM, FieslandCampina, Frutarom, International Nutrition Company—INC, Kellogg Europe, Kraft Foods, La Morella Nuts, Mars, Martek Biosciences Corporation, McNeil Nutritionals, Monsanto, Naturex, Nestlé, PepsiCo International, Procter & Gamble, Raisio Group, Red Bull, Raffinerie Tirlemontoise—ORAFTI, Südzucker/BENEO Group, Syral, Tate & Lyle, Ülker Bisküvi, Unilever, Soremartec Italia—Ferrero Group, Valio, Wild Flavors, Wimm-Bill-Dann Foods, Wrigley and Yakult Europe. For further information about ILSI Europe, please email info@ilsieurope.be or call +32-2-7710014. The opinions expressed herein are those of the authors and do not necessarily represent the views of ILSI Europe.

**Conflict of interest statement** The author declares no conflict of interest.

## References

1. Aggett PJ, Antoine J-M, Asp N-G, Bellisle F, Contor L, Cummings, Müller DJG, Persin C, Pijls LTJ, Rechkemmer G, Tuijtelaars S, Verhagen H (2005) PASSCLAIM Process for the assessment of scientific support for claims on foods: consensus on criteria. EurJ Nutr 44 (Suppl 1):I/1–I/30
2. Decision No. 1982/2006/EC of the European Parliament and of the Council of the 18 December concerning the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007 to 2013) (OJ, L412, 30.12.2006, p 1)
3. Council conclusions of 2 December 2002 on Obesity (OJ C 11, 17.1.2003, p 3) and of 2 December 2003 on healthy lifestyles (OJ C22, 27.1.2004, p 1)
4. European Commission (2007) White paper on a strategy for Europe on nutrition, overweight and obesity related health issues. COM 279
5. European Commission—Directorate General for Research—FAIR, Agriculture and Fisheries (2000) Functional food science in Europe, volume 1 and 2, Scientific concepts of functional foods in Europe, volume 3, EUR 18591
6. Koletsko B, Dodds P, Akerblom H, Ashwell M (2005) Early nutrition and its later consequences: new opportunitites. In: Advances in experimental medicine and biology, vol 569, Springer, Berlin
7. Ozanne SE, Fernandez-Twinn D, Hales CN (2004) Fetal growth and adult diseases. Semin Perinatol 28(1):81–87
8. Regulation No. 1924/2006 of the European Parliament and of the council of the 20 December 2006 on nutrition and health claims made on foods (OJ L404, 30.12.2006, p 9)
9. Remacle C, Reusens B (2004) Functional foods ageing and degenerative disease. Wood Publishing Limited, Cambridge
10. WHO—World Health report 2002. Reducing risks and promoting healthy life