



Dietary impacts on the risk of cancer

Several major studies identify smoking, diet, sunbathing and alcohol abuse as the leading avoidable causes of cancer among the general European population. The ability of certain diets to protect against cancer has been well documented. However, the long latency periods, and confounding factors, associated with this disease make it extremely difficult to demonstrate beneficial effects attributable to specific nutrients. As even a modest reduction in the occurrence of cancer would generate huge social and economic savings, the European Union is keen to develop foods that could help either prevent or fight the disease. With 24 partners from 13 Member States, the ECNIS Network of Excellence will use exposure biomarkers and disease bioindicators to study how diet and hereditary factors can influence the risk of cancer from environmental factors.

Putting down markers

Diet can contribute to overall human exposure to environmental carcinogens and carcinogens generated during food processing, such as polycyclic aromatic hydrocarbons, heterocyclic amines and dioxins. Nutrition can also modulate endogenous formation of carcinogens or genotoxins, the function of metabolic enzymes, and the growth of neoplasia. Since most types of exposure are lifestyle-related and low-impact, it is difficult to assess them using traditional epidemiological methods. Moreover, as hereditary and dietary factors can modulate the effects of exposure, large human cohorts – comprising thousands of individuals and long-term follow-up – are required to identify key carcinogenic or modulating agents.

Biomarkers measure quantitative changes in a biological system caused by exposure to xenobiotic substances, at the cellular, tissue, fluid or organ level. Bioindicators measure changes at the organism, cohort or population level. Molecular epidemiology, using exposure biomarkers, may considerably improve conventional techniques by reducing misclassification and decreasing the time between exposure and the appearance of an observable effect.

In studies carried out in Africa and Asia in the 1990s on the role of aflatoxin in liver carcinogenesis, biomarker methodology greatly improved understanding of the disease's aetiology and human-exposure sources. The five-year ECNIS NoE will develop and validate biomarkers and bioindicators for use as short cuts in epidemiological studies on the modulation of cancer risk by diet, and the influence of genetic variation on cellular, tissue and organism susceptibility to carcinogens. These studies will provide support for the development of functional foods that protect against DNA damage and cancer.

A wealth of information

ECNIS will study populations from different European regions and climates, pollution levels and dietary habits, allowing for assessment of exposure-response relationships over a wide range of environmental scenarios. An important objective is to optimise use of the large number of human tissue-sample banks which exist in the Community. The project aims to develop and standardise procedures for cancer risk assessment, while identifying significant data gaps and providing directions for future development. Another goal is to use biomarker data to refine and validate pharmacokinetic and pharmacodynamic models and their potential application in risk-assessment protocols.

Driven by a high degree of specialisation, there has been insufficient interaction between epidemiologists, molecular geneticists, biochemists and molecular biologists. The ECNIS network will promote high-quality research by making use of its partners' multidisciplinary expertise and infrastructure, as well as providing the opportunity to conduct molecular epidemiology research on a Europe-wide scale. Its work programme will include scientific meetings, exchange of researchers and shared laboratory facilities, as well as joint training activities. This, in turn, will lower the cost of research and improve funding opportunities, while providing unbiased expertise and raising the level of general knowledge about cancer risk.

Full title: Environmental cancer risk, nutrition and individual susceptibility

Acronym: ECNIS

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Website: www.ecnis.org

Project coordinator:

KONRAD Rydzyński,
EPIMOL Centre, Nofer Institute,
konrad@imp.lodz.pl

EC scientific officer:

MINNA Wilkki,
minna.wilkki@cec.eu.int

EU contribution: €11,000

LIST OF PARTNERS

- EPIMOL Centre, Nofer Institute of Occupational Medicine (Poland)
- German Cancer Research Center (Germany)
- University of Copenhagen (Denmark)
- Karolinska Institute (Sweden)
- Institute for Scientific Interchange Foundation (Italy)
- The National Hellenic Research Foundation (Greece)
- University of Leicester (UK)
- József Fodor National Center for Public Health (Hungary)
- Nicolaus Copernicus University, Collegium Medicum in Bydgoszcz (Poland)
- Genetics Research Institute and Ospedale Policlinics (Italy)
- Institute of Toxicology, University of Mainz (Germany)
- Free University of Brussels (Belgium)
- Finnish Institute of Occupational Health (Finland)
- University of Lund (Sweden)
- Catholic University of Leuven (Belgium)
- Institute of Cancer Research (UK)
- University of Maastricht (The Netherlands)
- Biochemical Institute for Environmental Carcinogens, Prof. dr Gernot Grimmer Foundation (Germany)
- Catalan Institute of Oncology (Spain)
- Utrecht University, Institute for Risk Assessment Sciences (The Netherlands)
- University of Dundee, Biomedical Research Centre (UK)
- International Agency for Research on Cancer (France)
- NETIX Skrzypczyński, Krzysztofowicz Sp. J. (Poland)
- Leocordia AB (Sweden)



SIXTH FRAMEWORK PROGRAMME

Food Quality and Safety - Call FP6-2003-Food-2



Information for all: a recipe for success

The growing recognition of the significance of diet in maintaining human health has generated considerable amounts of research throughout Europe. Food components have been shown to help prevent a range of diseases and to prolong active life, and the search continues to unravel the various effects of different nutrients. Much of the information uncovered by this work is hard to access, although the European Commission has actively encouraged collaboration in several programmes. The establishment of EuroFIR (the European Food Information Resource Network) will help to create a comprehensive and authoritative European databank containing information on nutrient ingredients and newly emerging bioactive compounds with putative health benefits.

Excellence in food and information

EuroFIR will be the first port of call for pan-European information about the composition of food. It is needed primarily to help scientists collaborate in validating the relationships between dietary habits and chronic disease, and to exploit the findings to reduce the medical and social costs of ill health. It will also help the wider community to gain access to nutritional research results and understand their implications for public health nutrition. The database will be accessible to a wide range of stakeholders – policy-makers, the food industry, health professionals and concerned consumers.

The NoE unites many national database compilers with both analytical laboratories that generate the data and end-users of the data from universities and research institutes (including two from Israel and Turkey) specialising in nutrition from all over Europe in a major five-year project. They are joined by four SMEs with expertise in IT databases and software development, and disseminating and communicating the results and findings across Europe. More national compilers and industry SMEs are expected to join.

Food quality and safety

The food information will be structured to meet the main aims of EuroFIR. An essential step will be the standardisation of data collection methods, food composition tables and analytical techniques so that all results can be compared. This will provide an effective nutrition-monitoring system at European level to collate information on food consumption as input to the initiative to improve the safety and quality of European food. The second main objective is to support Europe's aim to make its food and biotechnology sectors more competitive in world markets.

Analysis of the data collected will reveal areas where new research could yield most benefit. The project will propose joint research activities to meet the needs of users and stakeholders. It also focuses on key food areas, in particular: composite, processed and novel foods; traditional foods and ethnic foods (that have received little attention); and bioactive compounds with functional benefits.

Innovative software tools will be developed to handle the information, along with new facilities for electronic communication. They are being designed with the needs of end-users foremost in mind, with the work being monitored by an expert group. A public website will offer food composition information and the project partners will communicate through a private intranet.

EuroFIR will aim to spread excellence and extend the impact of the NoE beyond those actively involved in its work. It will do this through training schemes for young scientists and sharing its methods and facilities. There will be a strong dissemination element to spread awareness of the network and its information potential. Feedback will ensure that the database continues to meet the needs identified by its users, the long-term aim being that it will go on providing this service when the EuroFIR project reaches the end of its five-year term.

Full title: European Food Information Resource Network

Acronym: EuroFIR

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Website: www.eurofir.net

Project co-ordinator:

Paul Finglas,
Institute of Food Research,
paul.finglas@bbsrc.ac.uk

EC Scientific officers:

Rosanna D'Amario,
rosanna.d'amario@cec.eu.int
Jürgen Lucas,
jurgen.lucas@cec.eu.int

EU contribution: €12M

LIST OF PARTNERS

- Institute of Food Research (UK)
- Graz University of Technology (Austria)
- Ghent University (Belgium)
- Nutrienten Belgie vzw (Belgium)
- Institute of Reference Materials and Measurements (Belgium)
- National Centre of Hygiene, Medical Ecology and Nutrition (Bulgaria)
- Danish Institute for Food and Veterinary Research (Denmark)
- National Public Health Institute (Finland)
- University of Helsinki (Finland)
- Agence Française de Sécurité Sanitaire des Aliments (France)
- Technological Institute of Iceland (Iceland)
- Federal Research Centre for Nutrition (Germany)
- International Life Sciences Institute – European Branch (Belgium)
- Verein zur Förderung Technologietransfers an der Hochschule Bremerhaven e.V (TTZ, Germany)
- National and Kapodistrian University of Athens (Greece)
- Agricultural University of Athens (Greece)
- University College Cork (Ireland)
- Ben-Gurion University of the Negev (Israel)
- National Institute for Food and Nutrition Research (Italy)
- Centro per lo Studio e la Prevenzione Oncologia (Italy)
- Wageningen University (The Netherlands)
- University of Oslo (Norway)
- National Food and Nutrition Institute (Poland)
- National Institute of Health (Portugal)
- University of Vienna (Austria)
- Centre for Superior Studies on Nutrition and Dietetics (Spain)
- Institute of Nutrition and Food Technology, University of Granada (Spain)
- Food Research Institute (Slovenia)
- Swedish National Food Administration (Sweden)
- Swedish University of Agricultural Sciences (Sweden)
- Tubitak Marmara Research Centre, Food Science and Technology Research Institute (Turkey)
- British Nutrition Foundation (UK)
- European Molecular Biology Laboratory– European Bioinformatics Institute (UK)
- Central Science Laboratory (UK)
- University of Leeds (UK)
- University of Surrey (UK)
- Bagent Ltd (UK)
- RIKILT – Institute of Food Safety (The Netherlands)
- Polytec (Denmark)
- Food Information Consultancy (UK)



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