«EU—RUSSIA SYMPOSIUM on S&T CO-OPERATION in BIOTECHNOLOGY» and «EU—RUSSIA PARTNERING EVENT in BIOTECHNOLOGY"

ABSTRACTS

Moscow 2005

Ministry of Education and Science of the Russian Federation
III Moscow International Congress "Biotechnology: State of the Art and Prospects of Development"
Russian National Contact Point on FP6 «Food Quality and Safety»
European Commission, Research Directorate General, Agriculture, Food and Biotechnology Directorate
INTAS

«EU–Russia Symposium on S&T Co-operation in Biotechnology»
and
«EU–Russia Partnering Event in Biotechnology»

Symposium Organising Group:

Russian part – Acad. R.V.Petrov (Head), Acad. V.A.Bykov, Acad. M.P.Kirpichnikov, Prof. V.O.Popov, Acad. K.G.Skryabin, Prof. A.G.Tonevitsky, Acad. V.A.Tutelyan, Prof. V.L.Khaikin.

European part – Dr. C.Patermann (Head), Dr. E.Balzi, Dr. P.Beckers, Dr. I.Eerola, Dr. M.Hallen, Dr. J.-F.Maljean, Dr. L.Matthiessen-Guyader.

Dear participants,

International EU-Russia Symposium on Science&Technology Co-operation in Biotechnology followed by the Brokerage Event that are held within the framework of the III Moscow International Congress "Biotechnology: State of the Art and Prospects of Development" both contribute to the development of the ideas and goals that were layed in the foundation of Moscow congresses on biotechnology.

The Symposium is dedicated to fostering the co-operation between Russian Federation and EU in the field of life sciences and biotechnology. It will highlight both running EU R&D programmes as well as outline general European strategy in this striving area of research.

During the Brokerage Event the potential partners from Russia and EU will have a chance to meet each other face to face, discuss possible areas of co-operation and start building up consortia for participation in future FP6/7 calls.

Symposium is the major event in the recent history of EU-Russia relations in the field of biotechnology. It provides a forum for discussion of the problems of mutual interest and will for sure become a milestone in co-operation between Russian Federation and EU in the area of life sciences.

On behalf of the Congress Programme Committee we wish you fruitful and successful work.

Welcome to the Symposium!

Academician Rem Petrov
Chair of the Programme Committee
III Moscow Biotechnology Congress

PROGRAMME of SYMPOSIUM and BROKERAGE EVENT on BIOTECHNOLOGY

March 14, 15.00–17.50

OPENING OF THE SYMPOSIUM

Chairs: Representative of the Ministry of Education and Science of the Russian Federation,

Dr. **C.Patermann** (EC, Director of Agriculture, Food and Biotechnology, Research DG, Brussels, Belgium),

Acad. **R.V.Petrov** (Head of Congress Programme Committee, Moscow, Russia).

15.00–15.20 **Opening of Symposium. Welcome Address.**
Representative of the Ministry of Education and Science of the Russian Federation.

Opening of Symposium. Welcome Address.
Acad. *R.V.Petrov.*

15.20–15.45 **Opening of Symposium. EU Strategies for Life Sciences and Biotechnology Research.**
Dr. *C.Patermann,* EC, Director of Agriculture, Food and Biotechnology, Research DG, Brussels, Belgium.

15.45–16.10 **The European Union R&D Programmes in the Field of Life Sciences and Biotechnology: Overview and Perspectives for Co-Operation.**
Dr. *M.Hallen,* EC, Research Directorate General, Strategy&Policy Unit, Brussels, Belgium.

Coffee Break

1 — FP6/7 TRENDS AND HORIZONS I

Moderators: Acad. **K.Skryabin** (Centre for Bioengineering RAS, Moscow, Russia),

Dr. **C.Patermann** (EC, Director of Agriculture, Food and Biotechnology, Research DG, Brussels, Belgium).

16.25–17.05 **The European Plant Genomics Biotechnology Platform.**
Acad. *A.Legocki*, Polish Academy of Sciences, Warszawa, Poland.

17.05–17.45 **Food Quality: Nutrigenomics.**
Prof. *B.van Ommen*, Netherlands Organisation for Applied Scientific Research, TNO Food and Nutrition Research, Zeist, The Netherlands.

17.45–17.50 Concluding Remarks

18.00 Congress Opening Ceremony

March 15, 9.30–19.15

2 — BIOTECHNOLOGY AND HUMAN HEALTH

Moderators: Acad. **E.Sverdlov** (Institute of Molecular Genetics RAS, Moscow, Russia),

Dr. **M.Hallen**, EC, Research Directorate General, Strategy&Policy Unit, Brussels, Belgium.

9.30–9.55 **Post-Genomic Approaches Exploiting Aquatic Molecular Biodiversity for Biomedical Applications.**
Prof. *W.E.G.Muller*, Johannes Gutenberg Universitaet, Mainz, Germany.

9.55–10.20 **Russia: on the Way From PCR to Postgenomic Era.**
Prof. *V.Govorun*, Institute of Physico-Chemical Medicine, Moscow, Russia,
Acad. *A.Archakov*, Institute of Biomedical Chemistry, Moscow, Russia.

10.20–10.40 **Biotechnology for Health, SCANBALT – Bioregions Networking**
Dr. *W.Blank*, BioCon Valley GmbH, Greifswald, Germany.

10.40–10.55 **Ecological optimisation of agrosphere through microbial-plant interactions.**
Acad. *I.Tikhonovich*, All-Russian Research Institute for Agricultural Microbiology, St.-Petersburg, Russia.

10.55–11.10 **Summary and Discussion**

11.10–11.30 Coffee Break

3 — FOOD QUALITY AND SAFETY

Moderators: Dr. **C.Patermann** (EC, Director of Agriculture, Food and Biotechnology, Research DG, Brussels, Belgium),

Acad. **V.Bykov** (Scientific Research Centre for Biomedical Technologies, Moscow, Russia).

11.30–11.50 **Food Biosafety in Russian Federation.**
Acad. V.Tutelyan, Institute of Nutrition RAMS, Moscow, Russia.

11.50–12.10 **Food Safety: Contaminants – Chemical.**
Prof. J.-A.Gustafsson, Karolinska Institute, Dept. for Biosciences at Novum, Dept. for Medical Nutrition, Huddinge, Sweden.

12.10–12.30 **Food Safety: Emerging Pathogenic Contaminants.**
Prof. *M.Jakobsen*, The Royal Veterinary and Agricultural University, Frederiksberg, Denmark.

12.30–12.50 **Food Safety and Risk Assessment.**
Prof. *H.Marvin*, RIKILT – Institute for Food Safety, Wageningen, The Netherlands.

12.50–13.10 **Agro-Biotechnology: Soil Bio-control.**
Prof. *M.Vurro*, CNR – Institute of Sciences of Food Production, Bari, Italy.

13.10–13.40 **Agrobiotechnology: Plant Genomics and Grain Legume Crops**.
Prof. *N.Ellis*, John Innes Center, Norwich, UK.

13.40–13.55 **Summary and Discussion.**

14.00–15.00 Lunch

6 — BROKERAGE

Chairs: Dr. **C.Patermann** (EC, Director of Agriculture, Food and Biotechnology, Research DG, Brussels, Belgium),

Dr. **A.Gerard** (Director of INTAS, Brussels, Belgium),

Prof. **V.Popov** (A.N.Bach Institute of Biochemistry RAS, Moscow, Russia).

15.00–15.10 **Opening of the Brokerage Event.**
Dr. *C.Patermann*, EC, Director of Agriculture, Food and Biotechnology, Research DG, Brussels, Belgium.

15.10–15.30 **Specific INTAS Policy.**
Dr. *P.Beckers*, INTAS, Brussels, Belgium.

15.30–15.45 **Improving Project & Research Management Skills.**
Dr. *A.Girenko*, EURICE, Science Park Saar, Germany.

15.45–16.00 **Contribution to food biotechnology and safety in russian federation and commonwealth of independent states through the international science and technology center.**
Dr. *M.-F.Saron*, ISTC, Moscow, Russia.

16.00–16.15 **FP6 – Food Quality and Safety – 4th Call.**
Dr. *E.Balzi*, EC, Directorate on Agriculture, Food and Biotechnology, Brussels, Belgium.

16.15–16.30 **FP6 – Perspectives for Health Research.**
Dr. *I.Eerola*, EC, Directorate on Health Studies, Brussels, Belgium.

16.30–16.40 **FP6 – Specific Measures for International Co-operation.**
Dr. *D.Descoutures*, EC, Directorate for International Scientific Co-operation, Brussels, Belgium.

Coffee Break

5 — FP6/7 TRENDS AND HORIZONS II

Moderators: Acad. **M.Kirpichnikov** (M.V.Lomonosov Moscow State University, Russia),

Dr. **C.Patermann** (EC, Director of Agriculture, Food and Biotechnology, Research DG, Brussels, Belgium).

17.00–17.30 **White Biotechnology.**
Dr. *C.Laane*, DSM, JH Heerlen, The Netherlands.

17.30–18.00 **Agrobiotechnology: Coexistence of GM and non GM Crops.**
Prof. *Y.Bertheau*, Institut National de la Recherche Agronomique, France.

18.00–18.30 **Marine Research.**
Prof. *S.-O.Doeskeland*, University of Bergen, Norway.

18.30–19.00 **Functional Genomics for Health.**
Prof. *C.Buys*, University of Groningen, The Netherlands.

19.30–19.15 **Final Discussion.**

19.15–19.30 **Conclusion.**
Acad. *M.Kirpichnikov*, M.V.Lomonosov Moscow State University, Russia,
Dr. *C.Patermann*, EC, Director of Agriculture, Food and Biotechnology, Research DG, Brussels, Belgium.

Signing of the Documents

20.00 **Symposium reception**

March 15, 15.00–19.00 *(in parallel with Sections 5 and 6)*

4 — BIOTECHNOLOGY AND ANIMAL HEALTH (Round Table Discussion)

Moderators: Prof. **E.Nepoklonov** (Chief Veterinary Inspector of the Russian Federation, Moscow, Russia),
Dr. **L.Matthiessen-Guyader**, EC, Directorate on Agriculture, Food and Biotechnology, Brussels, Belgium.

15.00–15.20 **Prevention and Control of Zoonoses.**
Prof. *D.Newell*, Veterinary Laboratories Agency, Addlestone, UK.

15.20–15.40 **Animal Disease Genomic Network.**
Prof. *M.-H.Pinard-van der Laan*, Institut National de la Recherche Agronomique (INRA), Jouy-en-Josas, France.

15.40–16.00 **Priority directions in provide safety of feed and products of animal origin.**
Acad. *A.Panin*, All-Russian Research Institute for Standardisation and Certification of Veterinary Preparations, VGNKI, Moscow, Russia.

7 — BROKERAGE EVENT – FEEDBACK WORKSHOP AND POSTER SESSION

Chairs: Dr. **M.Hallen** (EC Directorate General),
Dr. **P.Beckers** (INTAS),
Dr. **O.Koroleva** (A.N.Bach Institute of Biochemistry RAS, Moscow).

17.00–18.45 **Brokerage Conclusions.**

8 — BROKERAGE EVENT – BILATERAL MEETINGS FOR PARTNERING

Moderators: Dr. **P.Beckers** (INTAS),
Dr. **V.Eryomin** (A.N.Bach Institute of Biochemistry RAS, Moscow).

17.00–17.15 Round 1
17.15–17.30 Round 2
17.30–18.00 Round 3
18.00–18.15 Round 4
18.15–18.30 Round 5
18.30–18.45 Round 6

OPENING OF SYMPOISUM

EU STRATEGIES FOR LIFE SCIENCES AND BIOTECHNOLOGY RESEARCH

Christian Patermann

Director, Biotechnology – Agriculture – Food
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A major policy objective of the European Union is the achievement of the "Lisbon Agenda": the blueprint for growth, competitiveness, employment and sustainable development that the EU adopted five years ago and is currently being implemented. Knowledge is what holds together all the components of the Lisbon Agenda. Knowledge and its exploitation are the key not only to economic growth, to the competitiveness of enterprises and employment, but also to the future of the "European way of life" and to European values. Scientific research as the main source of new knowledge and technological innovation and the mechanism for its application, are indeed at the heart of the rapidly developing knowledge economy.

The sequencing of the human and many other genomes and the recent advances in post-genomics have revolutionised life sciences research. Integrating vast amounts of data and understanding underlying biological processes requires bringing together critical masses of various expertises and resources that are not available at a national level. In addition, innovations and advancement of knowledge in the sustainable management, production and use of biological resources (micro-organism, plants, animals), will provide the basis for new, sustainable, eco-efficient and competitive products for agriculture, food, health and related industries.

Future activities shall therefore aim at building a European *Knowledge Based Bio-Economy* by bringing together science, industry and other stakeholders, in order to exploit new and emerging research opportunities, and to address new social and economic challenges such as a growing demand for safer and healthier food, and for renewable bio-resources, the increasing risk of epizootic and zoonotic diseases and food related disorders, as well as threats to the sustainability and security of agricultural production resulting from climate change. Another important strategic element is improving the health of European citizens and increasing the competitiveness of European health-related industries, while addressing global health issues. Emphasis needs also to be put on translational research (translation of basic discoveries in clinical applications), the development and validation of new therapies, preventive methods, diagnostic tools and technologies, as well as sustainable and efficient healthcare systems.

In line with the European Strategy on Life Sciences and Biotechnology[1], this will help increase the competitiveness of European biotechnology companies, in particular high tech small and medium-sized enterprises (SME), while improving social welfare and wellbeing.

[1] "Life Sciences and biotechnology – A strategy for Europe", COM(2002)27

THE EUROPEAN UNION R&D PROGRAMMES IN THE FIELD OF LIFE SCIENCES AND BIOTECHNOLOGY: OVERVIEW AND PERSPECTIVES FOR CO-OPERATION

Manuel Hallen

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European research is supported by different levels of funding, from the regional to the national and European transnational levels. The latter level is addressed through the Sixth Framework Programme for RTD (FP6) which is the frame for the EU activities in the field of science, research and innovation. With a budget of 17.5 billion euros for the years 2002–2006 it represents about 4 to 5 percent of the overall expenditure on RTD in EU Member States. The main objective of FP6 is to contribute to the creation of the European Research Area (ERA) by improving integration and co-ordination of research in Europe which is so far largely fragmented. At the same time research is targeted at strengthening the competitiveness of the European economy, solving major societal questions and supporting the formulation and implementation of other EU policies. Activities under FP6 have to be conducted in compliance with ethical principles, including those reflected in the Charter of Fundamental Rights of the European Union.

In the current Sixth Framework Programme (FP6, 2002–2006), a strategic decision was taken to support basic and applied research in the life sciences mainly through 2 thematic programmes, one on "Life Sciences, Genomics and Biotechnology for Health" and a second one on "Food Quality and Safety".

In the last three years, FP6 has been demonstrated to be quite successful in mobilising the life sciences research community in a number of new and exciting research projects, transnational by nature, which are defining the landscape of collaborative networks in European research. One specific feature of FP6 is its international dimension, i.e. its broad access to the world-wide research community, including funding for specific international co-operation activities (INCO) with selected groups of countries (Mediterranean Partner Countries, Western Balkan Countries, Russia and the Newly Independent States, Developing Countries) based on mutual interest and in support of Community external policy.

1 – FP6/7 — TRENDS AND HORIZONS I

EUROPEAN TECHNOLOGY PLATFORM ON PLANT GENOMICS AND BIOTECHNOLOGY "PLANTS FOR THE FUTURE"

Andrzej B. Legocki

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Member of the Steering Committee T. P. "Plants for the Future"

Plant science has undergone dynamic changes during the past decade. The impact of genomics and new high breakthrough technologies provide unprecedented opportunities for generating new insights and transferring knowledge of biological processes into the agriculture, biomedicine and environmental science.

Although Europe created a strong plant sciences base, fragmentation of research activity, unnecessary competition reduced scientific visibility and greater degree of integration of research objectives.

Primary mission of the Technology Platform "Plants for Future" is to establish and carry out a joint and long-term strategy for plant genomics and biotechnology research to improve synergy between EU, national and private research institutions. The base for a new vision for plant-oriented research will be provided by a long-term commitment by the stakeholders – industry, research organization and academia, farmers, consumers and other relevant groups – to work in partnership and pragmatic manner with the aim of strengthening research and applied innovation efforts.

Strategic research goals are formulated in the following way:

- secure a healthy and safe supply,
- develop a sustainable agriculture products,
- safeguard the environment, preserves the landscape and develop a new biotechnologies,
- ensure competitiveness of the European agri-food according to consumer choice.

After consultations with member states the Technology Platform will determine research priorities within the Strategic Research Agenda taking into account competitiveness, researcher's mobility and employment as well as industrial recommendations. The Platform is open to all parties that are interested in strengthening research and develop innovation efforts in Europe.

NUTRIGENOMICS AND NUTRITIONAL SYSTEMS BIOLOGY

Ben van Ommen

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The relationship between nutrition, health and disease is long and well known but enjoys a revival due to the maturation of nutritional sciences. Until recently, this relationship was approached either from a physiological or a biomedical perspective. With the growing knowledge of the (human) genome, related biology and available technologies, these two areas are merging into nutritional systems biology, allowing a real focus on prevention of disease and stimulation of health. However, numerous challenges still need to be met. This presentation will touch upon some of them, grouped into two themes:

From nutrigenomics to personalized nutrition. Genetic differences between individuals will influence the response to certain food components, and well known examples like cholesterol and folate exist. A number of nutrition and health relate degenerative diseases have multiple onset mechanisms, each containing a number of genetic variations. The complexity of the relative contributions of each of these SNPs raises questions to the relevance of a "personalized diet" strategy, and the current scientific approaches are not good enough to provide adequate answers. A number of scientific strategies emerge and will be discussed.

Early biomarkers and disease prevention. How can we measure the onset of disease before its occurrence? How should we design nutritional studies to determine the effect of a diet on disease prevention? New biomarker concepts are necessary, and nutrigenomics may provide these. Studies are performed aiming at i) describing very early steps in the onset of disease, by exploiting the power of measuring many subtle differences, and ii) describing the longitudinal process of progression from healthy to diseased. Both strategies will yield valuable information, but are still in its conceptual phase and toolbox development. Examples will be presented.

It is obvious that further exploiting the nutrition and health relationship calls for an almost fundamentally new approach in nutritional science, where collaborative efforts like the European Nutrigenomics Organisation will play a major role.

2 – BIOTECHNOLOGY AND HUMAN HEALTH

POST-GENOMIC APPROACHES EXPLOITING AQUATIC MOLECULAR BIODIVERSITY FOR BIOMEDICAL APPLICATIONS

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With the progress in molecular cell biology a rational exploitation of the natural resources of secondary metabolites and biomaterials from sponges [Porifera] became possible. It could be established that these compounds are superior for biomedical application to those obtained by traditional combinatorial chemical approaches. Molecular data showed that the basic structural and functional elements are highly conserved from sponges to the crown taxa. The major challenge for scientists working in natural product chemistry is to elucidate the target(s) of a given secondary metabolite, which is per se highly active and selective. After this step, the potential clinical application can be approached. The value of some selected secondary metabolites, all obtained from sponges and their associated microorganisms, is highlighted exemplarily. Examples of compounds, already in medical use, or being considered as lead structures, or as prototypes for the interference with metabolic pathways common from sponges up to human, are discussed. It is outlined that the skeletal elements, the spicules, can serve as blueprints for new biomaterials, especially biosilica, which might be applied in biomedicine. These compounds and biomaterials have been isolated/studied by members of the German Center of Excellence BIOTECmarin as well as the EU MARIE CURIE RESEARCH TRAINING NETWORK (MCRTN) "BIOCAPITAL Proposal Number: 512301". The future goal of our work in these centers is to introduce successfully some of those compounds for the treatment of human diseases.

– W.E.G. Müller et al. Intern. Review of Cytology 235, 53–92 (2004).

– W.E.G. Müller et al. Naturwissenschaften 90, 103–120 (2003).

– W.E.G. Müller et al. Marine Biotechnol. 6, 105–117 (2004).

– O.V. Kaluzhnaya and W.E.G. Müller: Dynamics of Skeleton Formation in the Lake Baikal Sponge Lubomirskia baicalensis. Part I. and Part II. Naturwissenschaften; in press.

RUSSIA: ON THE WAY FROM PCR TO POSTGENOMIC ERA

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** Institute of Biomedical Chemistry, Moscow, Russia*

SCANBALT BIOREGION – EUROPE'S FIRST METAREGION

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Europe takes part in the global competition for scientists, capital and knowledge, major factors of importance for societal growth. The individual European bioregions are relatively too small to be competitive in a global perspective. Therefore the main actors in the Nordic countries and the Baltic Sea states have created the first meta-bioregion ScanBalt BioRegion encompassing Denmark, Estonia, Finland, Iceland, Latvia, Lithuania, Norway, Poland, Sweden, northern part of Germany and north-western part of Russia. ScanBalt BioRegion has 11 countries and 85 million people with more than 60 universities and 870 life science/biotech companies.

ScanBalt is a not for profit member association encompassing regional networks, public institutions, hospitals and private companies within life sciences/biotechnology. ScanBalt is currently co-financed by Nordic Innovation Center, NordForsk, EU FP 6, Interreg lllB.

ScanBalt is a mediating and coordinating network without formal power and its strength depends on the strength of the individual networks. It implies coordination of existing networks and organisations as well as stimulating the creation of new ones. ScanBalt acts in a de-centralized and bottom up manner. ScanBalt initializes, facilitates and promotes either specific thematic projects (e.g. in intellectual property knowledge management, clinical research, marine biotech, environmental biotech, agro biotech) or projects focusing on metaregional infrastructure in education, research and tech transfer.

One project focusing on metaregional infrastructure is ScanBalt Campus (SBC). SBC will create a cross-sectoral network of education, research and innovation between universities, companies, hospitals/university hospitals and other actors – all sharing life sciences/biotechnology as a common platform.

For further information: www.scanbalt.org

INTERNATIONAL COLLABORATIONS IN THE FIELD OF PLANT–MICROBE INTERACTIONS

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Integration of genetics material from different organisms allows to develop very complex characters with high potentialities in adaptation to the environmental conditions. Biological nitrogen fixation is the most useful adaptation based on symbiotic relationships between legume plants and microbes. This will be the subject of my presentation based on the genetic work started twenty years ago in the ARRIAM in cooperation with many laboratories in Europe and oversea.

From the view of basic knowledge the symbiotic genes are of great interest because they cannot be revealed in ordinary genetic analysis. From the practical point the manipulation of them gives the opportunity for the creation of the highly effective symbiotic systems which look very promising for the realization of the principles of sustainable agriculture.

The complexity of the plant microbe systems determines the international cooperation for the studying of the mechanisms of integration.

During the past 10 years our institute has been involved in numerous bilateral and multinational scientific programs most of them were based on the grants.

Problems, peculiarities and perspectives of such collaborations will be discussed in the presentation.

3 – FOOD QUALITY AND SAFETY

FOOD BIOSAFETY IN THE RUSSIAN FEDERATION

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Public attention to the biosafety problems, including food biasafety, has risen sharply for the recent decades. It is specified by a broad application of the newest biotechlologies, methods of genetic engineering in particular, which emphasizes the matters of controlling GMO, used in food industry, and GM food sources of animal and plant foods. Hazard lies in a principal possibility to produce, intentionally or not, GM foods or GMO, which can have a harmful impact upon human health. Namely because of that, many countries of the

world, including the Russian Federation, have created systems of control of GM foods and the use of GMO in food industry, which rest upon appropriate legislation, normative and methodical documents. Since 1996 a special Federal Law has been regulating all genetic engineering work in this country.

The use of 12 kinds of GM plant food sources have been permitted in food industry in the Russian Federation upon the outcomes of medical, biological, genetic and technological researches.

Instrumental control of foods, which have GM analogues, is based on detection of recombinant DNA. Two methods were elaborated and standardized: the first – polymerase chain reaction with electrophoresis detected results and second – application of biologic microchip. There has also been worked out the way of controlling food production, which have GM analogues as well food production, received from GMO and GM analogues.

FOOD SAFETY: CONTAMINANTS – CHEMICAL

Gustafsson J.-A.

Karolinska Institute, Dept. for Biosciences at Novum, Dept. for Medical Nutrition, Huddinge, Sweden.

PATHOGENCOMBAT – CONTROL AND PREVENTION OF EMERGING AND FUTURE PATHOGENS AT CELLULAR AND MOLECULAR LEVEL THROUGHOUT THE FOOD CHAIN

Jakobsen M.

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Food safety is of fundamental importance to the European consumer, the food industry and the economy. Despite significant investment, the incidence of food derived disease is still too high. PathogenCombat attacks this problem through a holistic, multidisciplinary approach towards threats from new/emerging pathogens in the entire food chain. In the Project novel approaches will be used to analyse interactions at cellular and molecular level between pathogens and food and feed matrices, and their contact surfaces in the food chain. They will be based upon fluorescence ratio imaging microscopy and bioimaging, atomic force microscopy, laser tweezer technology, convergent evolution, functional genomics and functional mammalian cell models to understand the mechanisms, by which pathogens enter, adapt, persist and express virulence in the food chain. Strategies for breaking the transmission of the pathogens along the food chain will be investigated. They will include

probiotic cultures, hygienic design and novel cleaning and disinfection procedures as well as novel food processing technologies. Stochastic simulation models will be applied to define CCPs and to estimate the microbial food safety risk at the time of consumption. The results obtained will be integrated in a Food Safety Management System (FSMS) including identified human Critical Behaviour Points (CBP). Support measures to the food industries for the uptake of knowledge and the tools produced by the project will be developed and verification and validation of the system including Project deliverables will be done by application in production chains, involving SMEs. A webbased platform addressing the consumers, food industry and regulatory agencies will be established for dissemination of knowledge throughout Europe and to INCO countries.

FOOD SAFETY & RISK ASSESSMENT

Marvin H.J.P.

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Since the nineties, food safety has been prominent on the scientific and political agenda, mainly due to the food safety incidents such as BSE, dioxin and outbreaks of microbial food borne diseases. Furthermore, the market introduction of foods derived from GM crops in Europe has given rise to a broad public debate on the safety of such foods. Many of the concerns and questions raised in the public debate have been addressed in research projects supported by the European Commission under the 5th Framework programme. These projects often involved all stakeholders in the project. An excellent example of such an approach is the ENTRANSFOOD project.

The public debate on GMO is part of a more general discussion on the safety of foods produced in Europe, current with a decreased public trust in food safety assessment and management practices in Europe. These elements were important triggers for regulatory reform of the food safety analysis and control systems in the European Union resulting in the General Food Law and the establishment of European Food Safety Authority (EFSA).

Independent scientific risk assessment as conducted by EFSA is believed to contribute to the trust of the consumer in the Regulatory system. In addition, it is clear that the risk analysis practices need to be further improved and integrated with societal and quality of life issues.

This new concept entails a new approach towards interaction between natural and social sciences and is currently being developed in research projects supported by the European Commission in the 6th FP.

AGRO-BIOTECHNOLOGY: SOIL BIO-CONTROL

Maurizio Vurro

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Among all the living organisms that can attack crops causing qualitative and quantitative reduction of production, those living in the soil, such us plant pathogens and weeds are among the worst and the more difficult to control by traditional tools and strategies. Soil borne plant pathogens, such as Sclerotinia, Fusarium or Pythium spp., responsible for damping off, crown and root rots, and wilts, represent a major problem of plant protection in many open field and greenhouse vegetable crops. Parasitic weeds such as Orobanche species attack nearly all vegetables, legumes, and sunflowers in southern Europe to the Balkans and Russia. Perennials weeds such as Cirsium arvense are among the most troublesome weeds to manage.

Control strategies for the above pest problems, such as fumigations, soil solarization, seed treatments, application of fungicides or herbicides, mechanic weed control, have only a limited or none efficacy.

Considerable effort during the last few decades has been dedicated to biological control of weeds and plant diseases, and many interesting and potential microorganisms were found, but their practical commercial use is still very limited. This is due to many constraints, including: biological (virulence, stability, defense mechanisms of the target pest, interaction with other microorganisms); technological (scarcity of sporulation, lost of aggressiveness, special growth requirements); environmental (interaction with water, physical characteristics of the soil, physical and chemical barriers) and commercial (limited market, registration problems including secondary toxicity and registration costs, costs of production). Only a limited number of commercial products are available against a few diseases, and no commercial bioherbicides are available in the European market.

By studying the genetic and physiological enhancement strategies, the ecological fitness of the agents, the production, formulation and application methods, the integration with other organisms and with control methods, and assessing their quality and the risk of release into the environment, it could be possible to improve the efficacy of fungal biocontrol agents, allowing their wider use at the European level, and giving new important tools to support the production of safer and healthier foods.

PLANT GENOMICS AND GRAIN LEGUME CROPS

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Legumes have obvious benefits in agriculture: they act as a break crop, improve soil structure and fertility, and they are an essential component of pasture. Field legume crops provide a rich source of vegetable protein both for food and for animal feed, but remarkably have a very low inclusion rate in European agriculture where they represent about 5% by area as against 25% in most other parts of the world. The Grain Legume crops grown in 'European' climatic zones have two unusual properties: they all have huge genomes and they are remarkably closely related phylogenetically. All this means modern genetics is difficult, but creates the possibility of exploiting comparative biology as an integrating principle. The two model legumes, Lotus japonicus and Medicago truncatla are both very closely related to these crops. This talk will describe how we are implementing a plan to put comparative genetics and genomics in the centre of legume crop science in the EU, and how we hope to extend this programme to other interested groups.

see www.eugrainlegumes.org

4 – BIOTECHNOLOGY AND ANIMAL HEALTH

PREVENTION AND CONTROL OF ZOONOSES

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Diseases transmissible from animals to man (zoonoses) are of significant public health importance with major social and economic consequences. Over 60% of all agents pathogenic to man have animal reservoirs and about 75% of new and emerging diseases are zoonotic. Such diseases may be transmitted through the food or by direct contact with reservoirs in food producing animals and consequently need to be addressed across the whole food chain and across international borders.

Currently zoonoses research within Europe is highly fragmented with many operational divisions over all aspects but the largest barriers are between the public health and veterinary researchers. To address this problem the EU has recently funded a Network of Excellence, MED–VET–NET with the objective of integration of veterinary, medical and food research scientists. MED–VET–NET comprises 8 veterinary institutes and 7 public health institutes in 10 countries.

The network also employs a further partner, the Society for Applied Microbiology, to disseminate knowledge, both within the network and to other stakeholders including the general public. The network's strategic scientific plan is based around four thematic areas – epidemiology, host-microbe interaction, detection and control, and risk research. These areas are undertaking jointly executed scientific research on zoonotic agents selected on the basis of importance in Europe. Currently there are 11 research workpackages in such diverse topics as lyssaviruses in European bats (bat rabies) and molecular epidemiology to track food-borne pathogens across country boundaries (Pulse-NET Europe).

As zoonotic diseases are a global issue, MED–VET–NET is now actively expanding its international contacts and research collaborations.

EADGENE: EUROPEAN ANIMAL DISEASE GENOMICS NETWORK OF EXCELLENCE FOR ANIMAL HEALTH AND FOOD SAFETY

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Genomics provides a valuable tool to develop improved disease control in animals. Concentrating on pathogens of importance in the food chain, it has also significant impact on human disease. Methods for improved control and diagnosis of disease, a greater understanding of the interaction between a particular pathogen and a particular host, are all opportunities where functional genomics research can make an impact. However, genomics research in the animal sector does not receive the support of its human counterpart and the research base is relatively fragmented.

The EADGENE Network of Excellence (13 partners) aims at overcoming this fragmentation by linking its partners and by ensuring many other players, in research and in industry, can benefit from membership of a club of interest. Benefit is mutual, industry using the results of the research, while driving its focus and, eventually, supporting financially important areas. As a result, EADGENE has a strong role in orientating European animal genomics research. The project creates a European virtual laboratory in genomics of animals and their pathogens. It ensures sharing of genomics data and knowledge as well as of equipment and materials. It also promotes a common platform and language amongst European researchers. It has an extensive training and education programme, encouraging staff mobility and international exchange of information.

Based around, a core of studies in structural, population and functional genomics, the project aims to develop new vaccine targets, molecular diagnostic tools and assist in developing breeding strategies. It also encourages interaction with the human genomics research.

www.eadgene.org

PRIORITY DIRECTIONS IN PROVIDE SAFETY OF FEED AND PRODUCTS OF ANIMAL ORIGIN

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The VGNKI is responsible for State control in the Russian over compliance with the requirements of applicable standards regulating veterinary medicines and feed additives. Also VGNKI have supervised for epizootic situation in Russian in order to prevent the epizootic process evolution.

Since 1996 the Centre has had the official status of the OIE Collaborating Centre in Eastern Europe, Central Asia and Transcaucasia for Diagnosis and Control of Animal Diseases and since 2004 – Food Safety.

The Centre have developed and validated test systems for the diagnosis of infectious diseases, disclosure of falsification of feeds with soybean or maize ingredients, ruminant, pork, swine, chicken, carnivore tissues. Also VGNKI have developed PCR tests-systems for detection, quantitative appreciation GMO and identification different transgenic lines of soybean and maize.

VGNKI is carried out monitoring for presence in veterinary drugs and feeds declared compound and adulterated contaminant. For screening determination of clenbuterol, diethylstilbestrole, nortestosterone, methyltestosterone, trenbolone and ethynylestradiol residues in feeds was developed ELISA test-systems . The methods based on gas-chromatography-mass-spectrometry (GC-MS/MS) was developed for detection of anabolical steroids, b-agonists and PCBs.For determination of heavy metals VGNKI have been developed high-sensitive Flameless Atomic Absorbtion and Vapor Generation methods.The very sensitive method for determination of aflatoxin B1 using HPLC with fluorescent detection of aflatoxin B_{2a} have been developed.

5 – FP6/7 – TRENDS AND HORIZONS II

INDUSTRIAL (WHITE) BIOTECHNOLOGY IN EUROPE

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Industrial (white) biotechnology is rapidly gaining momentum as a cost-effective and environmentally-friendly technology to produce bio-based chemicals, materials and fuels in a safe and sustainable way from renewable resources.

Currently, Europe is shaping its white biotech future by the establishment of a Technology Platform on Sustainable Chemistry, of which industrial biotechnology forms one of the main sections besides materials technology and process & reaction design. This Technology Platform can be regarded as a multi-stakeholder public-private-partnership between the industry, research community, agriculture and society, and is bound to set the strategic research and policy agenda for the European chemical industry (the biggest in the world!) in the next decades. The European vision for white biotechnology includes that:

- An increasing number of chemicals and materials will be produced using biotechnology in one of its processing steps;
- Biotechnology allows for an increasing eco-efficient use of renewable resources as raw materials for the (chemical) industry;
- Industrial biotechnology will enable a range of industries to manufacture products in an economically and environmentally sustainable way;
- Biomass-derived energy, together with other renewable energy sources, is expected to cover an increasing amount of our energy consumption.

The prospects of industrial biotechnology are looking brighter than ever before, due to the momentum generated in this Technology Platform, the complementary Member States initiatives, the rapid advances in (gen)omic technologies, the proven environmental and economic benefits it offers, the increasing oil prices, and biotech's role as a important driver of innovation. Promises are increasingly turning into profit! In my presentation I will outline the European plans and indicate how Russia could play a role in shaping the future of white biotechnology.

AGROBIOTECHNOLOGY: CO-EXISTENCE OF GM AND NON-GM CROPS

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INRA, France

Since the development of DNA based technologies in the 70s, genetic modification of organisms have been increasingly used for basic research as well as commercial purposes. Since the end of the 90s, surfaces of GM plants are increasing worldwide.

According to several opinions surveys, GMO are facing reluctance of consumers in several countries including the EU. On another part, studies of consumers attitudes indicated positions are less well-marked. Whatever the opinions and attitudes, consumers ask for a clear labeling of products to keep their freedom of choice. Such freedom of choice has been taken into consideration by the European directives and regulations but the practical implementation of such a co-existence of supply chains and traceability of the products is not obvious, particularly for farmers and SME.

The objective of Co-Extra, a FP6 Integrated Project, is to provide all the stakeholders of the food and feed chains with a central decision-support system integrating the tools, methods, models and guidelines needed to deal with the supposed imminent arrival of large quantities of GMOs, further to the lift of the former de facto ban on GMO in the EU.

Co-Extra will, first, partly focus on co-existence of production by studying and validating biological containment methods. This work should complement SIGMEA, a European research program studying more in depth the conditions of productions' co-existence. Study of some supply chains organizations in third countries and EU should, by determining their critical points, allow modeling and provide practical tools and methods for implementing co-existence. Economic costs and benefits of co-existence of supply chains will also be studied on several models of raw and processed products.

In parallel, Co-Extra will design and integrate GMO detection tools, develop sampling plans and validation procedures of new kinds of detection methods. Moreover, this program will elaborate new techniques to meet the challenges raised by increased demands for cost effective, rapid and precise methods as well as to detect as yet unapproved or unexamined GMO and e.g. stacked genes.

The program will study and propose the most appropriate information structure, content and flow management for ensuring reliable and cost-effective documentary traceability.

All of the methods and tools that will be studied and developed will be assessed not only from the technical point of view but also with regard to economic and legal aspects. In parallel, to promote harmonization of co-existence and traceability practices around the world, Co-Extra will survey the GMO-related legal regimes and practices that exist in and beyond the EU.

Stakeholders will be involved in the project from the start through the dialogue platform, editorial offices, focus groups, national relays, etc. Co-Extra outcomes should contribute to reinforcing consumers' confidence in labeling claims and therefore EU products at large. By helping economic stakeholders to meet consumers' requirements for reliable choices, Co-Extra will improve European competitiveness. Several Co-Extra outcomes such as detection methods will be proposed to standardization after validation. Dissemination activities will largely benefit from the strong commitment of the European Network of GMO Laboratories (http://engl.jrc.it).

Although focused on GMO and the related supply chains, several results should be applicable to other kinds of supply chains, as the standardization of their detection methods has been a model in other detection fields of food safety.

The talk will focus on several key words such as reliability, precision and cost-effectiveness of sampling, detection methods and traceability systems which are common to several fields of food safety and can impact the consumers' accessibility to such products. The impact of procedures common to several fields of food safety will also be examined.

MARINE BIOTECHNOLOGY – BIOPROSPECTING

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The oceans and their shores represent a so far little exploited resource regarding bioprospecting. Pelagic as well as benthic (bottom- and sediment- dwelling) organisms exist in particular ecological niches (different salinity, temperature, pressure,....).

Early pioneering studies probing the genomes of marine micro-organisms suggest an unforeseen diversity. This represents an opportunity both for basic research to understand the evolution of genomes due to ecological pressure and – not least – for biotechnological exploitation.

Biotechnological exploitation can be through the discovery of the coding sequence of genes specifying proteins with novel properties. Examples are the fluorescent properties of proteins from deep sea species, and enzymes able to perform catalysis at very low temperature or synthesize novel compounds of medical interest. Biotechnology is also essential to detect natural toxins in marine seafood and to detect early enough unwanted effects of pollutants on marine species.

Russia has shorelines to the Arctic, Baltic, and the Pacific oceans/seas, and some of the World's largest lakes. Lakes with recent rise in salinity are "laboratories" for evolution of salinity-tolerance. Lakes become isolated from the oceans may give information of independent species evolution.

A long-term effort will be required to deal with the challenges mentioned. Obviously, scientists from Russia and other parts of Europe will gain through collaboration on training, field and laboratory work. Presumably, strong biotechnology centers combining marine biology and other fields, like medical biology, will be required.

PHYSICALLY, CHEMICALLY AND BIOLOGICALLY SUPPORTED MICROBIAL ACTIVITIES IN CONTAMINATED ENVIRONMENTS

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Major problems in the attenuation of land contamination arise from the low bioavailability of the pollutants, the lack of chemical factors needed for biodegradation and adverse physical conditions. As a consequence most contaminated sites have difficulties to sustain sufficient active microbial biomass to achieve satisfying attenuation rates.

The research and development projects presented here tackle these problems. In all cases minimally invasive and, thus potentially cost-effective physical, chemical and biological means are tested for their potential to speed up land decontamination. Examples to be presented will be the use of living vectors and electrical fields to achieve an in situ homogenisation of microbes and pollutants, soil heating with radiowaves for the simultaneous increase of pollutant bioavailability and microbial activity, the use of plants to provide auxiliary substrates and thus to decouple biomass formation from pollutant bioavailability, the use of predators for the internal recycling of nutrients, and the transfer of contaminated groundwater in natural compartments of higher reactivity. Advanced methods of in situ detection of the micobial degradation potential and its actual realization are discussed as well.

FUNCTIONAL GENOMICS FOR HEALTH

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The gradual elucidation of the DNA sequence of the human genome has led to an expansion of genomics into a diversity of applications in human health: genomic medicine. Still, our understanding of the physiological function of most proteins is very deficient. In functional genomics two major new technological approaches have been developed to study gene function. Once is the use of RNA interference, a biological mechanism by which gene silencing can be induced. Promising applications can be expected, but a number of obstacles need first to be removed. The other main approach, which has already found widespread application, is gene expression profiling by microarray analysis. Expectations have been and still are high . What is badly needed, however, is a statistically reliable clustering of data corresponding with the phenotypes of interest. For most results published to date it cannot be assumed that this has been obtained. A solution has to be sought in formulating new statistical theories on the reliability of higher order clustering to be empirically tested in simulations.

Here, with its strong tradition in the mathematical sciences, the Russian Federation can make a substantial contribution. It would be an excellent investment for the immediate future if courses could be arranged to make Russian students and scientists in mathematics familiar with the developments in molecular biology that are so much in need of solutions from statistics and informatics.

6 – BROKERAGE

INTAS' INSTRUMENTS FOR INTEGRATION OF NIS FOOD/BIOTECHNOLOGY SCIENCE INTO THE EUROPEAN RESEARCH AREA

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INTAS is an independent International Association formed by the European Community, European Union's Member States and like minded countries acting to preserve and promote the valuable scientific potential of the NIS partner countries through East-West Scientific co-operation.

INTAS organizes calls for proposals to allow individual scientists, in the INTAS member states and in the NIS partner countries, to form partnerships and propose joint research projects for funding. Thus individual scientists are free to determine their own research agenda.

Scientists benefit from the fact that all projects proposed to INTAS are evaluated using highly professional peer review procedures.

In a region as vast and diverse as the NIS, it is essential to understand the different changing social and economic needs of specific NIS conditions and regions and to have the appropriate tools to respond rapidly. INTAS instruments are therefore varied and concentrate on partnership at various levels: calls for proposals, young scientists fellowships, summer schools, scientific policy workshops, innovation grants and other more focused actions.

INTAS adopts relevant programs to meet specific needs and strengths of NIS regions, to stimulate a particular field of research or to take joint initiatives with other organizations and with industry.

As an example, INTAS has organized a thematic call for proposals dedicated to Food science in 2000. As a result of that 16 projects in the area of food/ feed related research were funded. About 80 research teams from both European countries and NIS are involved in these projects. The consortia that have been built through this joint research could serve as stepping stones towards integration of NIS scientists into the European Research Area.

For 2005 a couple of open and thematic calls for proposals are under preparation among which one is related to the food/biotechnology area.

The "INTAS FP6 NIS Information Network (ININ)" was created to promote the involvement of the NIS scientific communities in the European Research Area, and in particular in activities funded by FP6, through awareness raising, information dissemination, advice and training activities about the aims, principles & opportunities of ERA and FP6 in the NIS countries. Part of the ININ objectives is to build a sustainable structure of National Contact Points. National Information Points throughout the whole NIS. Brokerage events and development of partner search-tools belong to the possible means that are supported by INTAS in this respect.

IMPROVING RESEARCH AND PROJECT MANAGEMENT SKILLS IN RUSSIA TO STIMULATE ITS COOPERATION WITH EUROPE IN THE FIELD OF LIFE SCIENCES

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IMPRESMAN-COEUR4LIFE FP6 project (LSH SSA) has an objective to improve the participation of LSH research organizations from third countries in European RTD schemes by developing and delivering a capacity building programme in the field of Research and Project Management. Russia keeps a very special place among the partner countries due to its research potential, economic opportunities and geo-political importance. In order to target precisely the subsequent training measures the project team is carrying out a study into the major barriers and enablers on the way to wider cooperation between European and third countries research communities. Recent talks which took place in several leading LSH research institutes in Moscow allow highlighting the major problems hampering further participation of Russian research teams in European LSH RTD projects, as well as possible solutions. The presentation includes brief overview of the finding obtained as a result of this analysis. As a general conclusion the project team supposes that there is a need to bring up a new community of research managers in Russia who will be able to assist and facilitate joint partnerships, ease researchers from non-scientific aspects of RTD project activities, improve quality of projects proposals and, finally, to improve climate for joint EU-Russia research partnership in Life Sciences. These and many other issues will be addressed in the course of interactive training workshops the project will deliver in October 2005 in Moscow.

CONTRIBUTION TO FOOD BIOTECHNOLOGY AND SAFETY IN RUSSIAN FEDERATION AND COMMONWEALTH OF INDEPENDENT STATES THROUGH THE INTERNATIONAL SCIENCE AND TECHNOLOGY CENTER

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The major task of International Science and Technology Center (ISTC) is to re-orientate former USSR's weapon specialists to peaceful activity thanks to their high research level knowledge and skill. Thus ISTC is placed within the efforts of 37 nations working toward nonproliferation and greater world security. ISTC implicates governemental ministries and legislative bodies, international organizations, major scientific research centers, academia and industrials.

Thanks to international funds, industrial and scientific cooperations, former weapon specialists became successful in manny fields as demonstrated by numerous international publications, patents applications and products.

Upon 10 years of accomplishement, a total of 2065 proposals have been funded by ISTC out of 4382 (43 % of the projects) for a total of more than 660 millions USD. Indeed, the main supported field with 23% of the funds is Biotechnology and Life Sciences.

In this area, up to now ISTC registrated 155 projects related to Food Biotechnology and Safety. Sixteen are under consideration, 85 have not been funded (55%) and 70 were granted (45%). The funded projects concern mainly food products such as preparations for veterinary and poultry and for crops protection.

They also concern food safety for instance pathogens; the usage of .indicator organisms, food viruses, chemical residues and contaminants etc. Some proposals concern genetically modified plants and plant biodiversity.

Thus institutes from FR and other CIS countries already implied their capacities and facilities in Food biotechnology and safety. Further possibilities are present and promissing in this specific field of research.

FP6 – FOOD QUALITY AND SAFETY RESEARCH: PROSPECTS FOR CO-OPERATION

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The European Union (EU) funds research on a number of thematic priorities through the 6th Framework Programme (2002–2006), which is open to participation by public and private organisations in Europe and beyond. 685 € million is allocated to fund research in Food Quality and Safety (Thematic Priority 5). This includes collaborative research under the following headings:

- Epidemiology of food-related diseases and allergies
- Impact of food on health
- Traceability processes all along the production chain
- Methods of analysis, detection and control
- Safer and environmentally friendly production methods and technologies and healthier foodstuffs
- Impact of animal feed on human health
- Environmental health risks

More details about the supported research areas can be found on the Cordis website: http://www.cordis.lu/fp6/food.htm

Projects can be submitted following calls for proposals in which specific research topics are defined. The calls can be found at: http://fp6.cordis.lu/food/calls.cfm

The research is funded via collaborative research. In addition to the minimum requirement of 3 European partners (except for Specific Support Actions – SSAs – where 1 EU participant is sufficient), organisations (universities,

research institutes, private companies, etc.) from nearly all over the world, are welcome to participate in the consortium on the same footing as the European partners. Substantial funding is available for participating organisations from the "INCO target countries" i.e. the large majority of emerging, transition and developing economies, including Russia and NIS.
The next call for proposals will be published in summer 2005. The deadline for submitting the proposals is expected to be in November 2005. Participation of Russian and NIS partners will be most welcome.

FP6 – PERSPECTIVES FOR HEALTH RESEARCH

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The European Union (EU) funds research on a number of thematic priorities through the 6th Framework Programme (2002–2006), which is open to participation by public and private organisations in Europe and beyond. 2.3 billion is allocated to fund research in Life sciences, genomics and biotechnology for health (Thematic Priority 1). This includes collaborative research under the following headings:

- Fundamental knowledge and basic tools for functional genomics in all organisms
- Application of knowledge and technologies in the field of genomics and biotechnology for health
- Combating major diseases (including cancer)
- Confronting the major communicable diseases linked to poverty

More details about the supported research areas can be found at the Cordis website: http://www.cordis.lu/fp6/lifescihealth.htm.

Projects can be submitted following call for proposals in which specific research topics are defined. The calls can be found at: http://fp6.cordis.lu/lifescihealth/calls.cfm

The research is funded via collaborative research. In addition to the minimum requirement of 3 European partners, organisations (universities, research institutes, private companies, etc.) from all over the world are welcome to participate in the consortium on the same footing as the European partners. Funding can be provided for organisations from the "INCO target countries" i.e. the large majority of emerging, transition and developing economies.

The next call for proposals will be published in summer 2005. The deadline for submitting the proposals is expected to be in November 2005.

FP6 – SPECIFIC MEASURES FOR INTERNATIONAL CO-OPERATION

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