EUROPEAN SCIENCE FOUNDATION
SETTING SCIENCE AGENDAS FOR EUROPE

EuroBioFund: Conference Report

EuroBioForum II
Connecting Life Sciences

5-7 December 2007, Lisbon, Portugal

FCT Fundação para a Ciência e a Tecnologia
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

MCTES MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

SIXTH FRAMEWORK PROGRAMME

PORTUGAL 2007

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European Science Foundation

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Our strength lies in the membership and in our ability to bring together the different domains of European science in order to meet the scientific challenges of the future. ESF's membership currently includes 77 influential national funding agencies, research-performing agencies and academies from 30 nations as its contributing members.

Since its establishment in 1974, ESF, which has its headquarters in Strasbourg, with offices in Brussels and Ostend, has assembled a host of research organisations that span all disciplines of science in Europe, to create a common platform for cross-border cooperation.

We are dedicated to supporting our members in promoting science, scientific research and science policy across Europe. Through its activities and instruments ESF has made major contributions to science in a global context. The ESF covers the following scientific domains:

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- Life, Earth and Environmental Sciences
- Medical Sciences
- Physical and Engineering Sciences
- Social Sciences
- Marine Sciences
- Nuclear Physics
- Polar Sciences
- Radio Astronomy Frequencies
- Space Sciences

EuroBioForum

The EuroBioForum is an annual forum where researchers, funding organisations and other stakeholders thoughout Europe meet to discuss future life sciences priorities. Identification of these life sciences topics is based on ideas put forward by the life sciences community and by public and private funding organisations across Europe via a Call for Expressions of Interest. Following a selection by an international Steering Committee, the programme for each workshop is then defined in close collaboration with the proposers of the selected topic. The objectives of the workshop could be any or a combination of the following: i) to outline the plan for a new research programme, ii) to define a common strategic research agenda, or iii) to update current funders and sponsors and inform potential new ones.

The workshops are organised in the frame of the EuroBioForum, where a number of other selected topics are presented. In 2007, EuroBioForum II was held on 5 to 7 December, in Lisbon, Portugal, in association with the Portuguese Foundation for Science and Technology (FCT) and the Portuguese Ministry of Science, Technology and Higher Education (MCTES). In 2008, the EuroBioForum will be held from 17 to 19 September, in Strasbourg, France in association with the French Ministry of Research and Higher Education.

EuroBioForum II was organised by EuroBioFund, an ESF-led initiative that aims to support the coordination of life sciences research funding in Europe. It is funded by the European Commission's Sixth Framework Programme (FP6) as a Specific Support Action under contract number LSSG-CT-2005-019009.

Cover: The Vasco de Gama Bridge, Lisbon, Portugal. © Noémia Costa Dias

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Foreword

On behalf of the EuroBioFund and the European Science Foundation, we are very pleased to present the report of the EuroBioForum 2007. This report presents the discussions and outcomes of this second EuroBioForum, which took place from 5 to 7 December 2007 under the Portuguese EU Presidency, with support from the Portuguese Foundation for Science and Technology (FCT), the Portuguese Ministry of Science, Technology and Higher Education (MCTES), and the European Commission through the Sixth Framework Programme.

During the two days of the EuroBioForum, a number of specific life sciences research topics were explored, alongside new strategies for coordinating this research, with high profile speakers and participants from Europe's funding and research community.

Life sciences will be a decisive factor in the 21st century. The exciting new discoveries in this area of science, the progress made with related technologies and their broad application for health, environment and energy research will have a far-reaching impact on the quality of life for European citizens.

In the last decade, life sciences research has undergone a revolution in terms of research approaches, infrastructure needs, technology developments and costs. Furthermore, the mechanisms for funding and investing in life sciences research are rapidly changing.

The EuroBioForum, an initiative of the EuroBioFund, aims to address these challenges by providing a networking forum to bring together funding organisations and life science researchers to help develop strategic research agendas and routes for implementation.

We are pleased to report positive progress in the development of the research topics presented here and strong indications of support from several funders in Europe. We hope that the report of this conference will be useful in discussions on how to address challenges in life sciences funding in Europe and stimulate future action among researchers and research funders.

Dr. John Marks
Deputy Chief Executive,
European Science Foundation

Dr. Wouter Spek
Director,
EuroBioFund

1. Introduction

The 2007 EuroBioForum was the second of such conferences to be organised by EuroBioFund, a Specific Support Action of the European Commission's Sixth Framework Programme (FP6), in cooperation with the Portuguese Foundation for Science and Technology (FCT) and the Portuguese Ministry of Science, Technology and Higher Education (MCTES). Held in Lisbon, Portugal from 5 to 7 December 2007, the EuroBioForum attracted more than 120 participants from across Europe and beyond. Among the participants were representatives from national and intergovernmental research-funding organisations, leading research scientists, policy makers and representatives from foundations, industry and patient organisations.

The primary aim of the EuroBioForum is to bring together selected research topics with potentially interested funders to define the next steps to move forward any topics that require a coordinated European effort. In 2007 in Lisbon, the groups presenting were: 'A Future with Reduced Animal Testing', 'Preparing Europe for the Next Viral Outbreak', 'Tracing the Pathways of Mental Illness', 'The European Vascular Biology Institute', 'Combating Bacterial Pathogenesis and Antibiotic Resistance', and 'Systems Biology to Combat Metabolic Syndrome'. There were short plenary presentations given by a representative from each research topic, followed by dedicated parallel workshops.

During the opening session there were presentations by: Dr. John Marks, Chief Executive, European Science Foundation; Professor José Mariano Gago, Portuguese Minister for Science, Technology and Higher Education; Dr. Patrik Kolar, Head of Unit, Genomics and Systems Biology, DG Research, European Commission; and Dr. Wouter Spek, Director, EuroBioFund. The keynote speakers were Dr. Thomas Hudson, President and Scientific Director, Ontario Institute for Cancer Research, Canada; and Dr. Michael Taussig, Head of the Technology Research Group, The Babraham Institute, United Kingdom.

This report summarises the contributions of the speakers, the discussions within the parallel workshops, and the conclusions from the second EuroBioForum.

The presentations can be downloaded from the website, together with the abstracts, conference programme and participant list at www.esf.org/eurobiofund/lisbon. Regular updates of the follow-up from the conference can be found on the website at www.esf.org/eurobiofund.

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2. Opening Session

José Mariano Gago


John Marks


Patrik Kolar


Wouter Spek

Opening Session

Chair: **John Marks**, European Science Foundation

John Marks, European Science Foundation,
ESF and EuroBioFund
José Mariano Gago, Portuguese Ministry of Science, Technology and Higher Education,
The Lisbon Agenda
Patrik Kolar, European Commission,
EuroBioFund: Building the ERA in Health Research
Wouter Spek, EuroBioFund,
Connecting Europe's Unmet Needs

To help coordinate the efforts of life sciences research funders, the EuroBioForum contributes to the development of the European Research Area (ERA). EuroBioForum II was organised as an event under the Portuguese Presidency of the European Union and the opening session included addresses by Professor José Mariano Gago, the Minister for Science, Technology and Higher Education; Dr. John Marks, Chief Executive of ESF; Dr. Patrik Kolar, Head of Unit of Genomics and Systems Biology at the European Commission; and Dr. Wouter Spek, Director of EuroBioFund.

Dr. John Marks opened the conference with an introduction to the background of the EuroBioFund in the broader context of ESF's mission. This included a brief summary of ESF as a forum for its Member Organisations to have discussions on joint strategies and collaborative actions to advance European science and explore new directions for research at the European level. In undertaking these activities, ESF serves the needs of the European research community in a global context.

Key instruments, such as Forward Looks and the EUROCORES (European Collaborative Research) Scheme are central elements in ESF's strategy, described in the ESF Strategic Plan 2006-2010[1]. Forward Looks, for example, are a foresight-type activity which enables policy makers from ESF Member Organisations in interaction with the scientific community, to develop medium- to long-term views and analyse future research developments with the aim of defining research agendas and priorities for improved science policies at national and European levels.

Dr. Marks emphasised the importance of working with ESF's 77 Member Organisations, which together fund approximately 25 billion euro of research each year.

In the areas of life and medical sciences, one aspect of this work is the EuroBioFund, which aims to 'organise the scientific community to articulate major initiatives in the life sciences that are beyond the reach and scope of national funding agencies'. Involving other funding sources was also key to leveraging sufficient funds to eventually develop large-scale transnational research programmes.

> EuroBioFund is *'an experiment in a new way of defining large scale science in the life sciences… in joining funding from a variety of sources'*
>
> Dr. John Marks

Referring back to a *Nature* editorial that was published at the launch of the EuroBioFund in January 2006, Dr. Marks reminded the audience of the article which stated that 'the EuroBioFund is a positive sign of the Commission's willingness to generate ideas for the European Research Area and serve as a catalyst [2]. It may end up being just a small step towards the ideal, but it is the biggest single step that we have seen for some time'. Dr. Marks hoped that the EuroBioForum would give rise to a number of activities and called on European agencies to give it their full support.

1. www.esf.org/fileadmin/be_user/publications/Plan20062010final.pdf
2. Editorial, *Nature* 2006, Jan 19;439(7074):244

Professor José Mariano Gago described several important achievements made since the launch of the Lisbon Agenda in 2000. This included the securing of the Seventh Framework Programme (FP7) (2007-2013) with a budget of 53.2 billion euro, representing an increase of 63% on the previous Framework Programme at current prices.

There is a stronger emphasis on research themes, such as space, energy and health, along with a more flexible and responsive programme to the needs of industry, which is essential because increasing the investment from the private sector is a key element of the Lisbon Agenda. With the European Research Council (ERC), recently established as an Executive Agency (14 December 2007), the EC now supports, for the first time, bottom-up research at the frontiers of knowledge based on individual excellence.

However, EC funding represents only a small portion of the total spending on research in Europe, and so efforts are now focusing on the internationalisation of national research funding. It is not relevant for every research area but where it is necessary to bring together a critical mass of resources and expertise, horizontal strategies should be supported.

There are however, many challenges, including legal hurdles, different funding and evaluation systems, and the alignment of varying national interests. Furthermore, combining national public funding with private sources, either from foundations or industry, brings another level of complexity. In addressing this challenge, the EuroBioFund, must convincingly demonstrate that it can develop new models of combined funding, and that it is indeed a better model than what already exists. It is also important to collaborate with other organisations working on coordinating life sciences funding in Europe.

As a platform for its 77 Member Organisations, ESF is ideally placed to do this. Speaking on the recent progress in research-performing organisations working together politically, including the German Max-Planck-Gesellschaft, the Spanish National Research Council (CSIC) and the French National Centre for Scientific Research (CNRS), Professor Gago added that there now exists an 'extraordinary opportunity' to build on this new type of trust. ESF must also continue to work closely with the European Heads of Research Councils (EUROHORCs).

Professor Gago ended by saying that 'ESF must not fail this time. We must give it full support to ensure that this initiative is a success'.

Dr. Patrik Kolar provided more detail on recent achievements in developing the ERA and explained why supporting initiatives such as the EuroBioForum is a priority for the EC.

Dr. Kolar reviewed the important recent milestones for the ERA in 2007, including the launch of the first call for proposals for FP7, the development of ERA-NET-plus schemes and the agreement by the Council of Ministers on four Joint Technology Initiatives (JTIs), including one on Innovative Medicines (IMI). JTIs are established on the basis of Article 171 of the EC Treaty which allows the Commission to set up Joint Undertakings for 'the efficient execution of Community research, technological development and demonstration programmes'. IMI forms a public-private partnership between the EC and the European Federation of Pharmaceutical Industries Associations.

Dr. Kolar then spoke about the role the EuroBioForum has in the ERA, which 'has already proven its value as a discussion platform, bringing new mature ideas for research programmes in life sciences directly to the national and European funding agencies'.

There are still many questions to be answered including: i) how to streamline individual strategies of different research funding agencies into a coherent plan at the European level, and ii) how to better coordinate European, national and regional efforts in order to overcome the fragmentation and avoid unnecessary duplication. The best way is through dialogue and in this way the EuroBioFund can help make a contribution towards answering these tough questions.

> These research topics *'reveal the strong global dimension of life sciences today and place EuroBioForum itself on a global level'*
>
> Dr. Patrik Kolar

The first session was closed by **Dr. Wouter Spek** who spoke about the background to EuroBioFund and its key objectives. The EuroBioFund developed from a key recommendation of a 2004 European Commission conference (Funding Basic Research in the Life Sciences: Exploring Opportunities for European Synergies), which urged that an annual funders' forum be established to discuss the new challenges in the life sciences with the scientific community in order to agree on the best funding strategies to address them[3]. This is precisely what EuroBioFund has been striving to do with the annual EuroBioForum in the life sciences area.

Dr. Spek explained that the EuroBioFund is basically about networking and sharing information; more specifically, it is about cross linking networks and getting stakeholders together to address unmet needs. A greater focus on networking is an essential step

3. http://ec.europa.eu/research/health/genomics/funding/pdf/fund_genomics.pdf

towards more sustainable financing, which is about identifying and securing potential financial sources for a longer period of time.

The financial landscape for life sciences research is changing in Europe. Charities and foundations, now represented by the European Foundation Centre[4], are playing an increasing role in setting research agendas. The EC and the European Investment Bank have developed the Risk Sharing Finance Facility (RSFF) as part of the Seventh Framework Programme, which will use loans as a tool to support R&D and innovation[5].

> *'EuroBioFund was set up by the European Science Foundation (ESF) to take steps to bridge the gap between finance and life sciences research'*
>
> Dr. Wouter Spek

In conclusion, Dr. Spek encouraged participants to actively participate in the workshops and so take the first steps in initiating and facilitating strategic alliances to develop joint strategic research agendas and activities in these key areas of life sciences research.

4. www.efc.be
5. http://ec.europa.eu/invest-in-research/funding/funding02_en.htm

3. Keynotes

Thomas Hudson

Michael Taussig

The two keynote speakers provided an insight into the key challenges involved in organising and running large life science consortia. **Dr. Thomas Hudson**, President and Scientific Director, Ontario Institute for Cancer Research, Canada, spoke about a nascent consortium, which aims to generate a comprehensive description of the '-omics' changes in 50 different tumour types or subtypes. Why is such a consortium necessary?

Cancer is one of the leading causes of death in the world, causing 7.6 million deaths in 2005 (WHO). Based on projections, cancer deaths will continue to rise with an estimated 9 million people dying from cancer in 2015, and 11.4 million dying in 2030. What is needed is a way to accelerate the identification of the genetic changes in cancer, to enable the identification of new therapeutic strategies. The broad goals of cancer genomics research can be summarised as: i) identification of genome changes in tumours that drive cancer progression, ii) discovery of new targets for therapy, and iii) drug selection based on the genomics of the tumour.

A number of pilot studies on cancer genomics have been undertaken that demonstrate the strengths of using large-scale genomics. In John Hopkins University, a group sequenced about 13000 genes in tumour tissues from colorectal and breast cancer patients. They reported finding potentially significant mutations in nearly 200 different genes, demonstrating the enormous heterogeneity that exists both within and across tumour types, which may explain the challenges in treating patients effectively[6]. Several lessons have been learned from such pilot studies, including the importance of sample quality and the high rate of abnormalities within tumours.

To lay the groundwork for the proposed International Cancer Genomics Consortium (ICGC), a meeting was called by several supporting organisations, including among others, the Ontario Institute for Cancer Research, Genome Canada and the National Cancer Institute (USA) in October 2007 to exchange knowledge and discuss opportunities for developing a consortium that would generate a comprehensive atlas of genomic abnormalities in cancer.

Explaining the rationale behind such an ambitious international initiative, Dr. Hudson pointed out that the scope was so huge that no country could generate a comprehensive database for all tumours. In addition it would help minimise duplication of efforts, whilst increased standardisation could allow the merging of databases and the detection of additional targets.

A number of challenges face the setting up of the ICGC consortium such as: data management; sample quality, size and informed consent; intellectual property; and publication policy. Overcoming these challenges would enable the generation of a comprehensive catalogue of somatic changes in major cancers which would be a 'powerful driver for cancer research and clinical practice for decades'. Early clinical benefits would be the stratification of tumours to allow better prediction of prognosis and response to therapy and longer term benefits would be the development of new and more effective targeted therapies.

Dr. Michael Taussig, Head of the Technology Research Group, The Babraham Institute, Cambridge, United Kingdom, spoke about an already established consortium, ProteomeBinders. ProteomeBinders is a European consortium that aims to establish a comprehensive infrastructure resource of binding molecules for detection of the human proteome, together with tools for their use and applications in studying proteome function and organisation. A FP6 Research Infrastruc-

6. Wood L D et al, *Science* 2007, Nov 16;318(5853):1108-13

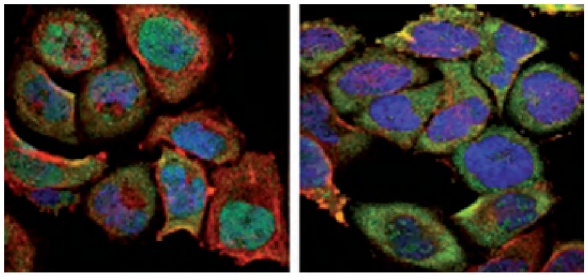

Fig 1. Immunofluorescence of protein expression in human cell lines: a) protein kinase anchor protein; b) renin receptor precursor (from the Human Protein Atlas, www.proteinatlas.org).

ture Coordination Action, ProteomeBinders began in March 2006 and links 26 EU partners together with two partners from the United States[7].

Binding molecules, e.g. antibodies, are among the most essential reagents in biomedical research and an area where Europe has made breakthrough achievements. It is essential to create – for the first time – a comprehensive, standardised binder collection. These tools could then be used to explore protein expression and function in health and disease.

> *'Turning ProteomeBinders into a full-blown large scale reagent-generation program can drive the field and incite additional efforts in and outside Europe'*
>
> Editorial, *Nature Methods*, January 2007[8].

Addressing the question 'What is proteomics?' it was defined as being the expression, localisation, interactions, modifications, actions and structure of all proteins. While the human genome has approximately 24 000 genes, it is estimated that the number of proteins could be anywhere in the region of 10-100 times this. Another challenge, in addition to the number of undiscovered proteins, is the low concentration of many proteins, such as interleukins, so that highly sensitive protein detection methods are required. Currently, only a very small part of the proteome is covered by available binding molecules, e.g. antibodies. As a result a large number of new binding molecules are required and must be linked with protein-detection tools capable of high sensitivity, wide dynamic range and multiplexing.

As Dr. Hudson described in his talk, standardisation is a key issue for ProteomeBinders, and Dr. Taussig emphasised the importance of 'creating a gold standard for binder quality control and validation'.

It was outlined how a European binders infrastructure could operate. It would involve as a central core a 'validated binder collection', which would be subject to quality controlled production (new and existing) at various centres in Europe. There would also be a major database linked to the 'validated binder collection' with a tool box of technologies, to lead to the generation of new knowledge of the proteome.

Despite the challenges of the programme, the benefits of having such an infrastructure in Europe would be three-fold: i) access: for proteomic researchers to essential tools; ii) discovery: definition of new drug targets and biomarkers, which could feed into the biotechnology and pharmaceutical industries; and iii) applications, e.g. to biobanked samples.

7. www.proteomebinders.org/
8. Editorial, *Nature Methods* 2007, Jan;4(1):1-2

4. Brokerage Sessions

Plenary and Brokerage Sessions

Plenary Chair: **Wouter Spek**, EuroBioFund

Bart Sangster and **Jos Kleinjans**, *A Future with Reduced Animal Testing (ASAT)*
Jerome Weinbach, *Preparing Europe for the Next Viral Outbreak (V2 Task Force)*
David Nutt, *Tracing the Pathways of Mental Illness (METPETS)*
Alain Tedgui, *The European Vascular Biology Institute (EVBI)*
Christopher Bayliss, *Combating Bacterial Pathogenesis and Antibiotic Resistance (GVG-NET)*
Roel van Driel, *Systems Biology to Combat Metabolic Syndrome (SBMS)*

Rapporteurs:
Fiona Kernan *(ASAT, GVG-NET)*,
Sandra Pinto-Marques *(V2 Task Force, SBMS)*,
Catarina Resende *(EVBI, METPETS)*.

The central focus of the EuroBioForum was the presentation of six research topics that were first introduced in a plenary session to the EuroBioForum participants and developed further in dedicated parallel workshops. The workshops were attended by between 15 and 35 representatives from research-funding organisations, industry, academic research institutions and government ministries.

4.1 A Future with Reduced Animal Testing

The afternoon plenary session of 6 December opened with a presentation on 'A Future with Reduced Animal Testing' by **Professor Jos Kleinjans**, Maastricht University, NL, and **Dr. Bart Sangster**, former Senior Vice-President, Safety and Environmental Assurance, Unilever, UK.

The key objectives of Assuring Safety without Animal Testing (ASAT) are: i) public health and environmental protection based on health risk assessment; ii) development of experimental models; and iii) generation of data and information for risk assessments, exploiting the opportunities presented by new technologies.

There is an increasing demand to eliminate animal testing and generate improved data for risk assessment, based on societal expectations, changes to regulations (REACH; see box), and pressures on the pharmaceutical industry, where many new drug candidates fail because of their high toxicity.

Bart Sangster

What is REACH?

REACH is the new EU regulation on Registration, Evaluation, Authorisation and Restriction of Chemicals. It entered into force on 1 June 2007. The main aims of REACH are to improve the protection of human health and the environment from the risks that can be posed by chemicals, the promotion of alternative test methods, the free circulation of substances on the internal market and enhancing competitiveness and innovation. REACH requires the systematic testing of all chemicals that were put on the market prior to 1981, as well as all new chemicals manufactured or imported in quantities greater than 1 tonne a year (estimated to be 30 000).

http://echa.europa.eu/reach_en.html

Given this situation, together with recent advances in '-omics' technology and systems biology approaches, it was explained that a programme such as ASAT was highly feasible but was a huge effort, which would require investment and collaborations between partners unaccustomed to working together.

During the workshop, Dr. Sangster and Professor Kleinjans presented more detailed information on ASAT from its objectives and justification, to the proposed business models for development and implementation, and debated various aspects of the programme with participants, including the next steps to be taken in 2008.

In his presentation, Dr. Sangster described the proposed model for implementation; a comprehensive programme, managed by strong leadership with many projects carried out in parallel including development of new risk-assessment paradigms and identification of

the underpinning biological mechanisms, linked to new insights from clinical medicine. He also reviewed the support that ASAT has received to date, including from the Dutch National Academy of Science, the Netherlands Genomics Initiative and Maastricht University, the latter of which has offered to act as the hub for the Netherlands network. Ultimately, ASAT has to be an international consortium and developed in openness and transparency.

> *'Sooner or later this was supposed to happen: be bold and do it'*
>
> Dr. Ben van Ommen, TNO Quality of Life, NL

Professor Kleinjans then presented further details on the ASAT research programme, explaining the potential application of toxicogenomics in the development of alternative testing methods. The potential deliverables include: i) in vitro assays for human hazard identification validated in vivo, by interacting with clinical trials and pharmacotherapy, and by performing exploratory studies among human volunteers; and ii) a pan-European knowledge infrastructure for improving environmental health through innovative and robust science-based safety assessments of substances.

In the discussions and reactions to the presentations, which were very positive, a number of issues were addressed. The first was whether the objective of ASAT was to eliminate *all* animal testing. Professor Kleinjans replied by saying that the primary aim is not necessarily to do this, but rather to create a better scientific basis for risk-assessment procedures. He added 'given the policy on alternatives, it is not about replacing, but also about refining and re-using'.

With regard to feedback on the business plan presented, which was well received, one participant highlighted that demonstration of affordability was important. In response, Professor Kleinjans said that the business plan would explain the economic value in commercialising the research. 'ASAT may play a role as an outsourcing partner for the pharmaceutical industries' he added. The importance of data collection was also raised by another participant, who pointed out that there were a number of huge projects in Europe with '-omics' databases. While agreeing with this point, Professor Kleinjans added that the issues of data sharing and intellectual property would have to be addressed.

Another participant commented that they were very pleased with the overall proposal but recommended that industry be involved at an early stage. There was general agreement on this, with an acknowledgement that moving forward with industry – as advisers, not necessarily as financiers – was a critical element for the success of ASAT.

In conclusion, ongoing Sixth and Seventh Framework Programme projects in this field will be brought together in the first quarter of 2008. In parallel with this, there will be communication with industry-representative organisations to establish links. In addition to this, finance will be sought for the business plan and there will be further workshops early 2008 in the Netherlands to explore both the research programme and funding possibilities.

4.2 Preparing Europe for the Next Viral Outbreak

The second speaker on the afternoon of 6 December, **Dr. Jerome Weinbach** from Inserm-Transfert, France, presented the V2 Task Force (Preparing Europe for the Next Viral Outbreak). This is a proposed pan-European alliance to develop highly effective strategies against pathogenic viruses. In his introductory slides he convincingly demonstrated, through examples such as Dengue fever, Ebola virus, hepatitis C and West Nile virus, that infectious diseases are a significant threat to human health, causing approximately 15 million deaths worldwide each year.

He then described the two strategies to combat viruses: vaccines and antiviral drugs. However, as Dr. Weinbach pointed out, many viruses exist for which there is no effective treatment and, even for those vaccines which do exist, in the event of a pandemic, global production capacity is inadequate.

Against this background, the V2 Task Force aims to form a network of networks fostering cooperation between highly productive, complementary consortia, for a comprehensive coverage of the antiviral drug issue. Among these networks would be two Sixth Framework Programme projects, focused on antiviral research, VIZIER and VIRGIL.

Jerome Weinbach

During the workshop, Dr. Weinbach, together with Professor Jean-Louis Romette, University Aix-Marseille, France, described the objectives and structure of the V2 Task Force in greater detail, before opening the floor to comments and questions from participants.

What are VIZIER and VIRGIL?

VIZIER: this is a FP6 Integrated Project (2004-2008), involving 13 countries, with the objective of identifying new drug targets for RNA viruses, www.vizier-europe.org

VIRGIL: this is a FP6 Network of Excellence (2004-2008). The overall objective is to set up a European Vigilance Network capable of addressing current and emerging antiviral drugs resistance developments, www.virgil-net.org

In addition to the key objective introduced in the plenary session, the V2 Task Force would: i) link FP6 networks to existing national schemes, global surveillance schemes and organistions such as the World Health Organisation (WHO), European Centre for Disease Prevention and Control (ECDC); ii) provide the pharmaceutical industry with centralised management of transnational clinical trials and surveillance, in vitro/in vivo models, biobanks and patient cohorts.

Dr. Weinbach then described the four components of the network: i) surveillance (integrating existing clinical surveillance systems); ii) clinical virology (including clinical trials and central repositories); iii) socio-economic impact (impact of emerging viruses and drug resistance in terms of morbidity, monitoring and treatment costs); and iv) drug search and evaluation (identifying new drugs or new combinations of drugs).

Professor Romette, one of the coordinators of VIZIER (see box) also highlighted the importance of capitalising on the biological banks, libraries and facilities that have been created. He added that 'we have to save the valuable tools that have been created to date; otherwise they will be lost'. The discussions focused on how the proposed consortia could be financed and it was widely accepted that the finance involved was significant. Various options were discussed including lobbying national governments, foundations and international organisations, securing European programmes, via the setting up of an ERA-NET and/or a Joint Technology Initiative on Antivirals (e.g. the EC Innovative Medicines Initiative), and forming alliances with patient organisations and scientific societies.

There was a recommendation to focus on securing the inclusion of the development of antiviral strategies as a call topic, both at a national and European level. Although there was widespread agreement to involve industry, there was a concern, expressed by Dr. Weinbach, that the research data generated would not be freely available to the wider research community.

The issue of partnerships with countries in Africa and Asia was also raised and Dr. Weinbach highlighted the importance of including countries from virus-endemic areas (e.g. China, Turkey, Central Africa). Transferring technology and best practices to lower-income countries in need would also attract additional funding and interest from the development agencies and foundations (e.g. Bill and Melinda Gates Foundation).

Dr. Weinbach closed the session with a summary of the follow-up actions for 2008/9 and a commitment to keep interested participants updated. These actions include a meeting of the coordinators of topic-related FP6 programmes, which are ending (including VIZIER and VIRGIL), a development of a financial structure and the potential launch of the network in early 2009.

4.3 Tracing the Pathways of Mental Illness

Professor David Nutt, University of Bristol, UK, was the final speaker for the afternoon plenary session. METPETS (Measuring Endogenous neuroTransmitter release in human brain with PET and SPECT tracers) is an ambitious programme, that looking for new ways to improve our understanding of brain disorders and discover new treatments. Professor Nutt presented stark figures on the social and economic burden of brain disorders in Europe, which affect 127 million citizens, at a cost of almost 400 billion euro. He added that not only was the incidence of brain disease increasing, but brain mechanisms are so poorly understood, that ideas for new pharmacological treatments are limited.

David Nutt

4. Brokerage Sessions

METPETS aims to address this vital health issue by 'developing technologies to allow us to ask questions about the nature of these disorders and hopefully lead us on the path to better treatment'. METPETS would use PET and SPECT (see box) to develop new technologies to understand neurotransmitter function in the brain. Although radiotracer imaging is a rapidly developing discipline for biomarkers of disease, in the last decade only one tracer for a neurotransmitter in the human brain has been developed, dopamine, which has revolutionised the understanding of addiction, schizophrenia and Parkinson's disease.

The benefits from developing tracers for disorders such as addiction, anxiety and depression, would be three-fold: increasing our understanding of the disease process, providing new leads for drug discovery, and facilitating clinical development.

What are PET and SPECT?

Positron Emission Tomography (PET) and Single Photon Emission Computed Tomography (SPECT) are part of a family of nuclear medicine imaging techniques. They use radionuclide tracer techniques that produce images of the in vivo radionuclide distribution with measurements made with an external detector system. SPECT uses radioisotopes that emit gamma rays, such as thalium-101 and iodine-123, giving a resolution of 10-14 mm. PET, on the other hand, uses positron-emitting isotopes of carbon-11, oxygen-15 and fluorine-18, giving an improved resolution of 5-7 mm.

Source: Lodge M A *et al.*, *Journal of Invasive Cardiology* 2005, Sep 17(9), 491-6.

In the workshop, Professor Nutt was joined by three supporters who gave presentations on i) the state of the art of neurotransmitter imaging and brain disease (**Professor Gitte Moos Knudsen**, Copenhagen University Hospital, DK); ii) dopamine imaging and measurement in patients (**Professor Marc Laruelle**, GlaxoSmithKline, Imperial College London, UK); and iii) the European Brain Council (**Professor Jes Olesen**, President, EBC, Brussels, BE) who underlined his strong support for METPETS.

What is the European Brain Council?

The European Brain Council (EBC) is a coordinating council formed by European organisations in neurology, neurosurgery, psychiatry, basic brain research (neuroscience), as well as patient organisations and industry. It represents a vast network of stakeholders, working in close partnership with the European Commission, the European Parliament and the World Health Organisation (WHO), as well as other decision-making bodies. The EBC was officially founded on 22 March 2002 in Brussels, and has offices in Brussels and Florence.

www.europeanbraincouncil.org

The formal presentations ended with an overview of the work of P1vital Ltd., a contract research organisation that specialises in developing pre-competitive academic-pharma collabarorations in experimental medicine for central nervous system disorders[9]. **Dr. Gerry Dawson** outlined the envisioned role of P1vital Ltd. in METPETS.

Among the issues raised during the open discussion was that of sharing the risk of pre-competitive research. There was general agreement that better and faster progress was possible if industry would share the knowledge, and costs were shared between private and public funding. This was reiterated by another participant who said that 'pre-competitive collaborations are essential to facilitate drug discovery and avoid duplication of efforts'.

Another participant questioned the expected costs of the programme. Professor Nutt replied that it was difficult to predict, but that the estimated cost per tracer was in the order of 5 to 10 million euro. He added that the consortium could spread the work needed in a more efficient way.

> *'Understanding neurotransmitter function, the language of the brain, is the key to understanding brain function'*
>
> Professor David Nutt

In his closing remarks, Professor Nutt announced that there would be two meetings in early 2008 to organise the consortium further, and to design and elaborate METPET's work plan.

9. www.p1vital.com

Alain Tedgui

4.4 European Vascular Biology Institute

Another critical health issue for Europe is cardiovascular disease, which is responsible for almost half of all deaths in Europe (see box for further details). **Professor Alain Tedgui**, who heads a group in Paris working on the role of cell death and inflammation in atherothrombosis, presented an ambitious and exciting proposal for a virtual institute for vascular biology in Europe: The European Vascular Biology Institute (EVBI).

The mission of this institute is to connect and coordinate the leading groups in vascular biology research and so develop new diagnostic and therapeutic treatments for this devastating disease. These areas of research would include developing novel approaches toward stabilising atherosclerotic plaques, searching for biomarkers to identify at-risk patients and exploring the application of regenerative medicine in repairing damaged heart tissue.

To achieve these goals, Professor Tedgui argued that a pan-European structure was needed to assemble the necessary critical mass of expertise and resources and for keeping pace with increasing technological change. Importantly, EVBI would be starting from a basis of the Sixth Framework Programme Network of Excellence (NoE), European Vascular Genomics Network (EVGN)[10].

During the workshop, Professor Alain Tedgui provided more detail on the proposed institute, which he envisages as a platform taking a systemic approach to cardiovascular disease. Central to the structure would be a consortium of academic partners with key stakeholders involved including industry, patient organisations and foundations.

There was further information presented on the short- and long-term objectives of EVBI, funding possibilities and the implementation plan. With regard to funding, Professor Tedgui envisaged that the funding would be supported by three pillars: i) national funding agencies, ii) private and public foundations/charities, and iii) drug/device companies.

10. www.evgn.org

During the discussions, strong support was expressed by both the British Heart Foundation (BHF) and the German Federal Ministry of Education and Research (BMBF). [Support from the Netherlands Heart Foundation has already been expressed].

Cardiovascular disease facts

Cardiovascular disease is a group of disorders of the heart and blood vessels and includes coronary heart disease, peripheral heart disease, rheumatic heart disease and deep vein thrombosis. Cardiovascular disease is the primary cause of death among men and women in Europe with over 1.9 million deaths per year. It is estimated to cost the EU economy 169 billion euro per year. At least 80% of premature deaths from heart disease and stroke could be avoided through healthy diet, regular physical activity and avoiding tobacco smoke.

Source: World Health Organisation

Another participant raised the question of opening up membership of EVBI to those outside the current EVGN consortium. Professor Tedgui replied that at present, membership was limited to EVGN partners, but that this could change in the future.

The issue of Intellectual Property (IP), which is critical for any involvement with industry, was also raised. **Dr. Catherine Clusel**, Inserm-Transfert, another coordinator of EVBI, replied that a one-day meeting with the pharma industry was being organised to discuss IP. She added that the current position was that the return on investment should remain with the institutions that create the IP.

Professor Tedgui closed the meeting with a review of the follow-up actions, which include collecting support letters, defining the governing structure and elaborating the consortium agreement.

4.5 Combating Bacterial Pathogenesis and Antibiotic Resistance (GVG-NET)

The second speaker on 7 December was **Dr. Chris Bayliss**, University of Leicester, UK, who introduced a proposal to set up a European-wide programme for researchers working on genetic variation generators (GVGs) in bacterial pathogens. GVGs, as Dr. Bayliss explained, are factors that increase the rate of production of genetic variation in a bacterial genome and so enable bacterial pathogens to evade preventative and therapeutic measure; examples of GVGS include mutators, repetitive DNA, recombination and lateral gene transfer.

Christopher Bayliss

What are common bacterial pathogens?

Neisseria meningitides: causes bacterial meningitis and is responsible for epidemics. In 2002, an outbreak in Burkina Faso, infected 13 000 people, killing 1 500.

Streptococcus pneumonia: causes many types of infection including pneumonia, meningitis and pericarditis. It is responsible for the deaths of at least 1 million children each year.

Mycobacterium tuberculosis: causes tuberculosis. In 2005, 8.8 million people fell ill with TB and 1.6 million died.

Source: World Health Organisation

GVGs are in all key bacterial pathogens (see box for examples), which are significant causes of illness and mortality worldwide. Given this and other factors, including the rise in antibiotic resistance, and the current explosion in genomic data, Dr. Bayliss emphasised that the timing was right for launching a major European initiative on GVGs in Europe.

The aims of GVG-NET are four-fold: i) to set up a European-wide networking scheme for GVG researchers, ii) to standardise techniques for studying GVGs, iii) to develop an infrastructure for dissemination of GVG data, and iv) to assess the contributions of GVGs to antibiotic resistance, spread and virulence of bacterial pathogens, and to genome diversity.

In summarising the two-hour workshop session, there were presentations by other members of the GVG-NET consortia, to provide further detail on the science, discussions on the outputs of GVG-NET and an outline of the next steps to be taken to realise the goals of this consortium.

Dr. Alex van Belkum, Erasmus Medical Center, NL, spoke about molecular typing and repetitive DNA; **Professor Tone Tonjum**, University of Oslo, NO, gave a presentation on transformation and its contribution to the pathogenicity of bacteria, including Neisseria meningitidis, the meningococcus. **Professor Fernando Baquero**, Ramon y Cajal University Hospital, Madrid, ES, ended with a presentation on mutators and antibiotic resistance. Another important task is to identify and predict the possible evolutionary trajectories of microorganisms in particular environments.

Following these presentations, Dr. Bayliss then reviewed some of the outputs that would result from GVG-NET. These would include: i) fundamental research (i.e. identification of novel GVGs), ii) applied research (i.e. finding new drug targets), and iii) databases (i.e. current GVGs). To illustrate the potential for developing a database, a presentation was made by **Dr. Claus Lundegaard**, Technical University of Denmark, DK.

The discussion was then opened to the floor. In a direct comment on Professor Baquero's earlier presentation, one participant remarked on the issue of raising awareness among medical doctors of the importance of taking regular samples from patients, to track the evolution of bacteria. In response, Dr. Bayliss, said that such a comment highlighted the need for a network; 'we need much more discussion, and there needs to be an inflow of ideas from those working on the fundamental science area and those in the clinical area, so that both sides can understand the critical issues'.

A pharmaceutical representative questioned the benefit for industry, and asked how the knowledge coming out of such a consortium on GVGs could be beneficial. In response, Professor Tonjum said that antimicrobial peptides were an excellent example of a drug that could be developed using knowledge of GVGs. There was significant interest expressed by a number of the companies present to become involved in both pilot studies and database development.

> *'Genetic Variation Generators (GVGs) are an important and fundamental research topic, also of relevance to cancer development, ageing and neurodegenerative diseases'*
>
> Professor Tone Tonjum

One participant recommended that the proposers focus on the management structure and carefully consider the necessary elements for a sustainable network. This was reiterated by a number of other participants.

In his summary remarks, Dr. Bayliss said that potential partners had been identified, and that the key issue of developing a strong business plan would be circulated to other members of the group, so that GVG-NET could be taken a step further in the coming months.

4.6 Systems Biology to Combat Metabolic Syndrome

The final research topic presented was 'Systems Biology to Combat Metabolic Syndrome' (SBMS), by **Professor Roel van Driel**. Metabolic syndrome is a cluster of clinical disorders, including obesity, insulin resistance and hypertension, which is on the rise in Europe. Given its prevalence, metabolic syndrome has a significant societal and economic impact. To effectively address it, SBMS proposes a novel joint European programme over a period of 10 years, which will combine the rapidly growing systems biological expertise with biomedical research efforts on metabolic syndrome.

SBMS's key objective is to develop a true understanding of the syndrome, to allow the development of rational and effective therapies. As Professor van Driel said: 'understanding' means knowing how the networks of molecules cells and tissues interact in time and space, developing predictive quantitative models for metabolic syndrome and gaining an insight into the underlying principles of the networks.

What is Metabolic Syndrome?

Metabolic syndrome has been described as a 'clustering' of several risk factors for cardiovascular disease, namely obesity (particularly abdominal obesity), abnormal blood lipids (dyslipidemia), insulin resistance and high blood pressure (hypertension). There is no universal definition for the metabolic syndrome and differences exist in the criteria used to diagnose the presence of the metabolic syndrome. One measurement for diagnosis relies on waist circumference and blood triglyceride level. This has been called a 'hypertriglyceridemic waist' and for men is diagnosed as a triglyceride level greater than 2 mmol/l and a waist circumference greater than 90 cm.

Source: World Health Organisation

Professor van Driel pointed out some of the challenges involved including the complexity of the systems, data integration and the current fragmentation of research in Europe, but was confident that, with strong research management and coordination, they could be overcome.

During the workshop session, there was a lively discussion on many aspects of the proposed consortium. Professor van Driel began the session by reviewing the envisaged road-map for SBMS, which comprises four phases: i) develop the governance structure and agree on milestones, ii) start pilot research programme, iii) expand research activities, and iv) execute full-scale research programme.

Roel van Driel

One participant raised the issue of the quality of patient and clinical data, and recommended that a preparatory phase be put in place to address this, by for example, developing Standard Operating Procedures (SOPs). EUMORPHIA, a FP5 programme, which established a three-tier system for their SOPs, was cited as an excellent example.

A comment was made that there needed to be decisions taken on how many patients should be recruited and for how long they should be followed-up.

With regard to the composition of the consortium, after a brief debate, there was agreement that industry should be involved from an early stage. Professor van Driel also emphasised the importance of having clinicians working on metabolic syndrome who, although they were not present at the session, had been contacted and expressed an interest. Regarding the advisory board, there was agreement that it should consist of worldwide experts, and not be limited to Europe alone.

There was an enthusiastic response to the suggestion to have a number of workshops, which would focus on the different aspects of the consortium, including funding, establishing patient lists and planning the pilot projects. Several participants expressed an interest in supporting them financially, pending an elaboration of the workshop themes.

In closing the workshop, Professor van Driel said that this would be done early in 2008, in parallel with an expansion of the consortium to include all relevant representatives.

5. Concluding Session

Stanislav Ehrlich

Closing Session

Edvard Beem

Concluding Session

Plenary Chair: **Wouter Spek**, EuroBioFund

Bart Sangster and **Jos Kleinjans**, *A Future with Reduced Animal Testing (ASAT)*
Jerome Weinbach, *Preparing Europe for the Next Viral Outbreak (V2 Task Force)*
David Nutt, *Tracing the Pathways of Mental Illness (METPETS)* [replaced by Wouter Spek]
Alain Tedgui, *The European Vascular Biology Institute (EVBI)*
Christopher Bayliss, *Combating Bacterial Pathogenesis and Antibiotic Resistance (GVG-NET)*
Roel van Driel, *Systems Biology to Combat Metabolic Syndrome (SBMS)*
John Marks, European Science Foundation

The concluding session provided an opportunity for the leaders from each research topic to give feedback on the brokerage sessions to all conference participants and short summaries of the envisaged follow-up activities in the short term.

Professor Jos Kleinjans (Assuring Safety without Animal Testing, **ASAT**) summarised that the workshop had been very useful, with a clear expression of interest from participants. The first step in 2008 will be to organise a meeting to bring all relevant Sixth and Seventh Framework Programme projects together, and development of the ASAT website as an instrument of communication.

Based on feedback from participants during the workshop on the viral task force for Europe (**V2 Task Force**), the plans for the coming year will be modified. The national funding agencies will continue to be lobbied, with a possibility of using the French Presidency of the European Union to highlight the proposal (June-December 2008). A consultation with the major pharmaceutical players will also be undertaken to establish the basis for a partnership.

Speaking on behalf of Professor Nutt, Dr. Spek reported that the output from the workshop on 'Tracing the Pathways of Mental Illness' (**METPETS**), will be two meetings in the first half of 2008. The first will aim to fully elaborate the proposal, with the setting up of the project management team and securing of other partners; and the second to formalise the research plan. Potential funding will be explored at a European level, possibly through the Innovative Medicines Initiative, and through future partnerships with pharmaceutical companies.

The follow-up actions for the virtual institute to address cardiovascular disease at a European level (European Vascular Biology Institute, **EVBI**) were summarised. The first is to continue collecting support letters, adding to those already received from the Netherlands Heart Foundation and the British Heart Foundation. There will be a one-day meeting between the consortium and the industrial partners to explore routes for partnership and a meeting of the academic research centre to define the legal structure for EVBI.

In early 2008, there will be a follow-up workshop to clearly define the scientific scope of the programme for 'Combating Bacterial Pathogenesis and Antibiotic Resistance' (**GVG-NET**), another important public health care issue. Interest expressed by several potential partners will be followed up in the coming year.

Professor Roel van Driel reported that the meeting had set in motion a number of concrete actions for 'Systems Biology to Combat Metabolic Syndrome' (**SBMS**). There was agreement to draft a white paper in mid-2008, using input from two proposed workshops in March 2008 with researchers and interested funding agencies. Forming a basis for communication to

funders, the white paper will be discussed, along with the administration of the SBMS in late July, with the launch of a joint call at the end of the year.

In his closing remarks, **Dr. John Marks** highlighted the importance of collaboration in addressing key scientific questions. At the level of national agencies, the focus leans naturally more towards the national scientific community, while international collaboration remains in the margins. However, this situation is rapidly changing and having both a shared vision and shared leadership can help drive a move towards further internationalisation of science on a large scale. Europe must continue to develop innovative strategies to overcome the harmful fragmentation of research funding, programmes and policies.

EuroBioForum II was an important step in the development of the presented research topics and it was essential to continue in the coming year what had been started in Lisbon. The conference certainly highlighted the challenges in developing public-private partnerships, but with innovation and hard work, these could be overcome. In conclusion Dr. Marks said that 'ESF must succeed this time. It's not ESF alone, but us together in partnership, in the interest of science in a global context'.

6. Latest Developments

EuroBioForum II aimed to bring together the researchers with representatives from the pharmaceutical industry and funding organisations to assess how the presented initiatives can best be supported. For at least three research topics (of the six presented at the conference) positive progress can be reported.

In January 2008, Professor David Nutt (**METPETS**) received support for two workshops from the Medical Research Council UK and the University of Bristol, UK. The aim of these workshops will be to: i) set up the project management team, and ii) formalise the research plan. Professor Malcolm Anderson, the Pro Vice-Chancellor for Research at the University of Bristol said that *'METPETS is an important initiative which hopes to pave the way for significant advancements in research into the causes of mental illness. I am delighted that it has received such positive support from the European science community and the MRC and I look forward to seeing the initiative develop in 2008'*.

Dr. Chris Bayliss (**GVG-NET**) also received support from the Medical Research Council UK in January 2008 for a workshop with the objective of defining the scientific scope of the programme. Dr. Mark Palmer, the Head of International Policy at the MRC said *'GVG-NET is a promising initiative, addressing the critical issue of understanding how bacterial pathogens mutate their genetic code, and the impact this has on the bacteria's antibiotic resistance and pathogenesis. EuroBioForum was a first step in bringing together the researchers involved, with representatives from the pharmaceutical industry and funding organisations to provide input and advice. The support from the MRC will build on this first step, to facilitate interested parties in the process of developing GVG-NET'.*

On 28 February 2008 the coordinators of **ASAT**, Professor Jos Kleinjans and Dr. Bart Sangster, organised a meeting of the coordinators of relevant FP6 and FP7 funded projects, including those on toxicology, an important pillar of ASAT, in Milan, Italy. The aim was to achieve an overview of the relevant programmes in Europe and the activities of the major international players in the field, to discuss the research needs and explore ways of improving collaboration. A follow-up meeting has been tentatively scheduled for September 2008. For up to date information, refer to ASAT's newly developed website www.ASAT-Initiative.eu

For latest news: **www.esf.org/eurobiofund**

'Science knows no country, because knowledge belongs to humanity, and is the torch which illuminates the world'

Louis Pasteur

Appendices

Appendix I – Abstracts

A Future with Reduced Animal Testing (ASAT)

Kleinjans J.[1] and Sangster B.[2]

1. Faculty of Health, Medicine and Life Sciences, Maastricht University, NL
2. Former Senior Vice-President, Safety and Assurance, Unilever, UK

There is an increasing demand for better chemical safety management in the EU. In particular, there is a demand for the elimination of animal testing, more safety data and a better way to deliver safety, for instance within the context of REACH[(a)]. The arrival of gene-based (genomics) technologies will change traditional regulatory toxicology because it will generate more insight into molecular mechanisms, the underlying toxic mode of actions and dose-response relationships, and will therefore impact on assessing no-effect levels and thus the basis of our current approach to establishing chemical safety. The objective of ASAT is to avoid data generation in experimental animals by adjusting current risk paradigms, by using '-omics technologies', transcriptomics, proteomics and metabonomics in particular, modern information and data management technologies, clinical medicine and systems approaches in biology. ASAT aims to initiate a think-tank which will develop novel theoretical concepts on chemical risk-assessment and from that, design correspondingly required changes in toxicological paradigms, thereby steering RTD activities. ASAT further aims to develop and execute a 'scientific multicentre research programme' that will perform these RTD activities in a coordinated way, thereby focusing on developing novel risk-assessment paradigms and test models such as alternatives to current animal toxicity testing. ASAT will create a 'communication office' which will translate theoretical concepts and scientific results into information accessible for regulators and the general public, communicate with relevant user groups and organise training activities. In order to effectively use available toxicogenomics knowledge and develop the applied systems toxicology paradigm, the ASAT programme will integrate relevant current FP6 research programmes in the areas of toxicogenomics, chemical risk-assessments and alternatives to current animal models for toxicity testing.

(a) http://ec.europa.eu/environment/chemicals/reach/reach_intro.htm

Preparing Europe for the Next Viral Outbreak (V2 Task Force)

Weinbach J.[1], Neyts J.[2], Snijder E.[3], Zoulim F.[4], De Lamballerie X.[5] and Canard B.[6]

1. Inserm-Transfert, FR;
2. Rega Institute, KU Leuven, BE;
3. Leiden University Medical Centre, NL;
4. Inserm, Lyon, FR;
5. Faculté de Médecine de Marseille, FR;
6. AFMB, Marseille University, FR.

The V2 initiative aims at capitalising on the success of FP6 networks (VIRGIL and VIZIER, hence V2) by building a world-class comprehensive task force on highly effective antiviral strategies against emerging viruses, as defined by novel pathogenic viruses or viruses whose clinical importance is rising because of a series of factors that include, specifically, drug resistance (as defined in the 1992 American Institute of Medicine Report). This effort will build a long-lasting, comprehensive consortium capable of addressing all aspects of research on antiviral drugs and encompassing all known or emerging viral pathogens in an integrated and synergistic manner addressing pre- and ongoing pandemic situations. Activities will range from basic research on drug design, target identification, in vitro/in vivo models to translational clinical research for the anticipation and understanding of drug-resistant viruses, and socio-economic strategies to effectively introduce novel antiviral strategies. Moreover, the V2 FP7 activity platforms (surveillance, clinical virology, drug target identification and models, pharmacology, host/pathogen interactions, technological innovation, socio-economic impact) will be supported by transversal tools and services including bioinformatics and mathematical support, legal and ethical expertise, support for clinical trials and studies, a training and dissemination workpackage, a logistical service for large conference organisation, and a business platform for industrial contracts.

Tracing the Pathways of Mental Illness (METPETS)

Nutt D.[1]

1. Psychopharmacology Unit, University of Bristol, UK

We propose to develop a groundbreaking programme, based on the measurement of neurotransmitter release in the human brain using PET and SPECT tracers, which will significantly increase current knowledge of human brain disorders from schizophrenia to addiction and could lead to the development of innovative new treatments. PET and SPECT techniques are currently the only way in which endogenous neurotransmitter release can be measured. However, the challenges of developing new tracers are so massive that only an approach that brings together all the major European nuclear medicine centres will be successful. This programme of work will coordinate and integrate the undoubted expertise of the leading European centres to develop a focused programme for neurotransmitter measurement. Achieving this goal will have a major impact on the understanding of mental illnesses including addiction, the most costly of all medical problems in Europe and some of the least well served by current treatments – see Promoting the Mental Health of the Population: Towards a Strategy on Mental Health for the EU[(b)] – which cites a study of Wittchen & Jacobi (2005) that estimates that over 60 million Europeans aged between 18 and 65 suffer these disorders. It also will help achieve the goals of the EU drugs strategy 2005-2012 and the EU Action Plan on Drugs[(c)] through discovering new approaches to treatment. In addition, new tracers will profoundly benefit the neuroscience community in that they will allow fundamental hypotheses derived from pre-clinical studies about the role of neurotransmitters in normal mental processes to be addressed.

(b) http://ec.europa.eu/health/ph_determinants/life_style/mental/green_paper/consultation_en.htm
(c) www.emcdda.europa.eu/inde.g.cfm?fuseaction=public.Content&nNodeID=6790&sLanguageISO=EN

The European Vascular Biology Institute (EVBI)

Tedgui A.[1] (see below for other proposers)[2]

1. Cardiovascular Research Center,
Hospital Lariboisière, Inserm, Paris, FR

The European Vascular Biology Institute (EVBI) will provide a structure for leading European groups already involved in research on vascular biology and medicine, whose collaboration is currently supported by the FP6 Network of Excellence EVGN (European Vascular Genomics Network), created in January 2004. The common activity within the EVGN has been very fruitful, producing more than 100 novel collaborations between at least two EVGN partners. This is reflected in the number of publications in high-ranking journals emanating from collaborative studies, which has steadily increased since the creation of the EVGN. To further foster integration of partners within the network as well as the expansion of this grouping, three technology platforms were set up in 2005 and were fully operational in 2006. The Bioinformatics platform in Amsterdam, the Proteomics platform in London, and the Zebrafish platform in Milan offered cutting-edge technology, organised hands-on workshops and initiated several collaborative projects within the consortium, focused on the rapid identification of novel molecular targets. In light of the achievements of the EVGN, the consortium partners propose to create a virtual institute for vascular biology and medicine (EVBI) to perpetuate beyond the FP6 funding, the quality and excellence already gathered within the EVGN. The EVBI will seek to secure the necessary critical mass and accelerate multidisciplinary interactions by uniting world-leading basic and clinical institutions from European countries. It will be at the forefront of research in vascular biology and medicine, and will participate in the opening and exploration of novel areas of therapeutic potential in cardiovascular disease. The EVBI will permit us to go a step further towards drug discovery by inviting pharmaceutical and biotech companies to join the academic groups.

2. Bennett M. (UK), Binder B. (AU), Clusel C. (FR), Daemen M. (NL), de Vries C. (NL), Dejana E. (IT), Dimmeler S. (DE), Fleming I. (DE), Hansson G. (SE), Levy B. (FR), Martin J. (UK), Newby A. (UK), Struijker-Boudier H. (NL) and Zeiher A (DE).

Appendix I – Abstracts

Combating Bacterial Pathogenesis and Antibiotic Resistance (GVG-NET)

Bayliss C.[1], Tonjum T. [2] and van Belkum A.[3]

1. University of Leicester, UK
2. Institute of Microbiology, University of Oslo, NO
3. Erasmus Medical Centre, Rotterdam, NL

Genetic variation can be generated by transformation, conjugation, mutation or localised hypermutation (e.g. in DNA repeat tracts). Many bacterial pathogens exhibit strain-to-strain variations in the rate of generation of genetic variation by each of these processes. These strain-to-strain variations are due to differences in the presence and function of specific DNA sequences and gene products ('the genetic variation generators'; GVGs) responsible for mechanistic generation of genetic variation. Understanding the extent of variability is important as genetic variation contributes to persistence of bacterial pathogens in their hosts, to their avoidance of intervention strategies (e.g. vaccine-induced immune responses and antibiotic treatment) and to virulence. Studies in some pathogens have revealed an elevated global mutability in disease-associated isolates, 'mutators', that is associated with mutations in mismatch repair genes. Although a general link between disease and mutator phenotypes is not yet established, DNA repair components are clearly involved in the mechanisms facilitating genome fluidity and adaptation. For intragenomic variation, the relative contribution between spontaneous mutation and horizontal gene transfer is not known. There is therefore a requirement to extend our knowledge of strain-to-strain differences in generation of genetic diversity and to identify the 'generators' responsible for these differences. This research will improve our understanding of the balance between genomic instability and maintenance pathways and of the effects of GVGs on clinical outcomes of bacterial infections. Studies of strain-to-strain variability and the mechanistic basis for generation of genetic diversity have and are being performed in multiple laboratories within Europe but the data is dispersed and often collected by different methods. This programme aims to initiate a European-wide cooperative effort to standardise methods, to provide databases for collation and comparison of data, to generate further epidemiological and mechanistic data on GVGs and to assess the contributions of GVGs to persistence, spread and virulence of bacterial pathogens.

Systems Biology to Tackle Metabolic Syndrome (SBMS)

van Driel R.[1] (see below for other proposers)[2]

1. Netherlands Institute for Systems Biology and University of Amsterdam, NL

Metabolic syndrome consists of a cluster of interrelated common clinical disorders, including obesity, insulin resistance, glucose intolerance, hypertension, and dyslipidemia. Metabolic syndrome develops as a result of an imbalance of energy homeostasis, which leads to insulin resistance and often develops into type 2 diabetes (T2D). T2D, obesity and lipid disorders are major risk factors for myocardial infarction and stroke.

These cardiovascular complications are the primary cause of death in the Western world. In addition, diabetes is the main cause of loss of vision, renal failure and amputation of the lower extremities. Roughly 190 million people are affected with T2D worldwide, a number expected to double in the next 20 years. In addition, there is an alarming increase in the number of children who suffer from the traditionally age-related diagnosis of insulin resistance and T2D.

Metabolic syndrome, like other multifactorial diseases, evidently is too complex to tackle along the lines of classic research programmes. Considering its impact on human well-being and our Western society, it calls for a paradigm shift in biomedical research. Systems biology is a rapidly developing approach that systematically implements the iterative cycle of data-driven computational modelling and model-driven experimentation, resulting in more rational, cost-effective and goal-oriented scientific research. We propose to set up a pan-European programme, spanning a period of 10 years, which combines the rapidly growing systems in biological expertise in Europe with ongoing and new biomedical research efforts in the field of the metabolic syndrome, involving academia, industry, investors and charities.

2. Engel A. (CH), Groen B. (NL), Hohmann S. (SE), Klipp E. (DE), Priami C. (IT), Reuss M. (DE) and Westerhoff H. (UK)

Appendix II – Conference Programme

Wednesday 5 December

19.00-21.00
Welcome Reception/Registration

Thursday 6 December

Plenary Sessions

9:30 - 9:45
Opening and Welcome
John Marks, Chief Executive, ESF

9:45 - 10:10
The Lisbon Agenda
José Mariano Gago, Portuguese Minister for Science, Technology and Higher Education

10:10 - 10:35
EuroBioForum: Building the ERA in Health Research
Patrik Kolar, Head of Unit, Genomics and Systems Biology, DG Research, European Commission

10:35 - 10:45
EuroBioFund
Wouter Spek, Director, EuroBioFund

10:45 - 11:30
Coffee Break

11:30 - 12:00
International Cancer Genomics Consortium
Thomas Hudson, President and Scientific Director, Ontario Institute for Cancer Research

12:00 - 12:30
ProteomeBinders: Establishing a new European Infrastructure of Binding Molecules for the Human Proteome
Michael Taussig, The Babraham Institute, Cambridge, UK

12:30 - 14:15
Lunch

14:15 - 15:15
Introduction to Brokerage Session Topics

1. A Future with Reduced Animal Testing (ASAT)
Presented by Professor Jos Kleinjans, Maastricht University, and Dr. Bart Sangster, former Senior Vice-President, Safety and Environmental Assurance, Unilever

It is estimated that currently, 800,000 vertebrate animals are used each year in Europe for toxicological and other safety studies, in order to guarantee the safe use and efficiency of biological, chemical or other products. This number may strongly increase due to implementation of EU chemical safety policies, e.g. REACH. To prepare Europe for a future with reduced animal testing, while still assuring consumer safety, requires a large scale effort from scientists, industry and governments. ASAT aims to develop a multi-centre research programme to develop new approaches to risk assessment, new in vitro and in silico models and evaluate new technologies for generating data that can be used for risk-based safety assessment.

2. Preparing Europe for the Next Viral Outbreak (V2 Task Force)
Presented by Dr. Jerome Weinbach, V2 General Secretary, Inserm-Transfert

With recent outbreaks of pathogenic viruses, including H5N1 influenza, West Nile, Chikungunya and Ebola haemorrhagic fever, it is clear that viruses pose a real global threat. To be able to survey viral diseases and to respond to emergency situations with effective antiviral drugs, a unique European Viral Task Force is necessary. This would optimise and accelerate the design of the drugs, generate valuable databases for the research community, link the network to global schemes including the WHO and European Centre for Disease Prevention and Control (ECDC) and provide training to researchers and doctors in best practices concerning antivirals.

3. Tracing the Pathways of Mental Illness (METPETS)
Presented by Professor David Nutt, University of Bristol

Neurotransmitters are the chemical signals that relay messages from one brain neuron to another. Excessive or insufficient production of these key chemicals is linked to numerous disorders including schizophrenia, depression and Parkinson's disease. Developing new techniques to follow and measure neurotransmitter release in the brain may reveal the complex pathways involved in brain disorders, leading the way for the development of innovative new treatments. This programme proposes to develop new PET and SPECT tracers for this purpose, through the establishment of a collaborative effort between major European nuclear medicine centers and pharmaceutical companies.

Parallel Sessions

15:30 - 17:30
Session I
A Future With Reduced Animal Testing (ASAT)

Session II
Preparing Europe for the Next Viral Outbreak (V2 Task Force)

Session III
Tracing the Pathways of Mental Illness (METPETS)

20:00 - 23:00
Dinner at the Cultural Centre of Belém

Friday 7 December

Plenary Sessions

8:45 - 9:45
Introduction to Brokerage Session Topics

4. The European Vascular Biology Institute (EVBI)
Presented by Professor Alain Tedgui, Cardiovascular Research Center, Hospital Lariboisière, Inserm, Paris

Cardiovascular disease is the leading cause of mortality in Europe, causing up to half of all deaths in some European countries and is estimated to cost the European Union 169 billion euro each year. This ambitious European collaborative effort aims to unite the world-leading basic and clinical institutions across Europe to secure the necessary critical mass to address critical aspects of cardiovascular disease and therapy. New partnerships with pharmaceutical and biotechnology companies will also be fostered to encourage drug development through technology transfer from the laboratories. By uniting and strengthening existing programmes through EVBI, cardiovascular disease can be jointly addressed on a European level.

5. Combating Bacterial Pathogenesis and Antibiotic Resistance (GVG-NET)
Presented by Dr. Christopher Bayliss, University of Leicester, Professor Alex van Belkum, Erasmus Medical Centre and Professor Tone Tonjum, University of Norway

Many bacterial pathogens are endemic within Europe and are responsible for a significant disease burden which includes meningitis, gastric ulcers and gasteroenteritis. Recent years have seen an elevated incidence of new diseases such as MRSA but also old ones such as Tuberculosis. GVG-NET aims to understand the mechanisms by which bacterial pathogens change ('mutate') their genetic code and to characterise the distribution of strains with differences in these mutational mechanisms. This data will be essential for researchers in both Europe and world-wide for combating antibiotic resistance, pathogenesis and the spread of bacterial pathogens and may lead to new therapeutic targets for addressing these pathogens.

6. Systems Biology to Combat Metabolic Syndrome (SBMS)
Presented by Professor Roel van Driel, Netherlands Institute for Systems Biology and University of Amsterdam

Translating our extensive biological knowledge into strategies to combat diseases is disappointingly slow, due to the extreme complexity of biological systems. Systems biology offers highly promising tools to overcome the complexity hurdle. It systematically exploits the cycle of predictive andquantitative data-driven modeling, to identify the most effective approaches, and model-driven experimentation. We propose the stepwise development of a novel type of highly focused and cost-effective international research programme aiming at understanding one of the most threatening Western world diseases: metabolic syndrome. In this programme clinical and biomedical research is combined with expertise in chemistry, physics, mathematics and system engineering.

Parallel Sessions

10:00 - 12:00
Session IV
The European Vascular Biology Institute (EVBI)

Session V
Combating Bacterial Pathogenesis and Antibiotic Resistance (GVG-NET)

Session VI
Systems Biology to Combat Metabolic Syndrome (SBMS)

12:15 - 13:15
Session Feedback and Closing Remarks
Wouter Spek, Director, EuroBioFund
John Marks, Chief Executive, European Science Foundation

13:30 - 15:00
Lunch

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