EIBIR ANNUAL SCIENTIFIC REPORT 2009

EUROPEAN INSTITUTE
FOR BIOMEDICAL
IMAGING RESEARCH

CONTENTS

EDITORIAL

Dear Members, Dear Colleagues, Dear Partners,

We are pleased to present to you the Annual Scientific Report 2009 of the European Institute for Biomedical Imaging Research, which will give you a review of this year's activities and research projects as well as detailed information on planned future activities.

Over 40 new research institutes have joined the EIBIR Network during 2009, increasing the membership to over 280 research institutes with a focus on biomedical imaging or related disciplines. This number shows that networking activities in our specialty are much needed and highly appreciated, and it reconfirms EIBIR's mission to build a bridge between basic and clinical research, technological and pharmacological development.

During 2009 it became clear that, as the EIBIR Network and activities grow, there is a need for guidance of the various bodies in order to ensure efficiency, well-structured activities and a focused use of resources. Therefore, guidelines have been set up for the various bodies of EIBIR, which have been approved by the shareholder organisations and distributed to the relevant bodies.

The aim of the guidelines is to ensure a more active participation in the activities of EIBIR on the part of the shareholder organisations and industry partners, and to set up a more pro-active, multi-disciplinary Scientific Advisory Board (SAB).

In addition to the guidelines, EIBIR has developed a Strategic Plan for the years 2010 to 2012, with the aim of ensuring the financial viability of EIBIR and its structure and activities. The European Society of Radiology (ESR) has provided significant financial support to EIBIR since its establishment and will continue to do so in the future with a contribution of about EUR 200,000 per year. As the level of services provided by EIBIR has been significantly improved and is much appreciated by the European biomedical imaging research community at large, EIBIR has proposed a concept of modest service package fees to be paid by industry partners, EIBIR Network members and shareholder organisations that benefit from the services provided by EIBIR.

We very much hope that the new concept, which is explained in greater detail in the relevant sections of this report, will find wide support. We are confident that this will ensure a stable future for EIBIR and pave the way for further development of our services and network activities for the benefit of biomedical imaging research with the ultimate goal of improving diagnosis, treatment and prevention of disease.

Many of our new initiatives during 2009 would not have been possible without the continuous support of the European Society of Radiology and our industry partners, who subscribed to the mission of EIBIR and have provided financial support right from the beginning. Starting in 2010, we hope to see the Industry Panel grow, with a number of new industry members taking on active roles in our network, as the new support concept foresees reduced fees to attract a larger number of industry members (see p. 8).

During 2009 we were pleased to officially welcome the European Organisation for Research and Treatment of Cancer (EORTC) as a new co-shareholder organisation of EIBIR. We look forward to a fruitful cooperation and to joining forces in ensuring a better integration of imaging into clinical trials. A first step in that direction has been the creation of the EIBIR Cancer Imaging Working Group, made up of members from the fields of radiology, nuclear medicine and image processing, as a new joint initiative.

More and more European organisations are eager to support and seek cooperation with EIBIR. Negotiations are currently underway with the Cardiovascular and Interventional Radiological Society of Europe (CIRSE) as well as with the European Society for the promotion of Picture Archiving and Communication Systems in Medicine (Europacs), who expressed their wish to join EIBIR as shareholder organisations.

EIBIR's management and coordination of European research projects has increased in 2009, and the team of project managers at the EIBIR office has expanded in order to be able to cope with the growing demand for support, from the project idea and proposal writing to the coordination of project management and dissemination and training activities.

The EC-funded FP6 project that gave start-up support to the establishment of the EIBIR structure was successfully completed in June 2009 under coordination of EIBIR. The end of the project requires a new composition of the Scientific Advisory Board of EIBIR that advises the general meeting and defines the scientific priorities of EIBIR. We are now looking for experts from science and research, with specific experience in the field of biomedical imaging, who are interested in taking on an active role within EIBIR.

During this year, the ESFRI project Euro-BioImaging, a pan-European research infrastructure project aiming to provide access to imaging technologies across the full scale of biological and medical applications, from molecule to patient, has gained significant shape although not without teething problems, with the proposal for the 3-year preparatory phase being submitted in December.

The project is jointly coordinated by EIBIR and the European Molecular Biology Laboratory. More information can be found at: www.eurobioimaging.eu

The two FP7 research projects that were started in 2008 under the coordination of EIBIR, the cell imaging project ENCITE and the breast cancer imaging project HAMAM, progressed well during this year, with their first annual reports submitted to the European Commission and some nice first results published.

Regrettably, two of the projects submitted to the European Commission have not received EC funding, although both of them passed the evaluation thresholds, which demonstrates that competition for research funding in Europe is getting harsher and resources are limited.

However, we are pleased to see the project start of PEDDOSE.NET, a literature survey on dosimetry and the health effects of diagnostic applications of radiopharmaceuticals, in early 2010 and to inform you about new project proposals that were initiated during this year:

A COST Action on imaging and theranostics has been submitted, as well as two proposals to the FP7 HEALTH 2010 call: DETECT, aiming at the development and evaluation of a quantum imaging cadmium telluride breast CT scanner, and EMPIRE, a European multi-modal platform for imaging biomarkers for neurodegenerative disease. In addition, EORTC is leading the preparation of an Expression of Interest to the Innovative Medicines Initiative Call on biomarkers in oncology, in which EIBIR will coordinate the contribution of the imaging community.

We hope you enjoy reading the Annual Report and look forward to your active contribution to EIBIR's activities.

Yours sincerely,

Gabriel Krestin
Chair of EIBIR General Meeting
ESR Research Committee Chairman

Jürgen Hennig
EIBIR Scientific Director

THE EIBIR NETWORK CONTINUES TO GROW

EIBIR is continuously gaining importance and popularity among European and international research institutes active in the field of biomedical imaging research. We have already attracted more than 280 institutions from 35 countries, with the top three countries currently being Germany, the United Kingdom and France. In 2009 alone we gained 51 new members from all over Europe (Spain, United Kingdom, Norway, Sweden, Italy, France, Germany, Switzerland, Greece, Czech Republic, Slovenia, Estonia) and India. We are also pleased to have institutions from new countries like Bulgaria, Macedonia, Cyprus, Egypt and New Zealand on board.

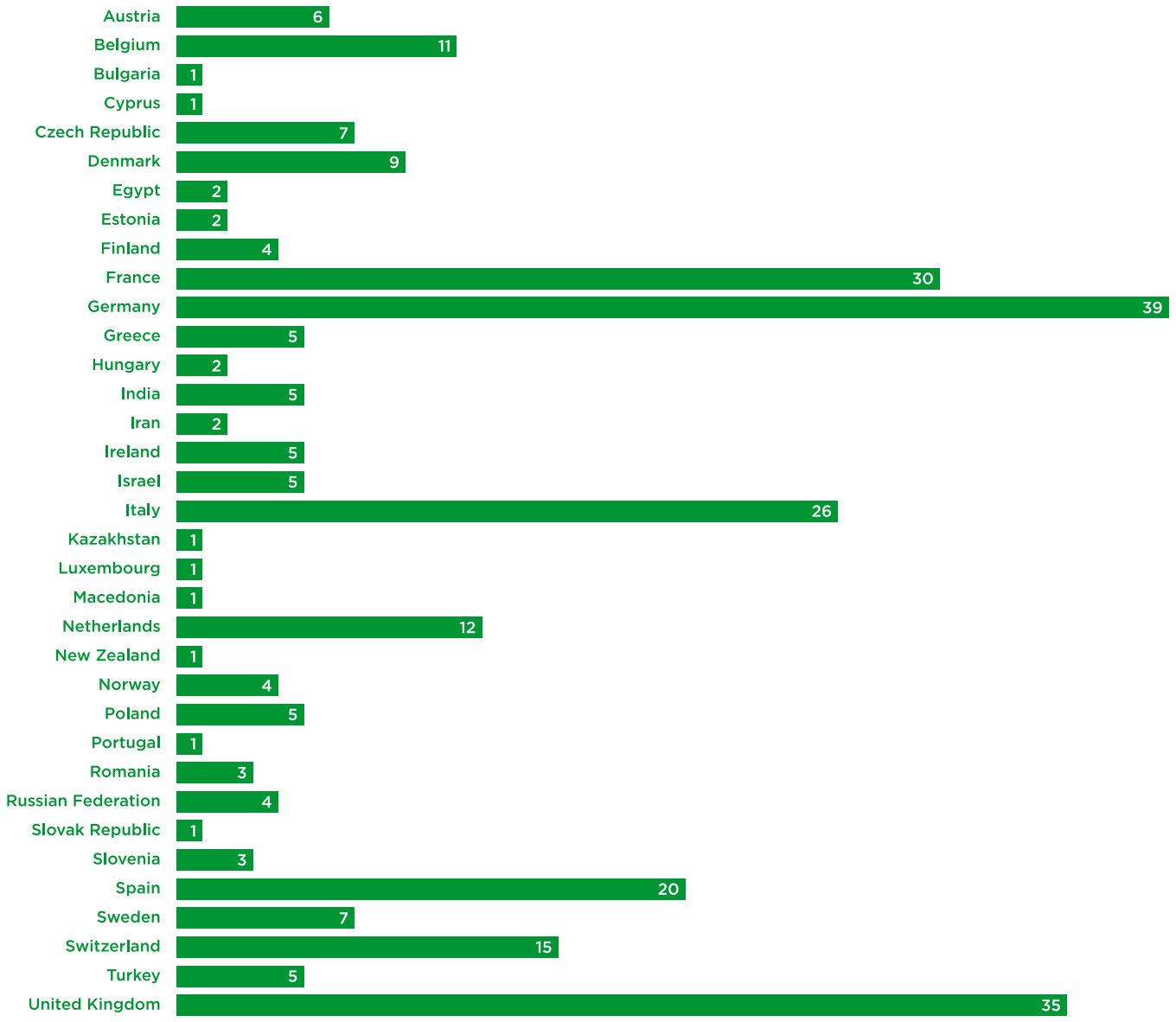
For more information, please visit:
www.eibir.org

EIBIR NETWORK MEMBERSHIP OFFERS YOU MANY ADVANTAGES:

1. the possibility to contact other European research institutions with similar expertise to exchange experiences or ideas
2. access to the restricted members' area containing detailed information on other EIBIR Network members' institutions, facilitating networking activities
3. support with EU projects and advance notice in EU affairs (announcements and calls for proposals)
4. list your ongoing and planned assessment studies and contact other EIBIR Network member institutions in the members' area on our website
5. announce job vacancies on the EIBIR Career Forum free of charge and reach a huge audience.
6. post your events, congresses and conferences in the field of medical imaging, free of charge for EIBIR members.
7. EIBIR Network membership composed of clinical departments (two thirds) and research laboratories (one third), representing a large variety of expertise.

EIBIR NETWORK MEMBERS 2009: 281

as per November 2009



EIBIR INTRODUCES SERVICE FEES FOR NETWORK MEMBERS

EIBIR has established itself as a network with a constantly growing number of research institutions. In order to secure the viability of the organisation as well as maintenance and, consequently, improvement of the services, a sound financial basis will be essential. Therefore, starting in 2010, three different categories of EIBIR service packages will be introduced for Network members.

The fees should be affordable for the research institutions involved and, together with the other sources of funding such as industry and shareholder support, will allow EIBIR to remain operational. We very much hope that the EIBIR Network members will support this strategy and look forward to a fruitful cooperation.

Active Service Package
€ 1,000 per year

This package is intended for all research institutions taking part or intending to take part in one or more research projects coordinated by EIBIR.

It becomes applicable as of approval of the project idea and support in proposal writing by the Scientific Advisory Board or from the moment the Network member joins a consortium coordinated by EIBIR. Within this service package, the services described below are without additional cost, including professional support in proposal writing, the organisation and management of the funding application phase, incl. project planning meetings etc.

After the end of the project or in case of unsuccessful application, it is possible to downgrade to the Regular Service Package. Network members who subscribe to the Active Service Package on a permanent basis enjoy continuous eligibility for support in proposal writing and project management.

Services include

Entitlement to participate in research projects coordinated by EIBIR
Eligibility to become a member of the EIBIR Scientific Advisory Board (upon nomination by the Scientific Director and appointment by the General Meeting)
EIBIR support in consortium composition, proposal writing and project management of new proposed research projects upon approval by the EIBIR Scientific Advisory Board at no additional cost
Access to the online directory of EIBIR Network institutions (currently 280 research institutions, listing detailed fields of expertise, equipment used, assessment studies etc.)
Possibility to post training events and job openings on the EIBIR website
Regular information and updates on biomedical imaging research activities in Europe, EIBIR Newsletter, direct communication channels with Europe's leading biomedical imaging researchers
Possibility to participate in EIBIR's topic-oriented initiatives such as image processing, cellular imaging, the probe development platform, the cancer imaging working group etc. as well as to propose the launch of new initiatives to the Scientific Director
Exchange and dissemination of good practice
Use of EIBIR umbrella and label for the submission of research proposals to funding institutions, e.g. at the national level, and option to apply for EIBIR support in project management etc.

Regular Service Package
€ 200 per year

This package is intended for all research institutions that are interested in an active participation in the EIBIR Network.

Services include

- Eligibility to become a member of the EIBIR Scientific Advisory Board (upon nomination by the Scientific Director and appointment by the General Meeting)
- Access to the online directory of EIBIR Network institutions (currently 280 research institutions, listing detailed fields of expertise, equipment used, assessment studies etc.)
- Possibility to post training events and job openings on the EIBIR website
- Regular information and updates on biomedical imaging research activities in Europe, EIBIR Newsletter, direct communication channels with Europe's leading biomedical imaging researchers
- Possibility to participate in EIBIR's topic-oriented initiatives such as image processing, cellular imaging, the probe development platform, the cancer imaging working group etc. as well as to propose the launch of new initiatives to the Scientific Director
- Exchange and dissemination of good practice
- Use of EIBIR umbrella and label for the submission of research proposals to funding institutions e.g. at the national level

Associate Service Package
€ 100 per year

This package is intended for research institutions that wish to be informed about EIBIR's activities, but for the moment do not intend to play an active role in EIBIR's initiatives and projects. In case of more active involvement, an upgrade to other packages is possible.

Services include

- Access to the online directory of EIBIR Network institutions (currently 280 research institutions, listing detailed fields of expertise, equipment used, assessment studies etc.)
- Possibility to post training events and job openings on the EIBIR website
- Regular information and update on biomedical imaging research activities in Europe, EIBIR Newsletter, direct communication channels with Europe's leading biomedical imaging researchers

EIBIR WELCOMES NEW DISCIPLINES

EIBIR is pleased to officially welcome the European Organisation for Research and Treatment of Cancer (EORTC) as a co-shareholder organisation of EIBIR, thus increasing the number of co-shareholder organisations to five.

In addition, negotiations are currently underway with the Cardiovascular and Interventional Radiological Society of Europe (CIRSE) and the European Society for the promotion of Picture Archiving and Communication Systems in Medicine (EuroPACS), who expressed their willingness to join.

During this year it became clear that, as the EIBIR Network and activities are growing, there is a need for guidance of the various bodies in order to ensure efficiency, well-structured activities and a focused use of resources. Therefore, guidelines have been set up for the various bodies of EIBIR, which were approved by the shareholder organisations and will be published on the EIBIR website shortly.

Co-shareholders are represented at the General Meetings of EIBIR, where major strategic decisions are taken and recommendations are developed for the other bodies and initiatives of EIBIR and are invited to nominate a representative to the Scientific Advisory Board of EIBIR. They are encouraged to promote EIBIR at their scientific/educational events and to inform their membership about their EIBIR shareholdership and provide regular updates on the activities/projects etc. of EIBIR to its membership. Shareholder organisations shall also encourage the research institutes of their specialty to join EIBIR as Network members in order to ensure a strong representation of their disciplines in the network.

The annual General Meeting of EIBIR serves as an open forum to discuss future strategies and cooperation. In order to ensure sufficient momentum and an efficient output of the meeting, shareholder organisations will be asked to provide a brief written review of their activities related to EIBIR as well as of their ideas for future cooperation to the Chairman of the General Meeting prior to the annual General Meeting.

EIBIR looks forward to receiving pro-active suggestions from its shareholder organisations regarding increased interaction and participation in EIBIR's activities.

All of EIBIR's running or planned projects and initiatives at European level involve multi-disciplinary consortia, including many of the professions represented by the shareholder organisations and beyond. The new strategic plan in place in 2010 and the renewal of the Scientific Advisory Board of EIBIR will pave the way for more intense cooperation between the organisations.

On the next page you will find a profile of the five organisations and their involvement in the activities of EIBIR.

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COCIR, the European Coordination Committee of the Radiological, Electromedical and Healthcare IT Industry with headquarters in Brussels, is a non-profit trade association representing the medical technology industry in Europe. COCIR's aim is to represent the interests and activities of its members and act as a communication channel between its members and the European institutions and other regulatory bodies.

EIBIR and its industry partners aim to identify joint interests and possibilities of cooperation in order to establish a sound, long-standing partnership that is of mutual benefit and serves the European research landscape. The re-structured Industry Panel will provide a forum for open dialogue with regard to industry involvement in and support of the activities of EIBIR.
www.cocir.org

The EANM is the umbrella organisation of Nuclear Medicine in Europe. It represents approximately 30,000 professionals working in the sector and is their sole representative body in dealings with the European institutions. As part of its role, the EANM aims to advance science and education in nuclear medicine for the benefit of public health as well as to promote and co-ordinate, throughout Europe and beyond, discussion and exchange of ideas and results relating to the prevention, diagnosis and treatment of diseases through the use of unsealed radioactive substances and the properties of stable nuclides in medicine. One goal of the EANM is thus to provide a suitable medium for the dissemination and discussion of the latest results in the field of nuclear medicine and related specialties.

Cooperation with EANM has been very fruitful since their participation in EIBIR as shareholder organisation. The PEDDOSE.NET project that was approved for EC funding under FP7 and will start in early 2010 under the coordination of EIBIR, will carry out a literature review on the short-term and long-term safety of nuclear medicine diagnostic procedures and involves a consortium of excellence of nuclear medicine institutes. Nuclear medicine will also be represented in the consortium currently established by EORTC and EIBIR for the Innovative Medicines Initiative call on imaging biomarkers for anticancer drug development.
www.eanm.org

EFOMP, the European Federation of Organisations for Medical Physics, currently has 35 national organisations which together represent more than 5000 Medical Physicists in Europe. The mission of EFOMP is to harmonise and advance medical physics at an utmost level both in its professional clinical and scientific expression throughout Europe, and to strengthen and make more effective the activities of the national member organisations.

EIBIR is currently in contact with EFOMP officers to discuss possible avenues for increased collaboration in the future, including raising awareness of EIBIR and its initiatives among the EFOMP member organisations and a more active participation in the activities of the Scientific Advisory Board. The discipline of medical physics is already well represented in ENCITE, the FP7 large integrated project on cell imaging coordinated by EIBIR.
www.efomp.org

The European Organisation for Research and Treatment of Cancer with headquarters in Brussels is both multinational and multidisciplinary, with the present EORTC Network comprising over 300 hospitals or cancer centres in more than 30 countries. The aims of the EORTC are to develop, conduct, coordinate, and stimulate translational and clinical research in Europe to improve the management of cancer and related problems by increasing survival but also patient quality of life.

EIBIR looks forward to a fruitful cooperation and to joining forces in ensuring a better integration of imaging into clinical trials. A first step in that direction has been the creation of the EIBIR Cancer Imaging Working Group as a new joint initiative that will cooperate closely with EORTC. In addition, EORTC and EIBIR are jointly planning the submission of an Expression of Interest to the Innovative Medicines Initiative call on imaging biomarkers for anticancer drug development.
www.eortc.be

ESMRMB, the European Society for Magnetic Resonance in Medicine and Biology, was founded in 1984 as a platform for clinicians, physicists and basic scientists with an interest in the field of MR. It aims to support educational activities and research in the widest sense in the field defined by the Society's name.

The field of Magnetic Resonance Imaging has played a key role in the research management activities of EIBIR right from the beginning. MR is a key modality in the FP7 large integrated project ENCITE on cell imaging, with a number of MR physicists involved in the research work. The ESFRI research infrastructure project Euro-BioImaging coordinated by EIBIR and EMBL involves a large number of disciplines and includes a major node on high-field MR that is coordinated by officers and members of ESMRMB.
www.esmrmb.org

EIBIR INTRODUCES NEW CONCEPT FOR INDUSTRY PARTNERS

Since its establishment in 2006, EIBIR has received support payments from a core group of industry partners in order to facilitate the establishment of its operational structures and to have some starting capital to initiate projects at research level.

Bayer Schering Pharma, Bracco, GE Healthcare, Philips and Siemens were the founding members of the EIBIR Industry Panel. In the first two years they each contributed €50K to support the establishment of the structures of EIBIR, until during the EIBIR Industry Panel Meeting 2008 it was decided to reduce the annual contribution to €35K per company. We regret that Bayer Schering Pharma ended its commitment in 2007.

The support has been used wisely and in a profitable way, for setting up the office structure, developing the EIBIR web space and for strategic planning meetings in order to identify synergies of expertise among EIBIR members, as well as to develop a coordinated research plan.

Now, as EIBIR has become thoroughly established with a great number of services for network members and industry partners, EIBIR has revised its strategy and developed a new business plan for the years ahead in order to ensure a financially viable structure of the EIBIR network.

As part of the strategic plan, industry service packages will be available starting in 2010 in three different categories, involving different service levels and different financial commitment, which will replace the former industry support payments.

This reduced amount of support per company should be attractive to a larger number of industry partners and will allow EIBIR to broaden its liaison with industry in general and also to spread the risk in case of withdrawal of individual industry partners.

The new concept will allow EIBIR and its industry partners to identify joint interests and possibilities of cooperation in order to establish a sound, long-standing partnership that is of mutual benefit and serves the European research landscape.

BRACCO
LIFE FROM INSIDE

GE Healthcare

PHILIPS

SIEMENS

INDUSTRY SERVICE PACKAGES

Starting in 2010, industry service packages will be available in three different categories, involving different service levels and different financial commitment.

GOLD PACKAGE
EUR 10,000 PER YEAR

This category includes the following services

- 1 representative on the EIBIR Industry Panel, regular meetings and direct exchange with key representatives of EIBIR
- Access to the online directory of EIBIR Network institutions (currently 280 research institutions, listing detailed fields of expertise, equipment used, assessment studies etc.)
- Listing as supporting company on the EIBIR website
- 1/2 page research-related advertorial in the EIBIR Annual Scientific Report
- Regular information and updates on biomedical imaging research activities in Europe, EIBIR Newsletter, direct communication channels with Europe's leading biomedical imaging researchers
- Eligibility for participation in research projects coordinated by EIBIR

SILVER PACKAGE
EUR 5,000 PER YEAR

This category includes the following services

- 1 representative on the EIBIR Industry Panel, regular meetings and direct exchange with key representatives of EIBIR
- Listed as supporting company on the EIBIR website
- Regular information and updates on biomedical imaging research activities in Europe, EIBIR Newsletter, direct communication channels with Europe's leading biomedical imaging researchers
- Eligibility for participation in research projects coordinated by EIBIR

BRONZE PACKAGE
EUR 1,000 PER YEAR

This category is reserved for companies with SME status according to EC definition, and includes the following services

- 1 representative on the EIBIR Industry Panel, regular meetings and direct exchange with key representatives of EIBIR
- Listed as supporting member on the EIBIR website
- Regular information and updates on biomedical imaging research activities in Europe, EIBIR Newsletter, direct communication channels with Europe's leading biomedical imaging researchers

We very much hope that we will be able to welcome a large number of new industry partners and are confident that the activities of EIBIR as a European network facilitating state-of-the-art research in biomedical imaging across disciplines will be of great benefit to the companies involved. EIBIR looks forward to a successful cooperation in the coming years!

For application to join the EIBIR Industry Panel, please contact: office@eibir.org

EIBIR'S JOINT INITIATIVES SET AMBITIOUS GOALS AND LOOK FOR ACTIVE MEMBERS

EuroAIM establishes working group on evidence-based radiology

The European Network for the Assessment of Imaging in Medicine was initiated because evidence for rational use of imaging technology is frequently lacking. EIBIR therefore decided to establish a network to assess radiological technology.

In 2009, Francesco Sardanelli from the University of Milan/ Italy, took over the lead of this network. Under his leadership EuroAIM will set up a European working group on evidence-based radiology that will include one representative of each of the ten subspecialty societies of the European Society of Radiology.

The aim of the group will be to assess which topics have been covered by systematic review and meta-analyses over the last 10 to 15 years and which have not. In addition, the group will identify uncovered topics with sufficient original primary studies to be meta-analysed.

EuroAIM will select a number of topics on which systematic reviews and meta-analyses are lacking while primary studies are available, and will define groups of radiologists and non-radiologists to perform these under the coordination of EuroAIM.

As a second step, EuroAIM will select a number of clinical topics on which primary studies are also lacking and will propose to subspecialty societies and/or to EIBIR Network members to carry out these primary studies. The group also plans to assign a group of authors in defining shared rules for issuing European radiological guidelines based on evidence-based radiology, building upon the evidence-based radiology paper published in European Radiology.

Are you interested in the activities of EuroAIM?
Please contact the EIBIR Office at: office@eibir.org

Prof. Francesco Sardanelli
Director of the European Network for the Assessment of Imaging in Medicine

BioMedIA launches EIBIR Winter School

The mission of the Biomedical Image Analysis Platform (BioMedIA) is to represent biomedical image analysis research on a European and international level and to establish educational activities in that field.

The group has launched the first EIBIR Winter School on interdisciplinary biomedical imaging for technical and clinical PhD students. The first edition of the School will be held in Viladrau/Spain in January 2010 and will address two key clinical disease areas: cardiovascular and oncologic diseases.

Are you interested in the educational activities of the EIBIR Winter School? Please e-mail the EIBIR Office at: office@eibir.org

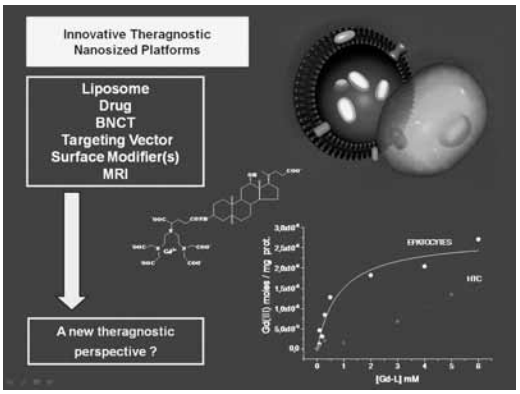
The Biomedical Image Analysis Platform is also actively contributing to the European research infrastructure project Euro-BioImaging, in which image processing and data management will be important nodes (for information on Euro-BioImaging see p. 24).

Prof. Wiro Niessen
Director of the Biomedical Image Analysis Platform

Chemistry Platform submits proposal on theranostics

The Chemistry Platform focuses on the development of imaging probes for medical applications and thus strengthens the liaison between chemistry groups on research and biomedical research teams.

Pre-clinical collaborations will support the focus of this initiative in order to explore new applications in the field of physico-chemical probes thanks to pre-clinical collaborations. The Chemistry Platform offers EIBIR Network members the access to specialised equipment for physico-chemical characterisation of probes.



Imaging and Nanotechnology: a great boost to imaging guided therapies

The Director of the initiative, Silvio Aime from the University of Torino/Italy, has co-ordinated the submission of a COST Action with the aim to develop novel diagnostic/therapeutic agents (theranostics) in September 2009. The European Commission has sent the invitation to submit the full proposal until January 15, 2010. (for more information see p. 28)

If you are interested in participating actively in this platform, please email the EIBIR Office at office@eibir.org

Prof. Silvio Aime
Director of the Chemistry Platform

Cell Imaging Network fosters collaborative activities

The joint initiative is to create an international network of chemists, biologists, physicists, computing scientists and physicians in order to take advantage of important synergies and to close potential gaps in the field of developing and validating imaging tools for in vivo cell imaging.

The key to the successful approach of its mission is to support collaborative research activities on a European level and to initiate workshops and training sessions as well as to create transnational access to state-of-the-art equipment between academic and research institutes, medical centres and industry.

Would you like to play an active role in this network, supporting its goals with your expertise?
Please e-mail the EIBIR Office at: office@eibir.org

Dr. Monique Bernsen
Director of the Cell Imaging Network

EIBIR launches new Joint Initiative to foster collaboration on cancer imaging

Following the accession of the European Organisation for Research and Treatment of Cancer (EORTC) as a new co-shareholder organisation of EIBIR, EIBIR has set up a Cancer Imaging Working Group made up of members from the fields of radiology, nuclear medicine and image processing, as a new joint initiative. The working group is led by Christiane Kuhl from the Clinical Centre for Radiology at the University of Bonn/Germany, and will work in close co-operation with EORTC in order to ensure a better representation of imaging in clinical trials.

If you would like to participate in the activities of the working group, please contact the EIBIR Office at: office@eibir.org

EIBIR – A 'ONE-STOP-SHOP' FOR BIOMEDICAL IMAGING INFORMATION

Thanks to the jump-start of the establishment of EIBIR from the Industry Panel and co-shareholders the network has gathered the leading centres of excellence of the biomedical imaging research community in Europe. With an international consortium of 14 institutes and their expertise in imaging and research management, EIBIR has become the leading network of biomedical imaging research in Europe and is continuously gaining importance and popularity among European and international research institutes.

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WHAT HAS BEEN ACHIEVED?

EIBIR has re-designed its Corporate Identity, and its Internet presence serves now as a 'one-stop-shop' for biomedical imaging information throughout Europe. Details on the technical equipment, scientific expertise and activities of its Network members, described in the members' area database, allow for the pooling of resources and the creation of synergies, in particular when setting up consortia for new research projects.

EIBIR lounge at ECR 2009, Vienna/AT

A special highlight was the development of a database for assessment studies in Europe. This online database helps investigators to find each other and facilitate collaborative efforts and multicentre studies. EIBIR Network members can view the full details of the listed studies and are welcome to upload information on their own assessment studies.

WHAT'S THE SERVICE?

EIBIR is the central hub between researchers, clinicians, industry and international associations and offers to its Network members the exchange of multidisciplinary expertise and information on EU research calls.

The key service is support from project idea to submission, project management, research communication and exploitation as well as research training.

Working meeting at ECR 2009, Vienna/AT

WHAT'S NEXT?

The network has set itself the target of further establishing and supporting educational and exchange programmes for researchers as well as organising workshops and meetings on relevant research subjects.

EIBIR will further establish itself as a renowned organisation representing Europe's multidisciplinary biomedical imaging community. EIBIR, together with the European Molecular Biology Laboratory, is proud to be one of the co-ordinating organisations of Euro-BioImaging, a research infrastructure project on the ESFRI Roadmap 2008, with the aim of setting up a pan-European infrastructure for biomedical imaging.

Within the framework of this project, all national European funding bodies will be approached in order to ensure that biomedical imaging is on their national research agendas and that a coordinated approach is taken meeting the requirements of the wider European community.

In future, EIBIR will aim to play a pro-active role in the elaboration and definition of future research policies and roadmaps at the European level.

EIBIR

Programme:	6th Framework Programme, Priority FP6-2004-LIFESCIHEALTH-5 for Life Sciences, genomics and biotechnology for health
Grant agreement for:	Support Action
Financial EU contribution:	€ 200.000
Project duration:	01.07.2007 – 30.06.2009
Project co-ordinator:	European Institute for Biomedical Imaging Research (EIBIR)
Project partners:	Beaumont Hospital and Royal College of Surgeons in Ireland, IE Charles University Prague, CZ Copenhagen University Hospital at Herlev, DK Creatis-UMR CNRS 5515, Inserm U630, FR Dr. Peset University Hospital, ES Erasmus, NL Innsbruck Medical University, AT Katholieke Universiteit Leuven, BE Universitaetsklinikum Freiburg, DE University of Cambridge, UK University of Pisa, IT University of Szeged, HU Uppsala University, SE

SIXTH FRAMEWORK PROGRAMME

EUROPEAN INSTITUTE FOR BIOMEDICAL IMAGING RESEARCH

ENCITE: CELL THERAPY – A PROMISING RESEARCH FIELD OF MODERN MEDICINE

In order to be able to address the extremely wide variety of cell therapies, the project ENCITE has been divided into generic and disease-oriented objectives. Since the project start, various research activities have been undertaken, and first key objectives have been achieved thanks to a strong collaboration of 26 European institutes and three from Israel, with outstanding scientific expertise in cell imaging.

ENCITE, the European Network for Cell Imaging and Tracking Expertise, comprises five main areas of work, namely novel imaging technologies, novel imaging reporter probes, novel tools for cell labelling, pre-clinical validation, and translation towards clinical application. The mission of ENCITE is to develop and test new MR and optical imaging methods and biomarkers to get a more comprehensive picture of cell fate and the reaction of the immune system and to ultimately improve and further develop cell therapy for the benefit of the European patient.

More than 100 delegates from 19 different countries participated in the first ENCITE Educational Workshop on molecular imaging and accepted the call to gain valuable insights into the subject. First publications on the interim results are available online.

ENCITE

WHAT HAS BEEN ACHIEVED?

SUBPROJECT 1
Novel Imaging Technologies

MR imaging methods for cell tracking based on iron oxides were successfully implemented, and clinical methodologies for preclinical evaluation of novel drugs were adapted and optimised. The image post-processing group generated 3D and 4D datasets from the brain and the heart, recorded under variable conditions using different MRI contrast and spatial resolutions. The aim was to evaluate the usefulness of the chosen imaging and image analysis strategies and to characterise the boundary conditions for successful image processing and analysis, including an articulated atlas for image registration of follow-up studies.

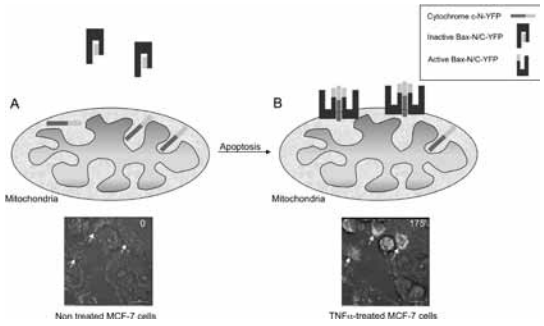
SUBPROJECT 2
Novel Imaging Reporter Probes

The main results achieved within the project so far were the synthesis of iron oxide nanoparticles at gram scale and the synthesis and in vitro testing of an MRI reporter based on detection of beta-galactosidase activity.

Aquous solution of iron oxide nanoparticles under magnetic field
© Jean-Luc Bridot, University of Mons/BE

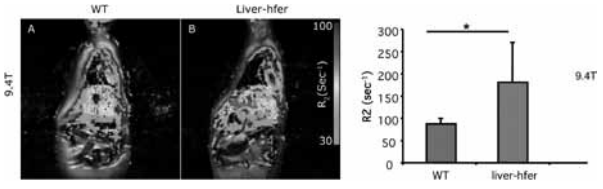
SUBPROJECT 3
Novel Tools for Cell Labelling

Preliminary experiments were successfully carried out regarding novel tools for cell labelling and cell fate imaging (recruitment, differentiation, cell death). Initial cell labelling experiments indicated the ability of porphyrins incorporated in endosomal membranes to induce the endosomal escape of contrast media by UV irradiation of labelled cells.



Imaging apoptosis
© Michal Neeman, Weizmann Institute Rehovot/IL

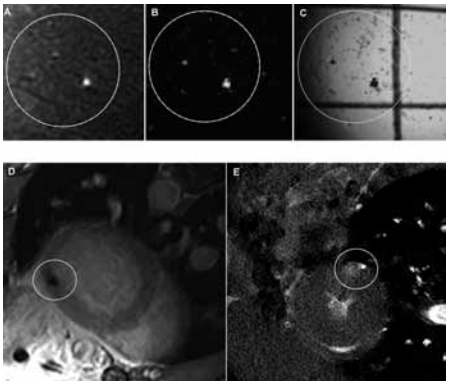
Another highlight is the successful construction of the Adenovirus TK vector. As for cell fate imaging, experiments showed that it is possible to image tumour stroma cell activation and differentiation by fluorescence intravital microscopy.



R_2 MRI contrast in aging liver-hfer mice
© Michal Neeman, Weizmann Institute Rehovot/IL

SUBPROJECT 4
Pre-Clinical Validation

In terms of pre-clinical validation, the main results related to neurological diseases were the design of paramagnetic CEST agents (Communications Exchange on Saturation Transfer) with improved properties for cell labelling purposes.
A transgenic mouse model was generated. The model reports on neurogenesis using a bioluminescent reporter allowing an increase in neurogenesis to be detected after stroke. The major breakthrough related to musculoskeletal diseases is the use of CEST to assess glycose-aminoglycan (GAG) concentration in the intervertebral disc, which may lead to early diagnosis of disc degeneration and a way to monitor repair mechanisms by stem cells.



Magnetic resonance imaging of paramagnetically labelled cells

SUBPROJECT 5
Translation towards Clinical Applications

The main results in the translation towards clinical applications refer to cancer and diabetes: With respect to cancer, the clinical trials that incorporate imaging techniques were approved. In the DERMA-ER-DC 06 trial, several patients already demonstrated broad response to numerous peptides prior to vaccination. Furthermore, tetramer-based 8-colour flow cytometry has become a routine monitoring assay, allowing extended phenotypic and functional characterisation of T-cell subpopulations. The identification of polyfunctional T-cells was of particular interest, since these have been shown to elicit more effective immune responses in HIV vaccination trials. With respect to diabetes, a sequence for the measurement of high resolution MR images at 3T Imager Trio Siemens was developed. The position of labelled pancreatic islets was found to be visible as black spots.

Publications and citations of publishable articles with details on these results are available at: www.encite.org > Press

WHAT'S NEXT?

In the long-term, ENCITE should lead to extensive collaboration on the development of novel imaging tools and implementation at the level of translational medicine across Europe, leading to a significant global impact.

In view of the results within novel imaging technologies, the consortium is confident of reaching the overall goal to provide novel imaging technologies and post-processing tools that will enable more efficient and sensitive diagnostic and scientific tools in the field of cell therapy. The consortium is highly encouraged to facilitate new and groundbreaking developments in the field of cell-based therapies.

Further information on the progress of the project is available at: www.encite.org

ENCITE HAS SUCCESSFULLY COMPLETED THE COMPETITIVE CALL

In order to complement the expertise of the project consortium, ENCITE has sought additional partners to provide input to certain work packages and specific issues. The ENCITE consortium is proud to welcome the new partners: Westfälische Wilhelms-Universität Münster/DE, Katholieke Universiteit Leuven/BE, The Chancellor, Masters and Scholars of the University of Cambridge/UK, Agencia Estatal Consejo Superior de Investigaciones Cientificas, Madrid/ES, Consorci Institut Català de Ciències Cardiovasculars, Barcelona/ES, Vrije Universiteit Medisch Centrum Amsterdam/NL, Universitätsspital Basel/CH.

In addition, the Hebrew University of Jerusalem/IL is also a new partner that has been working with respect to the work package 'Pre-clinical validation regarding musculoskeletal issues', in close co-operation with the Tel Aviv University.

In June 2009, the new partners started their work mainly in the Subprojects 1-3 and give their impetus and strong commitment to the project.

ENCITE EDUCATIONAL WORKSHOP 2010

Make sure to keep up with the news:
the 2nd ENCITE Workshop is envisaged for
May 21-22, 2010!

The programme will be designed and held by the ENCITE consortium and will include progress reports of the project as well as other major aspects and latest advances in the field of cell imaging and tracking. In May 2009, radiologists, medical scientists, physicists, biologists, technicians and phD students, with expertise mainly in MR, optical imaging and probe development engaged in inspiring discussions and exchanged experiences in an interdisciplinary and international environment. For more information, please visit:
www.encite.org > Press

ENCITE

Programme:	7th EU Framework Programme for research, technological development and demonstration
Theme:	Cooperation Health-2007-1.2-4, In vivo image-guidance for cell therapy
Grant agreement for:	Large-scale integrating project (IP)
Financial EU contribution:	€ 11.9m
Project duration:	01.06.2008 – 31.05.2012
Project co-ordinator:	European Institute for Biomedical Imaging Research (EIBIR)
Project partners:	Agencia Estatal Consejo Superior de Investigaciones Cientificas, ES Akademisch Ziekenhuis Leiden – Leiden Universitair Medisch Centrum, NL Consorci Institut Català de Ciències Cardiovasculars, ES Biospace lab, FR Cage Chemicals srl, IT Erasmus, NL Friedrich-Alexander Universität Erlangen-Nürnberg, DE Fundacion Para La Investigacion Medica Aplicada, ES Hebrew University of Jerusalem, IL Institut Curie, FR Institute For Clinical and Experimental Medicine, CZ Katholieke Universiteit Leuven, BE King's College London, UK Max Planck Gesellschaft zur Förderung der Wissenschaften e.V., DE medres - medical research GmbH, DE Radboud Universiteit Nijmegen - Stichting Katholieke Universiteit, NL Tel Aviv University, IL The Chancellor, Masters and Scholars of the University of Cambridge, UK Universidad de Navarra, ES Universita Degli Studi Di Torino, IT Universita Degli Studi Di Milano – Bicocca, IT Universitätsklinikum Freiburg, DE Universitätsspital Basel, CH Université de Mons-Hainaut, BE Université Rene Descartes – Paris, FR Vrije Universiteit Medisch Centrum Amsterdam, NL Weizmann Institute of Science, IL Westfälische Wilhelms-Universität Münster, DE

SEVENTH FRAMEWORK PROGRAMME

ENCITE

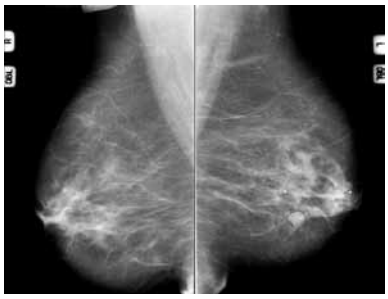
HAMAM: ON THE RIGHT TRACK TO ADVANCED DETECTION AND DIAGNOSIS OF BREAST CANCER

HAMAM – Highly Accurate Breast Cancer Diagnosis through Integration of Biological Knowledge, Novel Imaging Modalities, and Modelling – is a three year project that started in September 2008.

HAMAM

HAMAM LOOKS BACK AT A VERY SUCCESSFUL FIRST PROJECT YEAR:

The clinical goals of the project were discussed and defined in detail, modality specific tasks were described, and the scope of tumour modelling and risk analysis integration was refined and delineated. The clinical workflows and indications were clarified, and a first complete description of all relevant use cases was delivered. A functioning online database prototype was developed and made accessible for storing multi-disciplinary data from all partners. A special highlight was the implementation of a first workstation prototype.



Mammography CAD: tumour detection by the computer
© Nico Karssemeijer, Radboud University Nijmegen Medical Centre/NL

THE HAMAM WORKFLOW

Work Package 1
Clinical and diagnostic requirements

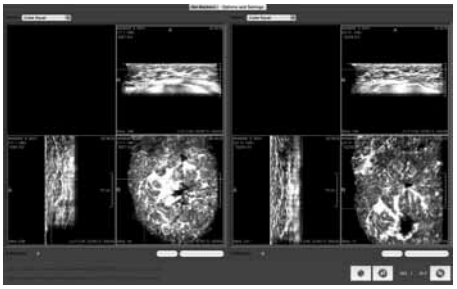
Under the lead of project partner Fraunhofer MEVIS, the aim is to collect and define detailed requirements from a clinical perspective. To secure the clinical practicability, the project can rely on a clinical advisory board, composed of leading experts in the field of breast imaging and breast cancer diagnosis in Europe and the USA. Two project workshops were held with all partners plus the clinical advisory board with the major objective of aligning technical and clinical goals of the project and to combine the two areas in a suitable way.

Work Package 2
Development of multi-modal environment

A first workstation prototype was implemented by the project partner MeVis Medical Solutions that incorporates a new patient-centric workflow as opposed to the traditional examination-centric workflow. This prototype is already capable of providing a first impression of future multi-modality presentation of medical data.

Work Package 3
Imaging spatial correlation

Challenging problems regarding the spatial correlation between imaging sequences were approached. First steps and achievements were related to intra-modality motion correction, both for breast MRI and 3DBUS, to registration of prior and current MRI examinations. This included a first prototype implementation for efficient comparison of images with earlier examinations, and for co-registration between MRI and MG, even though being acquired in very different anatomical configurations.



Annotation application to set corresponding landmarks
© Tobias Böhler, Fraunhofer MEVIS, Bremen/DE

Work Package 4
Model-based analysis of integrated imaging data

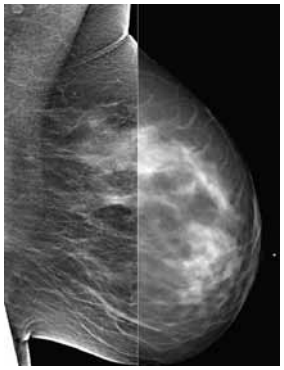
The overall objective is to develop robust methods for extraction of quantitative tissue parameters from multi-modal breast imaging data. Research applications are breast cancer detection, diagnosis, and determination of therapy response. With the clinical advisory board it was decided to focus research on the three most important modalities: mammography, breast MRI, and 3D ultrasound. In addition, for Position Emission Tomography (PEM) efforts will be made to develop lesion segmentation. Research during the first months concentrated on breast MRI. The main aim was the development of a reliable method for bias field correction, segmentation of anatomically relevant regions, and lesion detection.

Work Package 5
Integration of multi-disciplinary data

The ETH Zuerich took the lead in collecting clinically and scientifically required information items to be used for the project and provided a specifically tailored database setup for storing multi-disciplinary case information. Some efforts were to be invested in the build-up of project infrastructure, including solutions regarding data storage and transfer, such that the multi-modal data collection could be taken up by all clinical partners. By the end of year one, several novel and improved algorithms based on the collected data could be developed by the technical project partners.

Work Package 6
Technical validation and verification

The developed novel and improved algorithms and methods based on the collected data are now to be evaluated both from a technical and clinical perspective.



Wavelet-filtering of mammographic images for the accentuation of relevant breast tissues.
Left: enhanced image, right: original unfiltered mammography.

Work Package 7
Clinical validation and verification

As HAMAM aims to provide a clinical workstation this work package is of utmost importance. The clinical partners together with the Clinical Advisory Board help to develop a workstation that fulfils the needs for clinical application.

Work Package 8
Dissemination

The project partners presented their work at several scientific conferences and congresses, including such prestigious events as the European Congress of Radiology 2009, Informatik 2009, the American Society of Clinical Oncology (ASCO) Breast Cancer Symposium and the World Congress 2009 on Medical Physics and Biomedical Engineering.
A highlight was surely a TV documentary on the HAMAM project, broadcasted on EuroNews. The TV documentary is available in different languages on the HAMAM website.

After successful completion of HAMAM, the project partners expect that the developed prototype workstation will implement the final multi-modal workflow and use cases as defined through interactions with the clinical advisory board. All developed and relevant modality-specific and inter-modality algorithms will be available in this workstation. The assessment and diagnosis of multi-modality data will be made possible in a more efficient way, and the assessment of suspicious areas will be more sensitive and reliable.

For more information, please visit: www.hamam-project.org

HAMAM

Programme:	7th EU Framework Programme for research, technological development and demonstration
Theme:	ICT-2007.5.4 – Virtual Physiological Human
Grant agreement for:	Small and Medium Scale Focused Research Project (STREP)
Financial EU contribution:	€ 3.1m
Project duration:	01.09.2008 – 31.08.2011
Project co-ordinator:	European Institute for Biomedical Imaging Research (EIBIR)
Project partners:	Boca Raton Community Hospital, USA Charité Medical University Berlin, DE European Institute for Biomedical Imaging Research, AT Fraunhofer MEVIS, DE MeVis Medical Solutions, DE Radboud University Medical Centre, NL Swiss Federal Institute of Technology, CH University College London, UK University of Dundee, UK

SEVENTH FRAMEWORK PROGRAMME

HAMAM

eHealth

EC GIVES GREEN LIGHT FOR NUCLEAR MEDICINE PROJECT

Another European project coordinated by EIBIR is in its starting blocks. PEDDOSE.NET is dedicated to evaluating the potential health impacts of diagnostic imaging agent doses:

Dosimetry and Health Effects of Diagnostic Applications of Radiopharmaceuticals with particular emphasis on the use in children and adolescents

In April 2009 the consortium of PEDDOSE.NET was invited to open negotiations with the EC for funding of the project within the 7th Framework Programme.

Nuclear medicine contributes significantly to the health, healthcare and quality of life of European citizens, particularly in major clinical areas such as cancer and cardiovascular disease. Every year in Europe, over 6 million patients benefit from a nuclear medicine procedure, 95% of which are diagnostic and 5% therapeutic. The number of procedures will increase in importance and number during the coming years, in particular with the higher number of installed positron emission tomographs (PET) or PET/CT systems and the introduction of new molecules and radiopharmaceuticals through rapid developments in molecular biology and medicine.

The evaluation of the impact on patients' health of small and non-repetitive or less repetitive doses of radioactive substances, as currently used in diagnostic imaging procedures, has up to now not been addressed systematically in a European context. Therefore, the major aim of this project is to provide a comprehensive report on the short-term and long-term safety of nuclear medicine diagnostic procedures including the new ICRP recommendations, epidemiological data and technical aspects of image production. The report will also include recommendations and guideline proposals for the application of radioactive pharmaceuticals to children. Missing data will be identified and proposals will be made for further research and/or clinical trials. The dissemination of results will be organised by EIBIR and its co-shareholder the European Association of Nuclear Medicine (EANM).

As the consortium consists of the leading experts in Europe dealing with dosimetry of nuclear medicine, the results of this support action will lead to improved patient radiation protection, further enhancement of the number of nuclear medicine procedures and an immense increase of knowledge within the European Union.

The project is coordinated by EIBIR and scientifically led by Dr. Michael Lassmann from the University Clinic of Wuerzburg and fully supported by EANM.

PEDDOSE.NET

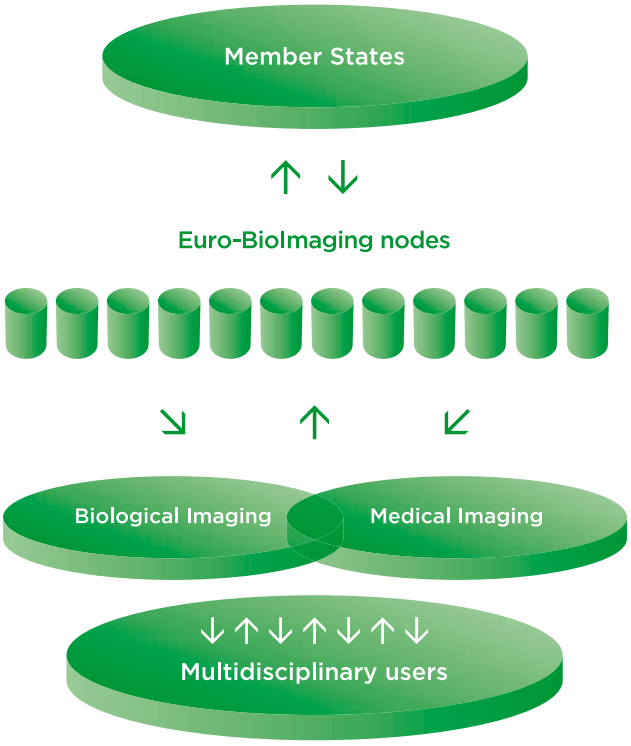
Programme:	7th EU Framework Programme for research, technological development and demonstration
Theme:	HEALTH-2009-1.2-6: Evaluation of the potential health impact of diagnostic imaging agents doses
Grant agreement for:	Support Action
Financial EU contribution:	€ 499.581
Estimated project duration:	01.02.2010 – 31.08.2011
Project co-ordinator:	European Institute for Biomedical Imaging Research (EIBIR)
Project partners:	Bundesamt für Strahlenschutz Berlin, DE European Institute for Biomedical Imaging Research, AT Institut National de la Santé et de la Recherche Médicale, Nantes, FR University Clinic Wuerzburg, DE University Gent, BE

SEVENTH FRAMEWORK PROGRAMME

FIRST STEPS TOWARDS THE DEPLOYMENT OF A PAN-EUROPEAN BIOMEDICAL IMAGING INFRASTRUCTURE

The project Euro-BioImaging: European Biomedical Imaging Infrastructure - from Molecule to Patient is among 10 biomedical science projects on the European Roadmap for Research Infrastructures.

EIBIR and the European Molecular Biology Laboratory (EMBL) will jointly coordinate the new research infrastructure project Euro-BioImaging. The European Roadmap for Research Infrastructures (update 2008) was published by the European Strategy Forum on Research Infrastructures (ESFRI). ESFRI acts on issues related to the development of high scientific quality European research infrastructures and facilitates multilateral initiatives leading to the better use and development of research infrastructures.



Proposed Organisation of Euro-BioImaging

EURO-BIOIMAGING PREPARATORY PHASE

Currently the proposal for the 3-year preparatory phase is being prepared and will be submitted before December 3, 2009. The Euro-BioImaging preparatory phase project consists of 13 strongly interrelated work packages that address the strategic work (WP1-WP5) required to establish the framework for implementation phases as well as technical work (WP6-WP13) required to optimise the nature and quality of the infrastructure.

WP1 Project Management aims to survey and coordinate activities of the Euro-BioImaging project and guarantee a smooth flow of information among project partners and towards the European Commission.

WP2 Legal, Governance and Ethical Issues will determine an organisational and governance model for the Euro-BioImaging research infrastructure as well as a suitable legal structure, also taking ethical issues into consideration.

WP3 Process Plan is to define the scope, role and benefits of Euro-BioImaging, including a coordinated and harmonised plan for the infrastructure deployment in Europe. After the review of current European biomedical imaging resources a plan for the future organisation and infrastructure support for Euro-BioImaging will be drafted.

WP4 Finance Planning will create a concept for funding and financing of Euro-BioImaging, considering financial support from various sources (public/private funding; industry), evaluate the costs for construction and operation and develop a business plan for the implementation phases.

WP5 Networking and Communications will develop communication, integration, and dissemination strategies among users, stakeholders, and the general public. It will also advance communication and relations with policy makers, funding bodies, industry, and scientific communities.

WP6 Advanced Light Microscopy Infrastructure – general access nodes deals with the creation of a distributed and strongly coordinated infrastructure of Advanced Light Microscopy that will provide access to a broad range of imaging methods. Nodes should become reference centres to the European life science communities. Harmonised access protocols and unified training platforms will be created.

WP7 Access to Innovative Technologies – Advanced Light Microscopy aims to search for innovative light microscopy technology developments, which may be included in the future Euro-BioImaging infrastructure. The needs of the scientific community with regard to respective instrument developments and access will be defined and a plan for the implementation of European access to innovative technologies will be developed.

WP8 Molecular Imaging aims to develop and serve a European infrastructure for multi-tracer, multi-modal molecular imaging applications from cells to animals and humans. This work package bridges the gap between basic molecular applications of imaging by advanced light microscopy and medical applications of imaging.

WP9 Access to Innovative Technologies – Medical Imaging aims to develop a distributed infrastructure for Ultra High Field-MR, a disseminated research infrastructure for the refinement and translation of phase-contrast x-ray imaging from bench to bedside, and a research infrastructure to foster the development of emerging new imaging technologies.

WP10 Medical Imaging infrastructure – Patient to Population will develop a long-term, strategic vision of the role and place of novel clinical imaging platforms at the interface between clinical practice and research and provide solutions for networking biomedical imaging in a way that maximises opportunities for the discovery of new diagnostic and interventional procedures. It will further provide evidence based validation of novel procedures for clinical applications and support for the development of a European framework facilitating harmonisation of standards for state-of-the-art image analysis.

WP11 Data management: Aims are to develop concepts for a computing infrastructure for image data generated by present and future biomedical imaging technologies. Database models for quantitative imaging data will be identified. Synergies with other research infrastructures/databases regarding a development of central digital repositories will be evaluated. The work package will also investigate solutions for addressing the specific image processing and analysis needs of the medical and biological imaging communities.

WP12 User Access will develop a framework to provide, facilitate, monitor and maintain user access to the Euro-BioImaging infrastructure. An inventory will be performed of existing or foreseen platforms in core partners and associates of Euro-BioImaging that will be open for external access. Finally policies of the framework will be tested, evaluated, refined and approved.

WP13 Training targets the development of a pan-European training programme in imaging methods for students, postgraduates and senior scientists. A number of basic and advanced courses hosted by the Euro-BioImaging nodes will be established.

PARTNERS

The Euro-BioImaging Preparatory Phase Project consortium will comprise more than 30 partners from 20 countries. New partners of Euro-BioImaging, especially institutions with national support, will be identified during the Preparatory Phase.

For further information, please contact the EIBIR Office at pzolda@eibir.org and visit: www.eurobioimaging.eu

EURO-BIOIMAGING WILL RUN THROUGH 3 PHASES:

Euro-BioImaging Preparatory Phase
(2010–2013; funded by the EC)
Euro-BioImaging Construction Phase
(2013–2017; funded by Member States)
Euro-BioImaging Operation Phase
(2017 onwards; funded by Member States)

EURO-BIOIMAGING

Call identifier:	FP7-INFRASTRUCTURES-2010-1
Work programme topics addressed:	INFRA-2010-2.2.7
Type of funding scheme:	Combination of Collaborative Projects and Coordination and Support Actions for Construction of New Infrastructures – Preparatory Phases
Requested EC contribution:	€ 6m
Estimated project duration:	November 2010 – November 2013
Scientific coordinators:	Gabriel Krestin, EIBIR / Jan Ellenberg, EMBL
Project partners:	EMBL European Molecular Biology Laboratory, DE (Project coordinator) EIBIR Gemeinnützige GmbH zur Förderung der Erforschung der Biomedizinischen Bildgebung, AT Aarhus Universitetshospital, Skejby, DK Åbo Akademi, FI Agencia d'Avaluació de Tecnologia I Recerca Mèdiques, ES Biotechnology and Biological Sciences Research Council, UK Commissariat a l' Energie Atomique, FR Consiglio Nazionale delle Ricerche, IT Deutsche Forschungsgemeinschaft, DE École Polytechnique Federale De Lausanne, CH Eidgenössische Technische Hochschule Zürich, CH Erasmus Universitair Medisch Centrum Rotterdam, NL European Organisation for Research and Treatment af Cancer Aisbl, BE Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung e.V., DE Fundacio Privada Centre de Regulacio Genomica, ES Fundacio Privada Clinic per a la Recerca Biomedica, ES Herrmann Von Helmholtz-Gemeinschaft Deutscher Forschungszentren e.V., DE Imperial College of Science, Technology and Medicine, UK Institute of Molecular Genetics – Academy of Sciences of the Czech Republic, CZ Instytut Biologii Doswiadczalnej im. M. Nenckiego Polskiej Akademii Nauk, PL Istituto Europeo di Oncologia Srl, IT Ludwig-Maximilians-Universitaet Muenchen, DE Max Planck Gesellschaft zur Förderung der Wissenschaften e.V., DE Novartis Forschungsstiftung, Zweigniederlassung Friedrich Miescher Institute for Biomedical Research, CH Otto-von-Guericke-Universitaet Magdeburg, DE The Netherlands Organisation of Health Research and Development, NL Universita degli Studi di Torino, IT Universitaetsklinikum Freiburg, DE Universitair Medisch Centrum Utrecht, NL Universitat Pompeu Fabra, ES University of Dundee, UK Weizmann Institute of Science, IL Westfälische Wilhelms-Universitaet Muenster, DE

NEW PROJECT IDEAS DEVELOPED BY CONSORTIA OF EXCELLENCE IN BIOMEDICAL IMAGING

During 2009, a lot of project ideas have emerged from the EIBIR Network, leading to a number of proposals being submitted or drafted by or under the coordination of EIBIR.

EIBIR LEADS CONSORTIUM TO BUILD BREAST CT SCANNER WITH NOVEL DETECTOR TECHNOLOGY

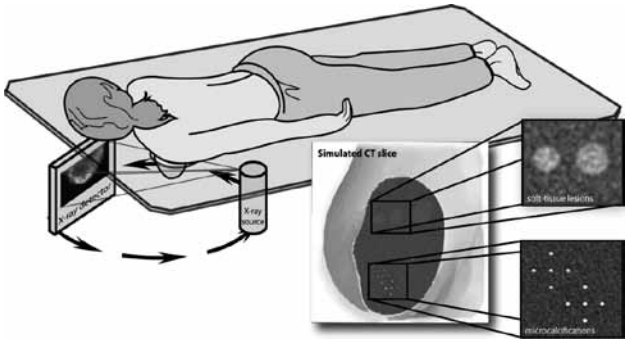
Early detection of breast cancer as well as the selection and follow-up of therapy are still major challenges in modern medicine. Current imaging modalities do not provide sufficient sensitivity and specificity, and the diagnostic performance needs to be improved. A specialised computed tomography (CT) breast scanner is the most likely candidate to provide the necessary solution.

EIBIR has put together a consortium of excellence to submit a project entitled DEteCT for the 2-stage call on 'Tools for the identification and the detection of biomarkers in clinical samples and patients' published within the EU FP7 programme HEALTH. The proposal for stage 1 was submitted in October 2009, with a consortium of 10 partners and EIBIR taking on the role of coordinator under the scientific lead of Prof. Willi Kalender from Erlangen, Germany. Pending positive evaluation by the European Commission, the full proposal will be developed for stage 2, with a submission deadline in February 2010.

The DEteCT project will build a breast CT scanner with new detector technology to investigate its potential in pre-clinical and clinical studies and to compare its diagnostic performance to competing modalities. The project aims to provide a breast cancer imaging modality with capabilities surpassing 2D mammography, and to provide a considerable innovation in quantum imaging detector technology and the potential for detection and analysis of biomarkers in routine diagnostics. The new scanner will be based on innovative cadmium telluride (CdTe) photon-counting, energy-discriminating detector technology. To date there are no comparable technical solutions available. Operation at low x-ray dose will be ensured through the novel detector technology, scanner optimisation and new approaches to image generation. The project will also focus on providing a methodology for the evaluation of the efficacy of breast CT in comparison to competing modalities.

Specific imaging biomarkers in breast imaging are the presence, structure and location of clustered microcalcifications and soft tissue masses. In X-ray mammography, breast cancer is detected in its pre-invasive phase by the presence of microcalcifications.

However, carcinomas can be missed due to the superimposition of fibroglandular tissues that can only be overcome with 3D imaging. Novel applications of DEteCT CT technology in breast imaging will provide the advantage of three-dimensional anatomical visualisation, leading to better detection and characterisation of microcalcifications and soft tissue masses.



In dedicated breast CT, the patient will be scanned in prone position with only one breast exposed at a time with low x-ray dose.
© Willi Kalender, Friedrich-Alexander-Universität Erlangen/DE

NEW PROJECT FOCUSES ON BIOMARKER DEVELOPMENT FOR NEURODEGENERATIVE DISEASES

Neurodegenerative diseases, such as dementia, constitute a major burden on society, both in monetary costs and the suffering of patients and their relatives. Alzheimer's disease, the most common form of dementia, is one of the most devastating healthcare problems facing western society.

The project entitled EMPIRE was also submitted to the 2-stage call on 'Tools for the identification and the detection of biomarkers in clinical samples and patients' published within the EU FP7 programme HEALTH. The proposal for stage 1 was submitted in October 2009, with a consortium of 8 partners and EIBIR as coordinator under the scientific lead of Dr. Sebastien Ourselin from London. Pending positive evaluation by the European Commission, the full proposal will be developed for stage 2, with a submission deadline in February 2010.
The last two decades have seen major technological advances in imaging and imaging biomarkers now play a key role in research and are increasingly seen as important in diagnosis, prognosis, and in the evaluation of treatment with drugs trials. Advances in image acquisition must, however, go hand-in-hand with sophisticated and efficient image analysis techniques and appropriate computing infrastructure, in order to maximise research potential and deliver the most robust imaging biomarkers.

Imaging biomaker in dementia (frontal temporal dementia in this example)

EMPIRE will build on world-leading technologies developed by the partners, to create a European platform for the integration and validation of existing imaging biomarkers in neurodegenerative diseases, and the development of new ones. The project will demonstrate that multi-modal imaging biomarkers provide better sensitivity and specificity for differential diagnosis of the underlying pathology of various dementia types. Novel imaging biomarkers will be developed and validated for early detection, differential diagnosis and the assessment of treatment effects in neurodegenerative diseases, both on their own and in combination with non-imaging features.

The consortium will demonstrate that multi-modal imaging and non-imaging biomarkers enhance the potential for pre-symptomatic identification of persons at risk for various dementia types and that multi-modal imaging biomarkers can reduce by at least 10-25% the sample sizes needed for hypothetical trials of drug treatment of some neurodegenerative diseases.

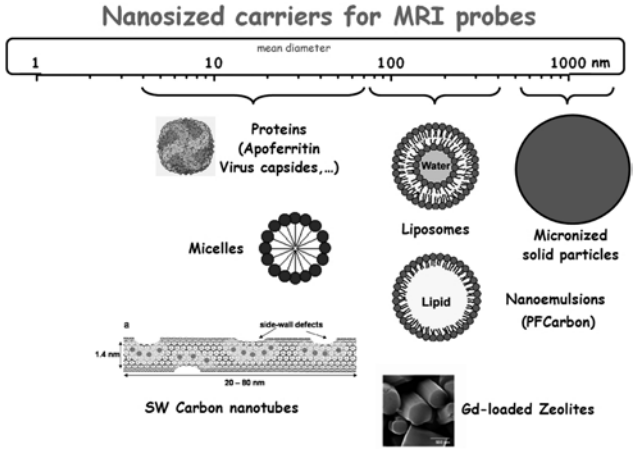
EMPIRE will provide a platform for dissemination, integration, standardisation, development and validation of biomarkers for early detection, differential diagnosis and assessing treatment effects in neurodegenerative diseases.

EIBIR SUBMITS COST ACTION ON IMAGING AND THERANOSTICS

The goal of COST is to ensure that Europe holds a strong position in the field of scientific and technical research for peaceful purposes, by increasing European cooperation and interaction in this field.

Led by Prof. Silvio Aime from the University of Torino, Italy, EIBIR submitted a COST Action on imaging and theranostics in September 2009. The aim of the project is to gather Europe's major research groups in the development of novel diagnostic/therapeutic agents (theranostics). Properly designed agents allow in vivo quantitative assessment of the amount of drug that reaches the pathological region and visualisation of the molecular changes due to the therapeutic effects of delivered drugs. Privileged routes to theranostics delivery are the use of lipidic self-assembled systems, polymeric/inorganic particles, "host-guest" supramolecular adducts and naturally occurring systems like lipoproteins and protein aggregates, viral capsids and even cells. Drug and imaging reporter release from the carrier can be spontaneous or activated by endogenous or exogenous stimuli such as heating, ultrasound or magnetic effects. Interdisciplinary work will enable understanding of the microscopic picture of drug delivery/release and therapeutic effect. The aim of the proposed COST Action is to make image-guided therapies a realistic opportunity in therapeutic treatment of major diseases.

EIBIR has been invited to submit the full proposal until 15 January 2010.



A new EU collaborative initiative to gather chemists and imaging scientists to improve sensitivity and specificity of Imaging probes
© Molecular Imaging Center - University of Torino

IMI PROPOSAL TO DEVELOP IMAGING BIOMARKERS FOR ANTICANCER DRUG DEVELOPMENT

In November 2009, the Innovative Medicines Initiative is expected to officially launch its second call, including the topic of imaging biomarkers for anticancer drug development.

The European Organisation for Research and Treatment of Cancer (EORTC), EIBIR and Cancer Research UK have joined forces to set up a consortium of excellence and to prepare an Expression of Interest to this call, responding to the need to develop a broader range of well-qualified imaging biomarkers for assessing response to new drugs in early clinical development.

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