

Sweden enters the era of large-scale biobanking sciences

Welcome to the first edition of Biobank Sweden, the newsletter of the BioBanking & Molecular Resource Infrastructure of Sweden (BBMRI.se). BBMRI.se is a large-scale national biobanking infrastructure commissioned by the Swedish Research Council. Six Swedish medical universities support us, with Karolinska Institutet as Host University. BBMRI.se is the national hub for Sweden of the European Union biobanking platform BBMRI.eu which has >280 biobanks in >30 countries as members. BBMRI.se is also chairing a NordForsk-supported network of Nordic national biobanks (BBMRI Nordic).

As further described on page 6, BBMRI.se has launched a national biobanking facility (Swedish National Large-Scale Biobanking Facility; SSB). This is the first national biobanking facility where researchers from all over Sweden can deposit samples and where researchers from all over the world can request access to samples - where all the samples are collected according to internationally harmonized formats for quality sample handling and data management. So far, SSB has only one physical site of operation, but we plan to launch a system of SSB satellite facilities all over Sweden to ensure that nationwide biobanking studies will have optimized and standardised biobanking services provided for them.

BBMRI.se emphasizes the scientific aspects of biobanking. Thus, BBMRI.se aims to develop an internationally leading resource center on the science of biobanking, systematically engaging the most prominent expertise in the country for a concerted, high quality research & development of the biobanking infrastructure.

Freezers & liquid nitrogen tanks per se are not particularly valuable, the really unique value is provided by the establishment of a nationwide network of prominent expertise in the biobanking sciences. Expertise in how to collect really valuable samples, how to develop technology for efficient and quality assured sample management and how to develop optimized accessibility and exploitation that ensures that the valuable samples are put to best possi-

ble use for the benefit of the patients are all examples of this. With BBMRI and BBMRI.se, the medical sciences are now finally entering the large-scale sciences. Large-scale or "big" science is the term used to denote scientific projects that are expensive to the extent that they can only be funded on an international level. So far, most large-scale endeavors have been in non-medical areas, but have commonly been motivated by claims that the research will ultimately benefit medical practice. To me, large-scale research in the medical sciences itself seems like a more direct way to promote medical advances.

The most important prerequisite for enabling large-scale sciences is the spirit of collaboration. With the joint application for the BBMRI.se national infrastructure from the medical universities in Sweden, the medical scientific community has taken a very important step towards showing that it is ready to collaborate in order to create a large-scale infrastructure also for the medical sciences.

Sweden has uniquely favorable prospects to take a leading role in the biobanking sciences. For scientific usefulness, biobanks must be followed over time for development of diseases using linkages to population-based and nationwide health data registries. A system that in principle only exists in the Nordic countries. In Sweden and in the other Nordic countries, we also have a long tradition of pioneering work in biobanking sciences. BBMRI.se will build on the existent expertise and infrastructure to develop new strategic advantages for Swedish biomedical industry, medical research and healthcare.



Joakim Dillner,
Director BBMRI.se



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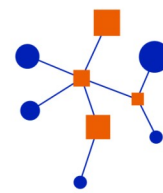
Biobank Sweden is the official newsletter of BBMRI.se (BioBanking and Molecular Resource Infrastructure of Sweden).

To subscribe to biobank Sweden, email info@bbmri.se or visit www.BBMRI.se website where you will find it as a pdf.

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Arnheim Dahlström



Presentation of a BBMRI.se customer

- professor Per Hall, project leader for KARMA.

www.karmastudien.se

The KARMA study (**KARolinska MA-mografi project for risk prediction of breast cancer**) is the largest national breast cancer initiative in Sweden and also one of the largest breast cancer projects worldwide. The goal is to include 100 000 women in the study and make five follow-ups over a ten year period. The aim is to collect comprehensive data on lifestyles factors, systematically collect blood samples and purified DNA and to store mammograms.

The overall aim of Karma is to identify women at high risk of breast cancer. The individual risk of a woman will be measured through bringing together information from risk factors, genetic alterations and mammographic density (measured in a mammogram and a very strong risk factor for breast cancer). In a second step intervention strategies to reduce risk will be developed.

All women visiting the mammography units at the Karolinska University Hospital, Södersjukhuset and Helsingborg Hospital for screening or examination are invited to participate while the Karma study is ongoing. The first test center opened at Helsingborg Hospital 10th of January this year and has already enrolled 3000 individuals to the study. The second

test center will open at Södersjukhuset (Stockholm South General Hospital) in Stockholm 28th of March and the third at Karolinska University Hospital in September this fall.

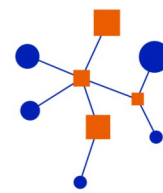
KARMA is a large scale study with national enrollment and is thus ideally matched to the BBMRI.se intention to provide effective and standardized services to large and nationwide studies at the front of international research.

KARMA is funded by Märta and Hans Rausing's Initiative Against Breast Cancer and Vetenskapsrådet (The Swedish Research Council). The first research results are expected already this spring.



Per Hall, professor & project leader for KARMA

Interview by Sofie Petersson



BBMRI.se national facility for the ethical and legal aspects of biobanking

The patients' perspective is the central concern when sorting out the ethical and legal aspects of biobank research. A rapidly growing number of scientific reports bear concrete witness to the great potential of biobank research for the benefit of current and future patients. Well-managed biobanks together with medical registries and datasets with medical and personal information constitute significant resources for health. There are numerous examples of how biobank-based research has resulted in new and improved ways of prevention, screening/early diagnosis or treatment of major diseases such as cancer or rheumatoid arthritis, as recently summarized (1). That biobanks can be used for health-related research is therefore of great significance from the patients' perspective.

Biobank research is based on trustful relationships between doctors and researchers on the one hand and patients and healthy donors of human biological material on the other. Biobank researchers need to attend to this concern, abide to rules of confidentiality and seek necessary approvals from ethical review boards and relevant authorities. However, one must not forget the other side of the coin. Trust must be earned also by legislators, regulatory bodies and review boards. Having regard to the significant benefits to patients, it should be observed that there is also a cost that has to be acknowledged if this research is restricted, e.g. by regulations or review practices regarding informed consent. There are unfortunately several examples of how regulations and ethical review boards do not serve the patients' best interests in improved medical treatment.

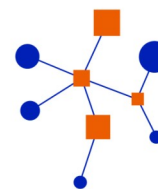
Patients have interests at the beginning, during and at the end of the research process. These interests, e.g. self-determination, integrity, confidentiality, new diagnosis and treatment forms, should be appropriately balanced. BBMRI.se is building a national facility in order to give constructive help to scientists, legislators and review boards in sorting out the ethical and legal aspects of biobank build-up and use. Advice on ethical issues and information is given to individual scientists and to groups of scientists based on internationally and peer-reviewed ethics research published in international quality journals. Information about publications and current projects is available at www.crb.uu.se. We are also addressing new and less researched ethical issues of relevance for biobank research. For example, we are currently doing a comparison of European and International guidelines for biobank research, investigating the relationship to commercial interests and starting a survey of how the Swedish ethical review boards are evaluating applications on biobank research.

The BBMRI.se ethics team at your service presently consist of Professor Mats Hansson, Associate Professor Kathinka Evers and PhD student Joanna Stjernschantz Forsberg. The facility will also employ a legal expert to help develop solutions to different legal problems in biobank research.

1. Hansson MG, Do we need a wider view of autonomy in epidemiological research?, *British Medical Journal* 2010;340:c.2335,1172-1174.



Mats Hansson, professor of
 Biomedical Ethics, Uppsala University & leader
 BBMRI.se WP7 (National facility for the ethical and
 legal aspects of biobanking)



BBMRI: The pan-European Research Infrastructure for Biobanking and Biomolecular resources - the future of biomedical research

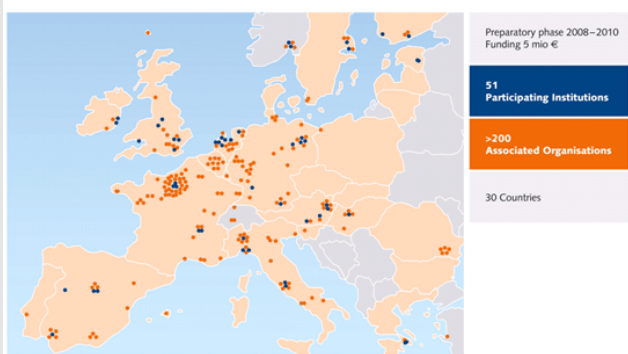
The broad spectrum of existing biobanks is considered a specific strength of European research. Unfortunately, the lack of standardisation of these biobanks and the diverse ethical and legal landscape across Europe has prevented their effective use. Development of common ICT (Information and communications technology) infrastructure and sustainable funding schemes are key features for large transnational projects inter-linking different national and regional biobanks. Agreement on common standards is equally important for all *de novo* biobanks.

In 2008, the pan-European infrastructure BBMRI (www.bbMRI.eu) was established to bring cohesion to the European biobanking community and to make both existing and new high quality biological resources available for health research in Europe.

The work during the BBMRI preparatory phase (BBMRI-PP) has built on previous and ongoing national, European and global projects and initiatives, such as

- 1) research projects funded under FP5 and FP6 as well as new projects under FP7,
- 2) public/private partnerships which are directly related to the needs of BBMRI,
- 3) work on biobank harmonization done by the P³G and PHOEBE consortia,
- 4) the strategic research agenda of the Innovative Medicines Initiatives, the WHO, and the OECD initiative on a global network of Biological Resource Centres.

Participants and Associated Organisations



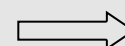
The objective of the BBMRI-PP is to develop a plan to integrate existing quality-controlled biobanks, biomolecular resources and enabling technologies into a novel pan-European biomedical research infrastructure. BBMRI will provide a comprehensive source of information about existing biological sample collections and biomolecular resources, but will also provide an operational concept for a sustainable infrastructure, deliver standard operational procedures for future biobanking and codes of conduct for European biobanks. A particular challenge is the generation of ICT infrastructure capable of linking the existing bi-derived genetic and molecular phenotyping data with data from clinical phenotyping and health-related registries. In the last 2.5 years BBMRI has grown into a 53-member consortium with over 280 associated organizations from over 30 countries, making it the largest research infrastructure project in Europe.

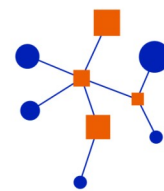
From BBMRI to BBMRI ERIC

The seven Work Packages (WP), fig 1, were responsible for the specific deliverables aimed at integrating the existing quality-controlled biobanks, biomolecular resources and enabling technologies into a novel pan-European biomedical research infrastructure. The operational concept of BBMRI for the next stage will be developed based on the experience gained during the PP.

The distributed hub-and-spoke structure, fig 2, will allow generation of technological platforms in areas such as biological resources, high-throughput techniques and bioinformatics. Such platforms will also foster collaboration between academia and industry in so-called Biobanking Experts Centers.

Hubs are coordinated and directed by an executive management, which is supported by a governance council as well as by a scientific and ethical advisory board and receives input from the stakeholder forum. The ICT infrastructure employs a federated database architecture and will integrate the complex network of hubs, members and associated partners. So far, most biobank infrastructure initiatives on a European level have developed as organisational networking or pure harmonisation efforts in terms of specific data sets. While it is important to raise awareness of the diversity in the field, it will not succeed until a biobank ICT-network is constructed and the full potential of a





biobank infrastructure is realised. A *minimum data set for biobanks* and a *metadata model for biobank hubs* have been developed during the BBMRI PP.

While national initiatives (e.g., BBMRI.SE, BBMRI.NL, BBMRI.IT, etc.) are gathering speed, BBMRI on a European level is proceeding for an official organisation.

ERIC (European Research Infrastructure Consortium) is an instrument specifically designed by the European Commission for the projects in the ESFRI roadmap, allowing consortia to operate in different Member States under a single legislation. An advantage of ERIC is that, as a legal entity and ruled by European legislation, it is exempt from paying VAT and duty taxes. BBMRI-ERIC headquarters will coordinate the activities of National Hubs established in all Member States. Austria has of-

fered to host the administration headquarter and Sweden has offered to host the headquarter on ICT for biobanking.

The National Hubs will become part of the ERIC legal entity and will link the national scientific community (e.g., universities, hospitals, research institutions, resource centers) together. BBMRI-ERIC statutes are essentially ready, but some items remain unresolved and need to be decided at a political level, for instance national contributions to a joint budget and voting rights. Although the decision-making process to join BBMRI-ERIC is still in progress, official commitments towards the construction phase of BBMRI-ERIC have been received from six European Member States and biobanking is on the national roadmap in eight further countries.

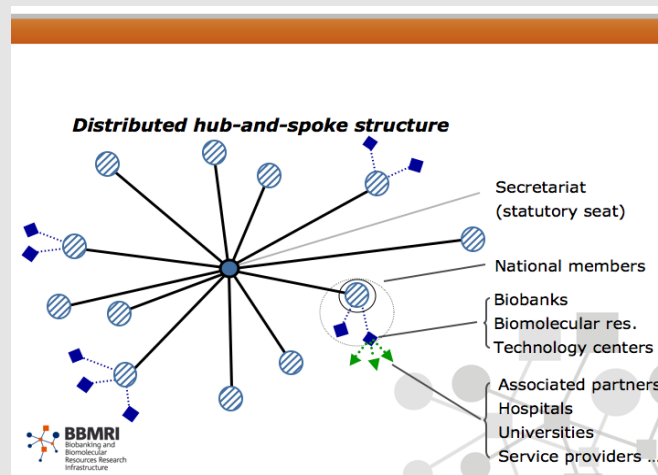
Fig 1: BBMRI Work Packages, governance structure and leaders/chairs

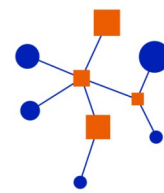
Work Packages (WP)	Leader(s)
WP1: Management and Coordination	K. Zatloukal (AT), E. Vuorio (FI)
WP2: Population-based Biobanks	A. Metspalu (EE)
WP3: Disease-orientated Biobanks	E. Wichmann, (DE), T. Maitinger (DE)
WP4: Biomolecular Resources and Molecular Tools	U. Landegren (SE), M. Taussig (UK)
WP5: Database harmonisation and IT-infrastructure	J-E. Litton (SE)
WP6: Ethical, Legal and Societal Issues	A. Chambon-Thomsen (FR)
WP7: Funding and Financing	G. Dagher (FR), C. Brechot (FR)
Advisory Board Chair	G-J. van Ommen (NL)
Coordination Board Chair	K. Zatloukal (AT)
Stakeholder Forum Chair	M. Griffith (IR)

Jan-Eric Litton, leader in WP5 of both BBMRI.eu and BBMRI.se & leader in WP8 and Deputy Director in BBMRI.se



Fig 2:





The Swedish Large Scale Biobanking Facility of BBMRI.se goes into operation

We are pleased to announce that the national large-scale biobanking facility of BBMRI.se was launched according to plan on 1st November 2010.

This is the culmination of 10 months of intensive development and implementation of the BBMRI.se plans, and is an exciting milestone in our overall plan.

Our service started in time to enable the first BBMRI.se user, LifeGene, to start collecting samples in its major population study for Sweden. Just three weeks later we were able to start receiving the samples from the next major user, "Stockholm-2" on prostate cancer. And in early January 2011, we started the handling of our third customer - a large study on breast cancer, "Karma".



These studies represent the first in a new wave of Swedish large-scale biobanking projects that will sample upwards of 50 thousand individuals (LifeGene will eventually include 500 thousand sample donors). They are part of the reason BBMRI.se is being established: to support large biobanking projects of national interest with a common, effective sample handling infrastructure that makes massive amounts of well managed material and data available as a resource for medical research throughout Sweden.



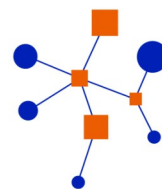
The development we've undertaken during 2010 includes new and automated lab processes, IT systems, facilities and a great deal of teamwork, creativity and problem-solving. We still have more development to do and will take on several other major studies during 2011, but we have got off to a flying start with the November launch. We took the chance to mark the occasion with a formal opening ceremony on 20th December with invited guests representing sponsors, users, national partners and staff.

We are also launching this newsletter now, and are committed to being communicative with all those interested in our development. In future issues we will describe development of more effective sample withdrawal systems and how we establish our national partnerships.

Of course we also welcome direct contact with anyone who is interested to know more about BBMRI.



Mark Divers
 Leader, BBMRI.se Work Package 6 on
 Biobanking Technology & Sample
 Handling

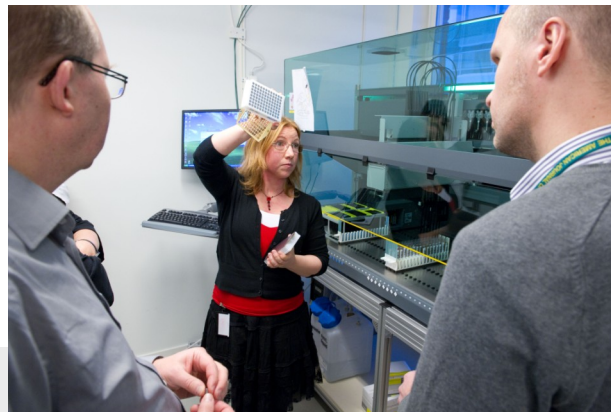


December 2010

OPENING CEREMONY OF THE LARGE SCALE BIOBANK



Joakim Dillner, Jan-Eric Litton and Harriet Wallberg-Henriksson at the ribbon cutting ceremony.



Cecilia Agardh showing the guests how the liquid handling robot works.



The ceremony started of with a demonstration of the automated sample handling process.



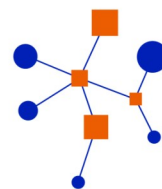
Mark Divers sets on donating blood to the biobank himself.



Excited guests waiting for the ribbon to be cut.



Max Kesselberg and Joakim Dillner celebrating.



Collaboration between BBMRI.se and the Swedish County Councils on a Swedish biobank register

In the Spring of 2010 the Swedish Association of Local Authorities and Regions (SALAR) and the Swedish Research Council appointed a joint SALAR - BBMRI working group for development of a national Swedish biobank register (SBR). The aim is to further develop SBR to make it optimally useful both for health care and research as well as to make the register compatible with the pan-European biobank register that is currently being built within BBMRI.EU

The ultimate goal is to facilitate research on biobank samples taken within the health care system (e.g. samples taken for clinical laboratory medicine or for national quality registers & patient cohorts) with highest respect to donor integrity.

Following the publication of the first working group report (published at: <http://bbmri.se/sv/Nyheter/Samarbete-mellan-BBMRIse-och-SBR-2/> and click on the link "En första rapport från arbetsgruppen finns att läsa här") the joint working group recently received an extended mandate to continue the development work.

BBMRI.se participants in the joint working group are professor Jan-Eric Litton and bioinformaticians Martin Fransson and Loreana Norlin.

For more information on the Swedish biobank register, please see www.biobanksverige.se

FACTS ABOUT BBMRI.SE

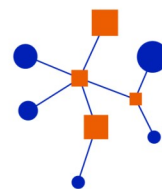
BBMRI.se is the Swedish national infrastructure for biobanking and associated analysis of biospecimens.

The commissioning body of BBMRI.se is The Swedish Research Council (Vetenskapsrådet).

BBMRI.se is supported by six Swedish medical universities with Karolinska Institutet being the host university.

BBMRI.se consists of eight work packages (WPs), each focusing on different aspects of biobanking such as large scale facilities for storage and management of samples, biobank informatics, optimizing access and utility and ethical and legal aspects of biobanking. For more information visit www.bbmri.se.

- ◆ BBMRI.se is the Swedish hub of the European biobanking infrastructure BBMRI.eu compassing > 280 biobanks in > 30 EU countries.
- ◆ BBMRI.se was the first national biobank infrastructure to be launched. Today many EU countries have launched similar national biobanks: BBMRI.fi, BBMRI.no, BBMRI.nl and BBMRI.it.
- ◆ BBMRI.se is chairing BBMRI Nordic, a NordForsk supported collaboration between the national biobanks in the Nordic countries.



Q&A

Frequently asked questions about BBMRI.se

Who owns the samples in BBMRI.se?

The custodian (provsamlingsinnehavaren) of a sample collection has the right of disposition of the samples, also when the custodian himself/herself does not store the samples. BBMRI.se merely runs facilities that offer storage and analysis services to the custodians of sample collections. BBMRI.se will also provide support in related areas, such as data management and study design.

Do you have to use BBMRI.se?

No, it is up to the custodian of a sample collection if he/she wants to use the services of BBMRI.se or not.

How will researchers benefit from using BBMRI.se?

Modern medical research is increasingly using international collaboration, where it is a requirement that samples and related information are collected using international standards that make collaborative studies based on many different collections worldwide possible. Both peer-reviewed journals and funding agencies have increasing demands on documentation of the quality of materials used in science. Such documentation should be in agreement with internationally recognized quality standards.

BBMRI.se is pursuing an active and internationally established research & development activity within all the major areas where cutting edge competence is needed for successful and cost-efficient biobanking: ethics, quality assurance, standards, sample management, sample refinement, automation and logistics, sample analysis, data management, registry linkages, accessibility and biostatistics. Development of internationally competitive tools and knowledge would be very difficult and costly for individual universities or research groups.

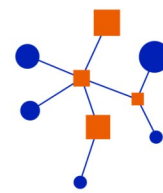
I am a scientist who intends to collect samples. Can I use the services of BBMRI.se for this?

As BBMRI.se does not have unlimited resources, we are currently only able to provide services to sample collections that are of national interest (e.g. sample collections that are large-scale and/or nation-wide). Please contact us with your request info@bbmri.se.

Are there any constraints that a scientist using BBMRI.se biobanking facilities has to conform to?

Samples and data must be collected in a standardized manner and the sample collection has to conform to fundamental requirements on quality and accessibility. BBMRI.se is happy to assist in these issues.

The customer must also be able to pay the fee for the services. The price list has yet to be determined, but the large scale of our operations and the basic infrastructural funding to BBMRI.se will, however, result in low prices.



Q&A

Frequently asked questions about [BBMRI.se](http://bbmri.se)

How is the integrity of the sample donor protected?

Current legislation provides a good protection of the personal integrity, through the Biobanks Act (2002:297), the Patient Data Act (2008:355) and the Personal Data Act (1998:204). All samples are coded. No research results will be linked to any particular individual.

What is the procedure for a researcher wanting access to samples?

All custodians of sample collections who use [BBMRI.se](http://bbmri.se) are required to participate in the Swedish Research Council/[BBMRI](http://bbmri.se) Biobank Catalogue, where instructions on how to make sample requests will be posted.

What is the procedure for evaluation of a sample request?

A custodian of a sample collection who uses [BBMRI.se](http://bbmri.se) will make a commitment for accessibility, which means that applications for access must be judiciously evaluated and that any restrictions in accessibility can only be made if motivated by the quality of the research project, the sample quality, available sample volumes or ethical and legal issues.

What is the point in collecting samples if you should share them with other researchers?

To be useful for others, a sample collection must be properly designed, quality assured, well-managed and actively made accessible. Whether the collection has been useful for high quality research by many researchers will be a major evaluation criteria for sample collections – and hence also a merit for the custodian of the sample collection.
 From a medical-ethical point of view, we can assume that the custodian of the sample collection desires the samples to be used in the manner that is most beneficial for the patients.

2011-03-14 VACANCIES

- Project leader (biobank research), Karolinska Institutet
- Graduate student in innovation and management, Karolinska Institutet

Read more at www.bbmri.se/sv/Lediga-tjanster/