BBMRI-ERIC
Biobanking and
BioMolecular resources
Research Infrastructure

Peter Riegman, Head of Erasmus MC Tissue Bank

Peter Riegman is a Molecular Biologist and presently the head of the Erasmus MC Tissue Bank. In his career he worked on biomarker characterisation and discovery, using human tissues as research object. His thesis was devoted to "Cloning and Characterization of Prostate-Specific Antigen". During two postdoc positions he worked on two distinct projects (1) "Towards a mouse model for meningioma and neurofibromatosis type 2" and (2) "Early detection of neoplastic progression in Barrett's Esophagus".

From 2001 he became Tissue Resource Manager of the "Erasmus MC Tissue Bank". During this period he became involved in European projects, EuroBoNeT, BBMRI, BIOPOOL, SPIDIA, and, EurocanPlatform, as the WP leader of Biobanks. He coordinated the TuBaFrost project 2003-2006, where a European virtual frozen tissue bank was developed; including a code of conduct, standardisation of SOP's, rules for access and an online sample exchange platform. This online exchange platform has been adapted and redesigned in EuroBoNeT and EurocanPlatform and is still active for the OECI (Organisation of European Cancer Institutes), where Peter was co-opted as board member and chair of the OECI working group biobanking 2006-2010.

From 2008 he became ISBER president-elect, from 2009-2010 he has been ISBER president, which was followed by the role of past president until 2011. He was elected vice president at the end of 2010 as vice president in ESBB ISBER chapter to become the second president in 2011. In 2011 he became section editor of Biobank Management in the Editorial board of Biopreservation and Biobanking and a member of the International Steering Committee of P3G.

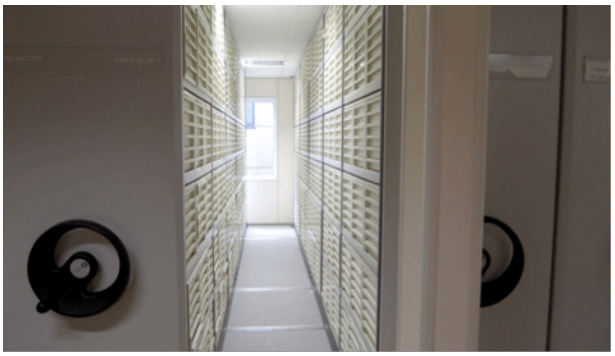
From 2012 he accepted the role of UMC coordinator for the Pearl String Initiative (PSI) for Erasmus MC.

Interview by Andrea Wutte

Peter, you are the Head of Erasmus MC tissue bank, please give us an overview about your tissue bank.

P The "Erasmus MC Tissue Bank" offers fresh frozen tissue and pathology archival FFPE materials for medical research under secondary use. The frozen samples are collected according to an in ISO 15189 described QA and QC program and issued for medical research under the rules defined by the Dutch code of conduct. Samples from the tissue bank are mostly used for cancer research however where possible, we also collect samples for many other disease types. The unique characteristic of the tissue bank is that starting from 1982, we have had a large frozen tissue collection of high quality samples with long term follow up that can be determined, starting with high quality samples from 1982.

Successes are based on a collection where snap freezing (conserving morphology), short collection times, pathologist selecting the samples, clinical data based on pathology outcomes have always been key. From researchers within Erasmus MC we receive hundreds of requests yearly. The golden standard is the frozen sample of which we have about 75.000 in liquid nitrogen. Although nowadays a lot of interest is seen in formalin fixed samples of which we have about 3 million in the pathology archive.



What was the reason for implementing quality in your Biobank?

P When starting with the TuBaFrost project it was clear that a biobank needed to work according to standard operating procedures, however as brought forward in the excellent OECD guidelines and ISBER best practices, you also need a quality assurance and quality control program. Within the TuBaFrost project and from contacts build up within ISBER and the Marble Arch working group, we started to compare SOP's, then wrote and incorporated our own SOP's together with a quality assurance and quality control program. This was also published in the European Journal of Cancer[1,2] together with the complete SOP for the collection of tissue samples. Special attention was raised to the snap-freezing process, because of the necessity to keep the morphology of the tissues in the best condition. This way the pathologist can still reveal important characteristics of the sample when it is used when the results are analysed.

In 2006 the Pathology department started to make its first steps towards accreditation. Since the tissue bank is completely integrated in the diagnostic process we could adapt our SOP's in the proper format and add more to cover all areas needed. In 2011 the pathology department received the accreditation ISO 15189 as the first in the Netherlands.

Currently you are Project leader in ISO/TC 212 'Clinical laboratory testing and in vitro diagnostic test systems', which mirrors the published European CEN/TS 'Molecular in vitro diagnostic examinations - Specifications for pre-examination processes' to International Standards.

P Yes, because during the accreditation process of the pathology department, we became involved in the SPIDIA project (2008 – 2013) that was focusing its attention to the pre-analytical phase of the samples. It became clear that quality is essential when samples are combined from different institutes into one research project. It showed how differences in the pre-analytical phase introduce sample variation that can contribute to false results.

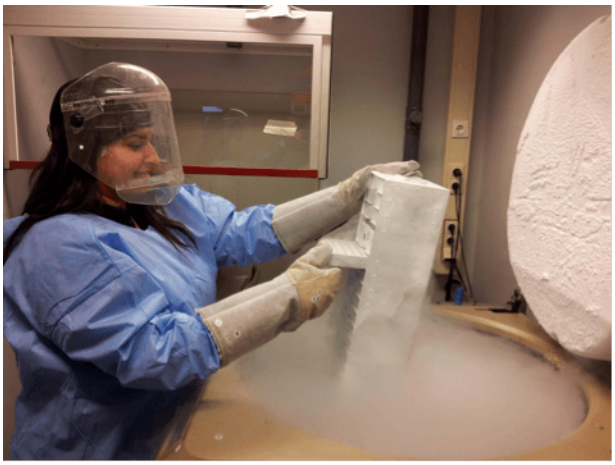
Would you give us insight to this development and how this development will affect the Biobank?

P Our gained experience was brought to practice right away. After SPIDIA the activities did not stop, EurocanPlatform had started where I lead the WP on biobanking. The writing of the CEN[3] and ISO documents was greatly supported within the EurocanPlatform project (2011-2015) where the documents were recognised as a very important activity. That gave the opportunity not only to compare again the quality strategies, but to in fact join the CEN and later ISO expert groups. So in answer to your question shortly, step by step and learning all the time. The Erasmus MC tissue bank has not yet been able to implement the complete technical standards. However, the ambition is to work on a complete implementation.

[1] Standard operating procedure for the collection of fresh frozen tissue samples.
Mager SR et al. Eur J Cancer. 2007 Mar;43(5):828-34

[2] TuBaFrost 2: Standardising tissue collection and quality control procedures for a European virtual frozen tissue bank network.
Morente MM et al. Eur J Cancer. 2006 Nov;42(16):2684-91

[3] CEN European Committee for Standardisation, http://www.cen.eu



You showed us the importance of these CEN/TS and the long development period to be finally approved as technical specifications, have you already experienced a success in your tissue biobank you would like share with us, to convince biobankers to do alike?

P Most of the experiences gained over time on sample quality were used when working on the CEN and ISO documents. I was project leader of two of the documents, now released. However, the standard developing process is not easy. Once described the procedures of your tissue bank this knowledge is shared with experts from many different experts in Europe. The draft proposal passes through a very comprehensive review process with the final aim to agree on the content on the basis of consensus. Now the same CEN/TS documents are in the process of becoming international Technical Standards of ISO. The review process is even more extensive.

In the end you know it is all worth it, because the impact of the documents will improve the outcomes of tests and the range of tests that can be performed on the diagnostic samples.

The same holds true for medical research that can be done with the samples, where better diagnosis or perhaps even prediction has the potential to fully exploit precision medicine and directly innovate patient care and therewith improve chances for survival or living with the disease more sustainable with a better quality of life.

BBMRI-ERIC set up an Expert Working Group[4] jointly evaluating this CEN/TS bottom up in an intra- and inter-biobank benchmark process. You as Expert are part of the Working Groups, why do you contribute, although it is not funded?

P Yes that's true, I joined this group even without being properly funded, because I feel it is of major importance that technical standards are being implemented in the biobanks. In my view this can very much contribute to a successful exchange of samples in multi centre research projects, using collated pan-European samples for medical research to achieve sufficient statistical power in studies. This pan-European cooperation will enable medical research excellence and will stimulate scientific cooperation with sample exchange in translational research.

Erasmus MC tissue bank in the spotlight:

- 75.000 tissue samples of approved quality
- Up to 2.000 tissue samples reused /year
- Since 1982 frozen samples with approved RNA and morphology quality
- ISO 15198:2012 accredited pathology department

Most relevant references:

Standard operating procedure for the collection of fresh frozen tissue samples.
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Optimizing sharing of hospital biobank samples.
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The influence of tissue procurement procedures on RNA integrity, gene expression, and morphology in porcine and human liver tissue.
Kap M et al. Biopreserv Biobank. 2015 Jun;13(3):200-6. doi: 10.1089/bio.2014.0076.

Comprehensive catalog of European biobanks.
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[4] Chair of BBMRI-ERIC expert WG for CEN/TS Molecular in vitro diagnostic examination - Specifications for pre-examination processes for snap frozen tissue - Part 1: Isolated RNA and Part 2: Isolated proteins