



Prof. Jan-Eric Litton

# Towards Personalized Medicine



BBMRI-ERIC is a new research infrastructure for European biobanks with its headquarters in Graz. Franz Zuckriegel and Ben Hemmens interviewed the Director General, Prof. Jan-Eric Litton, in the offices at the new Med Campus Graz.

A major trend in medicine is towards finer differentiation of subgroups of patients – groups with similar combinations of genetic markers, shared lifestyle factors, male versus female, etc. Ultimately this may lead to 'personalized medicine' in which every patient's therapy is tailored to their individual profile. Biobanks are an essential part of this future vision. A biobank is a collection of biological samples such as human blood or tissues, along with the data associated with these samples, such as the clinical records of the patients and the genetic and diagnostic information that has been derived from them. Such collections of samples and data have become an essential resource for medical research, to the extent that the patients give their consent to their use.

## Biobanks as a research resource

These data are specially important for understanding diseases in which relatively similar clinical presentations actually reflect a diverse set of different

underlying pathologies. For example, we now know that breast cancer is not one single disease, but consists of many different subtypes with different causal mechanisms. Increasing knowledge of these subtypes brought the opportunity to develop specific therapeutic approaches for each type. This process of stratification, that is, of differentiation of patients into subgroups for which different treatments are indicated, is now well under way for many other common diseases. And the process is being supported by several hundred biobanks across Europe, who mostly make their data and samples available to local research partners.

## Stratified medicine and networking

"Stratified medicine is already working and will be important in the near future. Personalized medicine is many years in the future," says Prof. Jan-Eric Litton, Director General of BBMRI-ERIC. He cites a practical example: "Sometimes a pharma firm develops a new drug and then has to withdraw it shortly after going to market because a subgroup of patients has an adverse reaction. If you can identify that subgroup and filter them out, the drug can be used for the others." The chances of accurately identifying subgroups of patients increase with the size of the datasets. Especially when

researchers are searching for statistical patterns made up of multiple parameters, meaningful conclusions are only possible on the basis of large numbers of cases. Especially research on disease prevention depends on statistical analysis of big numbers and, in order to filter out region-specific factors, on international data collections. All in all, this leads to a need for a framework in which the European biobanks can cooperate – and that is what BBMRI-ERIC aims to provide.

## History

BBMRI-ERIC has its origins in the consultations of the European Strategy Forum on Research Infrastructures (ES-FRI), which in 2006 drew up a roadmap identifying over 30 research infrastructures that were needed in Europe. One of these was an umbrella organization for biobanks. After that, a preparatory phase followed, which was led by Prof. Kurt Zatloukal from the Med Uni Graz as coordinator of the EU RP7 project BBMRI (Biobanking and Biomolecular Resources Research Infrastructure). This preparatory phase involved discussions with a broad group of stakeholders and resulted in the definite plan to set up an ERIC (European Research Infrastructure Consortium) for biobanking. What exactly is an ERIC? It is a non-profit consortium of at least three EU member

states, which has to be approved by the European Commission. BBMRI-ERIC was officially founded in December 2013 with twelve full members and five observers, with headquarters in Graz. In mid-2014, the organization set up its offices in the ZWT Centre for Knowledge and Technology Transfer at the Med Campus Graz and began regular operations. The mission of BBMRI-ERIC is to be an organizational and methodological platform for cooperation between European biobanks. As the Director General emphasizes, the goals do not include either directly controlling access to the individual collections – this responsibility must remain decentralized – or running the sharing of data as a for-profit business. Rather, the mission is to "set up an expert center to find new ways for researchers from academia and industry to work together", says Prof. Litton.

## Coming challenges

Among other tasks, Prof. Litton identifies two particular challenges. Firstly, Europe speaks many languages, which can create barriers to the transnational use of clinical data. "A big problem in finding and sharing data is that Europe doesn't speak English. We are working with different kinds of text mining tools to try to extract information from medical records." Another problem is the often poor reproducibility of results in biomarker research. One cause of this is the lack of standardization (and/or documentation) of how the samples are handled from the moment when they are taken from the patient to their arrival in storage in the biobank. Therefore, another task of BBMRI-ERIC will focus on the "needle to freezer" phase. "Developing shared quality standards for many aspects of biobanking is a central part of our mission", concludes Prof. Litton.



# Starting Out Small



M&R Automation is a specialist producer of automated industrial plant based in Grambach, near Graz. It's eight years now since the company got its first contract for the human technology sector. "It began with small jobs for Roche Diagnostics", recounts CEO Herbert Ritter. "As often happens with a new field of business, you start off small; it takes a while for you to gather the resources and expertise you need to take on larger projects." From these beginnings, human technology has now become a strategic focus of the company. In 2011, M&R set up a separate department dedicated to the pharma, medical devices and healthcare sectors.

## New segment boosted business

Depending on the volume of the projects, M&R now make between 10-25% of their revenues from equipment for human technology. Their products have included sterile filling lines for liquid pharmaceuticals, production machines for blood gas sensors, cleanroom systems, and assembly lines for electric dental hygiene and shaving appliances. As Herbert Ritter says, this market segment has been a big step forward for M&R. Also in 2011, M&R joined the Human Technology Cluster. "The Cluster gives us good opportunities to present ourselves to

gether with other companies serving these markets", says Ritter. "Obviously the HTC doesn't organize jobs for us, but it puts companies that make different things in touch with each other. It's important to present Styria as a technology and innovation champion to the outside world." One organization which Ritter sees as making a big contribution to this international profile is the Research Center Pharmaceutical Engineering in Graz. "But we also need companies that implement that technology", the M&R manager believes. Herbert Ritter is also of the opinion that innovations that are generated with the help of subsidies should be kept in the region for the production phase. Citing an example from the IT industry, Ritter says "We can't allow situations like with the MP3 format where one person develops it and someone else makes the money". In line with this thinking, M&R has ambitions to convert ideas to reality within the HTC. This would mean investing in fields that do not generate profits immediately. Ritter sees the future optimistically: "We want to show that Styria can set the pace in medical and pharmaceutical technology", he says. "And we have enough highly educated people who have all the necessary expertise to meet the demands of the pharma industry."

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