

BIOBANKS WILL PROVIDE "ELECTRONIC SPECIMENS" FOR MEDICAL RESEARCH

Future medical research will focus increasingly on electronic data, with less need both for laboratory animals and tissue samples. This long term trend emerged at a recent conference on biobanking organised by the European Science Foundation (ESF), which dealt with the challenges posed by the growing scale and complexity of research in the life sciences.

But in the more immediate future biological specimens will be required in ever greater quantities, with higher quality, for a wide variety of given experiments. Anticipation of this need provided the motivation for the many biobanks that have been created in Europe and the rest of the world over the last decade. For example a pharmaceutical company may need blood samples from individuals with specific genetic profiles in order to screen a candidate drug for damaging side effects. Equally, research into the effects of ageing may require access to samples taken from the same people at different times in order to measure changes in specific biomarkers that indicate different aspects of the process.

Biobanks therefore have to serve a wide variety of requirements, and yet conform to common standards so that researchers can obtain the samples they need readily, as was pointed out by Alberto Orfao, one of the ESF conference chairs, from the University of Salamanca in Spain.

"Different types of biobank will probably coexist, including both generic and smaller ones, depending on the specific purpose, the type of samples or collections hosted, and many other factors," said Orfao. "What seems to be clear is the need for different existing biobanks to work under harmonized frames and guidelines at the international level, so that sharing and collaboration are facilitated and fostered."

In the longer term samples will be converted into data, in effect providing researchers with the results they needed, such as the impact of ageing on biomarkers. This would reduce the need for expensive laboratory processes and expertise, although Orfao emphasised this was for the future. "A challenge for the future will be to provide access to enough data and information about large series of individuals so that further research could be linked to data stored in electronic resources," said Orfao. "However, this is still far from current practice, and it is still crucial that specimens be stored to facilitate the generation of additional data."

Creating electronic biobanks will itself involve a great effort and take time. Meanwhile the biobank community faces a daunting enough challenge just providing sufficiently diverse and large specimen sample collections to feed current research as well as provide the raw material for creation of the electronic biobanks of the future. "Current research projects studying human diversity and evolution, as well as the genetic/genomic factors underlying

complex, multi-factorial human diseases, require the availability and use of thousands of biological samples, together with associated epidemiological, genealogical, lifestyle and/or clinical data," said Orfao. "Biobanks have been created with the aim of providing scientists with large collections of high quality biological samples."

The ESF conference highlighted the substantial progress already made creating biobanks that now serve a variety of research projects all over Europe. "Some of the most significant achievements of biobanks include the promotion and driving forward of research on drug development, treatment of complex, multi-factorial diseases and personalized medicine, shortening the time-frame required to develop such large scale projects, and providing a higher standard of quality," said Orfao. "As such, this has also been the impact of the Spanish National DNA Bank, which is currently supporting several major disease-oriented research projects."

The ESF conference also identified the innovative technologies that will be exploiting samples from biobanks in the near future, and which should influence the course of biobank development. "This explains the decision for the topic of the coming 2009 ESF Conference 'Cutting edge genetic/genomic technologies impacting biobanking activities'," said Orfao.

But making biobanks fit for purpose will also involve more mundane activities relating to standards and harmonization. "One of the challenges of biobanking that has been discussed in the Conference was the need to stimulate coordinated activity in the field across Europe," said Orfao. "However the European Research Infrastructure for Biobanking and Biomolecular Resources (BBMRI) Project, represents a real and tangible example of how to stimulate the collaboration and harmonization on biobanking between different European countries. Furthermore, the advantages of the joint planning have been highlighted, as well as the specific challenges for international networking and the need for evidence-based biobanking and biospecimen research standards."

The ESF conference 2008, Biobanks Introduction and Next Steps, was held in Sant Feliu de Guixols, Costa Brava, Spain, in November 2008, with the support of the University of Barcelona.