



Special Report

The Promise of Molecular Medicine Pushes U.S. Biorepositories to Network

“The tissue is the issue” say the experts, meaning that in order to conduct the discovery research fundamental to molecular medicine, it will be essential to have access to large numbers of high-quality, clinically annotated biospecimens. Around the globe, several countries are advancing toward large, networked systems to ensure that researchers have such access.

Advanced technologies such as genomics, proteomics, molecular imaging, and nanotechnology hold great promise for understanding disease at the molecular level. But experts note that progress in using these technologies to deliver new preventive, diagnostic, and therapeutic agents to cancer patients is hampered by a lack of cooperative infrastructure among institutions that collect, store, and distribute human biospecimens for research. “The need to align and optimize biospecimen resources in the United States is among the most critical scientific issues we face in the cancer research community,” said Dr. Anna Barker, NCI deputy director for advanced technologies and strategic partnerships.

Human biospecimens—tissue, blood, urine, or other bodily materials—are critical for translating basic discoveries into new cancer interventions.

Biospecimens are collected for diagnostic procedures; however, material not used for patient diagnosis and care can be stored for research use with appropriate patient consent. Biospecimens are most valuable for research when they are annotated with detailed demographic, clinical, and longitudinal information that can be analyzed in combination with research results derived from analyses at the molecular level. Collections of biospecimens and associated data are called biobanks or biorepositories.

According to a report by the RAND Corporation, more than 300 million human biospecimens are currently stored in U.S. biorepositories. However, these biorepositories do not share common biospecimen standards and policies for quality control, data collection, ethical clearance, and access by the scientific community. “Given the variability in current procedures to collect, annotate, process, and store biospecimens, it is difficult for researchers to compare data derived from biospecimens collected at different institutions,” said Dr. Julie Schneider, of NCI’s Office of Technology and Industrial Relations. “Moreover, variations in informed consent processes hinder researchers’ efforts to aggregate the large numbers of biospecimens typically required for high-throughput analyses.”

NCI has been gathering input from its advisory boards on this complex issue. In addition, the future direction of biorepositories was discussed by representatives from the nonprofit, private, and government sectors, and by several international representatives at November’s 2004 IBM Biobank Summit. Dr. Barker delivered the plenary lecture at the meeting, calling for participation, commitment, and leadership from the entire biomedical research community. “If we can solve this problem in a timely fashion,” said Dr. Barker, “I think it will be a great advance for biomedical research and for the patients, who will be the ultimate beneficiaries.”

The biospecimen networking concept is gathering momentum internationally, with several recently announced biobanking initiatives; NCI is planning to test several key biobanking principles within its integrated network of prostate cancer Specialized Programs of Research Excellence. In addition, NCI and the Foundation for NIH, which raises private sector funds for NIH biomedical research initiatives, are planning a demonstration project for a national effort that would collect, process, store, and distribute high-quality biospecimens from many cancer types.

“NCI has an opportunity to provide needed leadership in the area of biobanks and biospecimens and will continue to collaborate with all sectors and obtain grassroots input from the scientific community,” said Dr. Barker. ♦