Biobanking Definition

Precision medicine and biomedical diagnosis are the key objectives of biobanking. Supported by collecting and analyzing biospecimen, biobanks were firstly managed as repository centers.

Implied in human health, they moved into expert centers and into integrative research platforms sharing data with pharmaceuticals laboratories. Biobanking created its own economic model to sustain its activities according to ethics, law, and societal issues. Part of the global market of genetic data and more generally to precision medicine data, biobanking became attractive to internet key players entering the sharing era with the New Generation Biobanking.

Biospecimen collection

Quality assessment and sample tracking consist in the first steps of operational management of the biobank. Upstream sample quality is checked to preserve final sample integrity. Preanalytical sample processing affects quality as for example whole blood or tissues frozen immediately and stored at -80°C until RNA or DNA extraction. After protocol optimization, lab procedures are standardized meanwhile, clinical information are annotated with protection of patient identity. Security and access controls of cataloging samples are the major factors of the sample management and storage.

Integrative research and biomedical diagnosis

6 million of samples are stored in biorepositories including human, animal, microbial, and vegetal biospecimens. Detailed phenotype information, but also clinical data and profiling data are available for patient samples. Cohort studies demand high throughput sample processing, bioinformatics analysis that produce high- quality data. For example, biomarker studies divide cohorts in patient subgroups for companion diagnostic tests of cancer subtypes. Population based biobank cohort try to understand chronic diseases influenced by genetics and environment interactions. Multiple factor approach includes urine and fecal samples for microbiome studies as well as patient-derived induced pluripotent stem cells, the promising tools of precision medicine.

Reference: Cadigan, R.J., et al. (2017). Forward-thinking in US Biobanking. Genet. Test. Mol. Biomarkers 21 (3), 148-154.

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