

Letter to the Editor

Biobank; An Essential Infrastructure for the Future of Personalized Medicine

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1996 was the first time when the term “biobank” appeared in literature.¹ As defined by Hewitt et al, “biobank is a facility for the collection, preservation, storage and supply of biological samples and associated data, which follows standardized operating procedures and provides material for scientific and clinical use.”² History of biobanking goes back to 100 years ago when human specimens were stored in pathology institutions worldwide; however, it has changed in the past thirty years from limited sample collection in academic settings to large-scale national biobanks.³ According to the European Biobanking and Biomolecular Resources Research Infrastructure (BBMRI), biobanks can be classified into two types: Disease-based and Population-based biobanks.⁴

Nowadays, with the growing importance of personalized medicine, biobanking is becoming increasingly more important. The advancement in the field of personalized medicine with “one dose-one patient” approach for treating diseases, is owed to the development of pharmacogenomics and success of the human whole-genome sequencing.⁵⁻⁷ Moreover, success and progress in all these fields depend on the existence of sufficiently large biobanks to obtain reliable results from different research objectives.⁸

Translation of cancer genomics such as The Cancer Genome Atlas (TCGA) project into new targeted therapies like Gleevec, Herceptin, Crizotinib, etc. are a few examples of using large scale specimens to make individualized medicine possible.^{7,9} In spite of the presence of this atlas, there are still decades of efforts required from the time of establishing a new cancer gene to translating it to something clinically meaningful. However, with the recent establishment of 3D culture tumor model banks named organoid biobanks, these processes will be accelerated.^{9,10}

Despite the undeniable effects of biobanks in advancement of science, biobanks themselves are facing different challenges in fields of governance for privacy and ethical issues, collaboration on both national and international levels and standardization in collection, storage and processing of biospecimen.¹¹ The most

important challenge, however, is sustainability which can be addressed by providing financial resources, means to enable efficient operation, and social trust.¹² These challenges can threaten the biobank's survival if not taken into consideration.

As a result, the future of personalized medicine, besides pharmacogenomics, also depends on the development of biobanking. Consequently, challenges hindering the development of biobanking will also adversely affect advancement of personalized medicine and careful consideration is required by governments to prevent this. In conclusion, since the future of biobanking is highly dependent on population-based data collection, every nation needs to start collecting biospecimens from birth in the format of a centralized national biobank with potential to form an international biobank consortium for data exchange and collaboration.

Authors' Contribution

MZ prepared the first draft of the manuscript and AG initiated the idea of the work and edited the first draft.

Conflict of Interest Disclosures

The authors declare they have no conflict of interest with respect to this study.

Ethical Statement

Not applicable.

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