



National Center Biobank Network

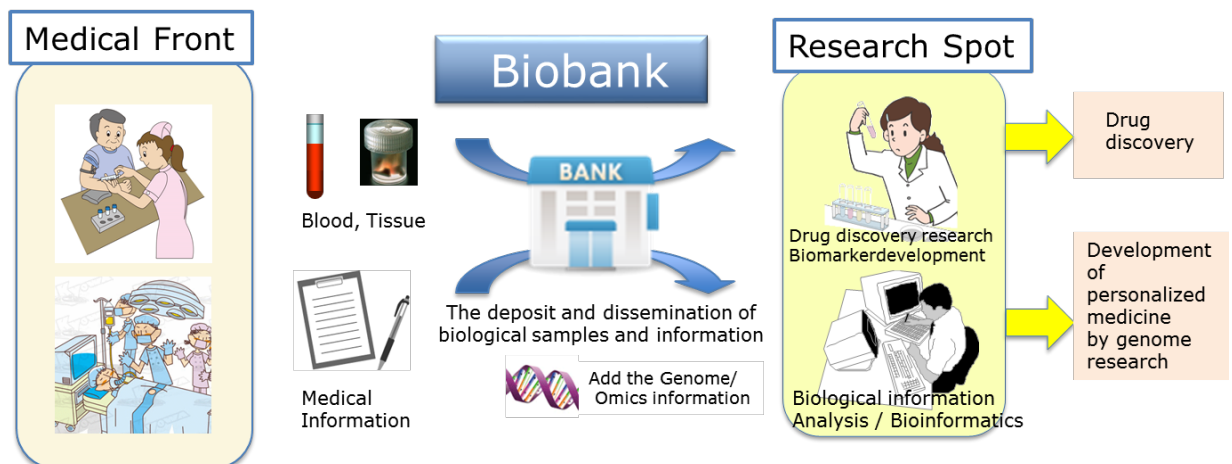
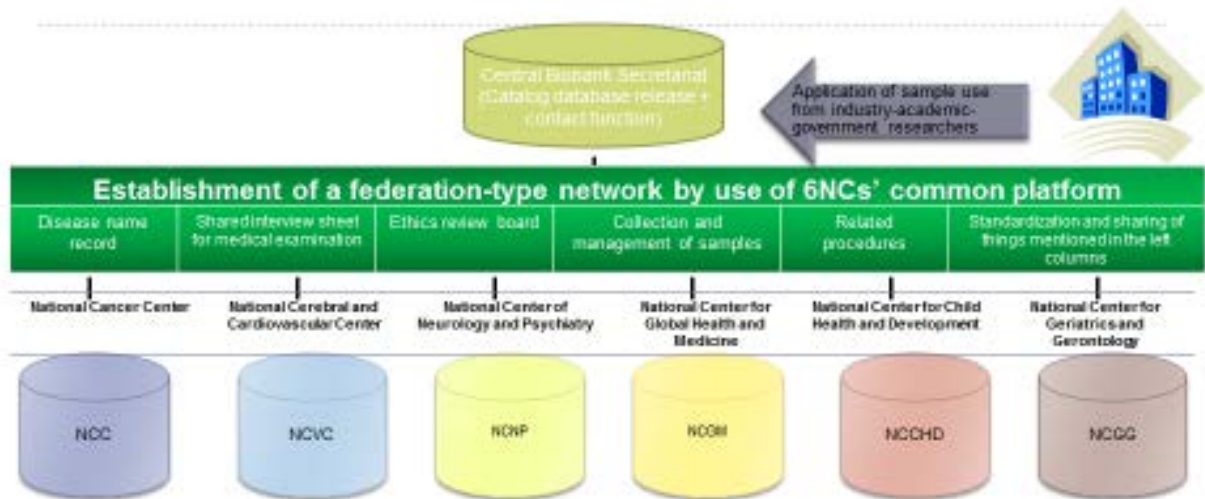
National Center Biobank Network

— Introduction to 6NC —

Oct. 10–12, 2018 @BioJapan 2018

What is National Center Biobank Network?

The National Center Biobank Network is a collaborative project by 6 National Centers in Japan, aim to create a research basis for the “new medical care”.





The largest national medical research center for cancer treatment

Features of Biobank

- **23,890 cases** of pathological frozen tissue, 66,430 cases of withdrawn blood for analysis (as of end-August, 2018) = **the nation's largest cancer tissue bank**
- **Pathologist removes** tissues based on an accurate diagnosis and maintains high quality through rapid freezing
- Collect all possible samples to **meet the needs of a variety of studies**
- Generate a high-quality **database for clinicopathological information**, which can interface with in-hospital cancer registry information, etc.
- **More convenient samples**, obtained with informed consent for sample transfer to outside researchers, including companies, for genome-wide analysis and to establish cell lines

Historical performance and achievements

- Published **513 studies** in English (the total impact factor is **2822.82 points**, the total number of citations is **11,929**).
- 67% of sample utilization studies are joint research carried out by providing detailed **clinicopathological information to an external institution** (21% is joint research with **private companies**).
- Used for nationwide clinical research derivations and many patent filings, such as The International Cancer Genome Consortium and The International Human Epigenome Consortium (ICGC, IHEC), Integrative Disease Omics Database construction, SCRUM-Japan, etc.
- Knowledge on how to manage high quality maintenance, as described in "Pathology organization sample handling rules and regulations for genome studies" by the Japanese Society of Pathology and meets **Japan standards**.

Future prospects

- To further improve the coefficient of utilization of completely collected samples and to pursue possible contributions to the All-Japan One Stop Service concept
- To consider the formulation of pipelines for sample transfer to companies, etc., without joint research with NCC
- To establish a "next-generation biobank", which **collects samples on demand from companies**; to improve the **connectivity** between biobanks as disorder cohorts and **molecular information databases obtained by clinical sequencing, etc.**; to promote industry-academia-government cooperation within all of Japan; and to contribute to the realization of genomic medicine

National Cerebral and Cardiovascular Center (NCVC) - Biobank



The largest domestic medical research center in cardiovascular and cerebral vascular fields

Features of Biobank

- Storage of blood and tissues collected from patients with various circulatory diseases including cardiovascular disease, cerebrovascular disease, metabolic disease and genetic disease. A nationally pre-eminent institution where specimens and tissues of rare cases such as hearts isolated in cardiac transplants and things delivered from pregnant patients with circulatory disease other than cerebral stroke and congenital cardiac disease are accumulated
- Stored blood and tissues are accompanied by detailed and high-quality medical information (treatment history, medication history, laboratory data, etc.)
- Properly and promptly address right-related relationships of intellectual property in cooperation with the industry-academia-government collaboration head office
- For management of "Human rights protection of subjects" or "Accelerating medical research," all human research materials for medical researches conducted by NCVC should be managed by the biobank

Historical performance and achievements

- Acquisition of consents from more than 14000 patients since the start in 2011. Initiation of specimen acceptance from outside medical institutions in cooperation with the genomic medicine department.
 - ①Numbers of patients who provided samples and samples collected by type②
 - Serum 11,820 patients (84,616)
 - Plasma 11,674 patients (59,002)
 - Living cell 11,835 patients (25,507)
 - DNA 11,746 patients (94,473)
 - Others: surgical/autopsy pathology specimen, placenta/umbilical cord, umbilical cord blood, amniotic fluid, etc.
- *As of the end of August in 2018
- Full-scale initiation of specimen collection with emphasis on acute diseases such as acute coronary syndromes and cerebral stroke unique to NCVC
- Examination on and development of handling and storing suitable for omics research using myocardial tissue samples
- Initiation of joint research with private companies

Future prospects

- Expansion of specimen acceptance from outside medical institutions. Reflection of it on research on/treatment for connective tissue diseases including hereditary arrhythmia and Marfan syndrome in cooperation with the genomic medical department
- Contribution to basic/clinical research and drug development. Cooperation with domestic and international biobanks. Utilization of biobanks and promotion of joint research with other institutions and global companies
- Cooperation with CDC/CRMLN Lipid Reference Laboratory, Department of Preventive Cardiology, the only member of the CDC Network in Japan. Building of a cooperative structure in obtaining specimens for measuring reagent certification testing in relation to the lipid items in the international standardization program
- Establishment of a disease cohort and promotion of clinical research as a core institution of the cardiovascular disease research in Japan

Information rich bioresources available for researches on psychiatric, neurological, and muscular diseases

Features of Biobank	Achievements	Future prospects
<ul style="list-style-type: none"> Collection of "hard to get" samples <ul style="list-style-type: none"> Frozen skeletal muscle: >16000 Fibroblasts: >1700 Cerebrospinal fluid: >2500 Brain tissues: >550 Samples to meet various research demands <ul style="list-style-type: none"> Frozen tissues (including muscles and brain tissues) Cultured cells (lymphoblasts, Fibroblasts, iPSCs, etc.) High-quality clinical information, including accurate diagnosis by specialists and PET/MRI images Broad consent for adapted not only for academic uses but also for industrial or oversea uses. 	<ul style="list-style-type: none"> Provided for >68 research projects since 2014 (New system), ~70% lead by non-NCNP institute and include 11 private companies. In muscle diseases, >400 papers in leading journals, i.e. Nature and Science, have been published. Those include identification of the intracellular location of dystrophin (Nature, 1988) and identification of the etiology of MELAS (Nature, 1990) <ul style="list-style-type: none"> ⇒ Led to novel treatments or clinical trials, including exon skipping and taurine treatment Identification of biomarkers for subtypes of psychiatric disorders <ul style="list-style-type: none"> ⇒ Fibrinogen, ethanolamine, etc. Identification of new causal genes for developmental disorders and neurological disorders 	<ul style="list-style-type: none"> Enhance industrial use The collaborations with private companies are essential for the implementation of biomarker researches. Thus, we are smoothing the procedure to use the sample not only for academia but also for industry. Standardization To increase the research reproducibility and enhance international collaboration, we should standardize our system using i.e. ISO20387 (biobank) Human resource development Biobanking is a long-term business. The staff is demanding high motivation and abilities. We shall develop a career path and mutual transfer of human resources with industry / academia.

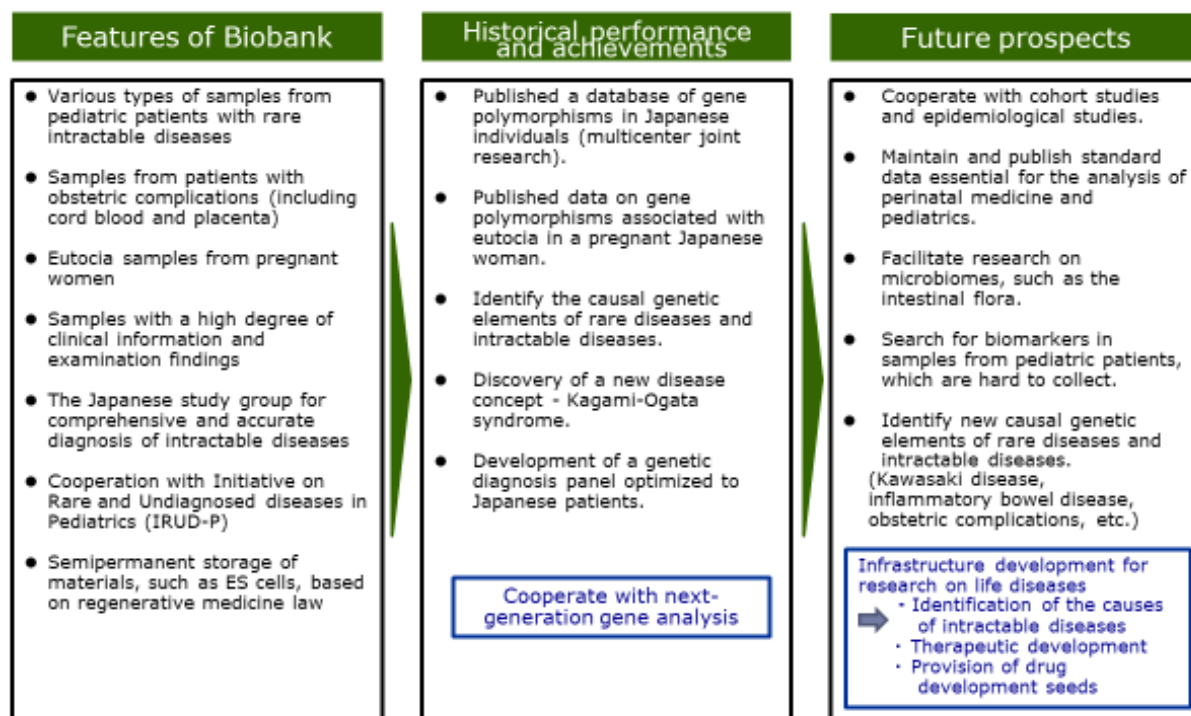
National Center for Global Health and Medicine (NCGM) - Biobank

National Center addressing internationally important diseases such as infectious diseases and lifestyle diseases

Features of Biobank	Historical performance and achievements	Future prospects
<ul style="list-style-type: none"> Collect samples of various diseases, taking advantage of a general hospital Possess extensive specimens and clinical information with high clinical significance, and capable of providing samples with the information <p>(Specifically, the following diseases:)</p> <ul style="list-style-type: none"> Diabetes Liver disease, child psychiatry HIV Fever after returning to Japan Dengue fever, etc. Rare incurable diseases 	<ul style="list-style-type: none"> Provision to various institutions <ul style="list-style-type: none"> To companies handling test agents To pharmaceutical companies To basic researches in universities To clinical researches in NCGM Provision to companies through CROs Utilization as materials of application for approval of in vitro diagnostic drugs, etc. Provision of specimens of various diseases and their use for research purposes <ul style="list-style-type: none"> Hepatic, cystic and pancreatic diseases HIV/autoimmune diseases Chronic kidney disease/hyperlipemia Amoebiasis/imported infectious diseases Data on the provided specimens developed to a joint research project between a medical department and business 	<ul style="list-style-type: none"> Promote collection of a set of pre- and post-operation specimens and a set of specimens consisting of a tissue and blood Expand types of samples which can be provided <ul style="list-style-type: none"> Cerebral thrombosis Lymph node Adipose tissue Dermis Cancer Promote acceptance of samples which are left in researches conducted outside Pursue shortening of a time from consultation until provision



The largest National Center for pediatric and obstetric research in Japan



The largest biobank for researching geriatric diseases including dementia in Japan

