

**The 11th Resource Committee of Information
Evaluation and Suggestions**

(February 25, 2019)

Division/Team Name: Integrated Bioresource Information Division

Division Head: Hiroshi MASUYA

1. Achievements and plans for the Division

(1) Have the current achievements reached the standards of those made by the major international bioresource centers?

- The access count of the BRC website is almost equal to that of Protein Data Bank Japan (PDBj), indicating that the Integrated Bioresource Information Division reaches the international standards in this aspect.
- Multifaceted efforts by the Division in total are leading the world.
- RIKEN BRC is well recognized by researchers within Japan and overseas. Its website that functions as its gateway to the BRC contains sufficient content and function..
- By participating in the International Mouse Phenotyping Consortium (IMPC) and distributing mouse resources and information, BRC is reaching the standards of the major bioresource centers in the world. The Division has contributed greatly to this achievement.
- The Division is working to attain international standards of all the aspects of its operation.
- The Division is working to establish the information infrastructure for disease research and to integrate mouse phenotype data and disease information. These efforts should be highly evaluated.
- It is recommended that the Division should grasp and analyze users' situations.

(2) Have sufficient achievements been made for contributing to society and to the research community within Japan and overseas?

- Satisfactory achievements have been made.
- The access counts of the BRC website are steadily increasing. This is a clear indication that the Division is contributing sufficiently to the community.
- To confirm the contribution of the Division, detailed analysis of database usage log and the outcome by outside users should be conducted, separately by such elements as users' country of origin, academic/commercial entities and research fields.

- For the field of genomic clinical research of rare diseases, the Division has integrated disease information and mouse phenotype data using Human Phenotype Ontology and Monarch Disease Ontology. As the result, users are able to search for bioresources by disease name on the BRC website. This is a clear indication of contribution of BRC to the society and the research community, both within Japan and overseas. There are only few researchers who can make such contribution in Japan.
- (3) Are current activities and plans based on the results of the 3rd Mid- to Long-Term Plan or the achievements in the previous position? Are they in line with the BRC's 4th Mid- to Long-Term plan (7 years from 2018 to 2024)? Are they appropriate and do they contribute to the development of the center?
- The Integrated Bioresource Information Division aims to “promote use of bioresources by information technology.” The Division planned the following three programs: 1) improvement of homepage contents, 2) data integration and standardization, and 3) big data analysis and data visualization. These plans are appropriate and will greatly contribute to the center's development.
 - It is particularly important to develop information technology and to strengthen the information infrastructure to extract information and value from resources. It may be difficult to implement homepage enrichment and metadata integration due to a limited budget and human resources. To overcome this problem, it is necessary to have cooperation from all Divisions in BRC.
 - Regarding enrichment of BRC homepage contents, there are plans to reduce the number of servers and labor while making enhancements. Although it will take a great effort, steady progress is anticipated including consolidation of homepage contents.
 - Metadata integration, international standardization, and development of search system across the BRC resources are the major efforts toward the development of the new web catalogue of BRC. These are leading the development of data utilization infrastructure for bioresources.
 - Big data analysis and visualization technology should be developed by the Division but not by private companies. This is a unique and meaningful way for RIKEN BRC, the public entity.
 - The implementation of the metadata integration and cross-search is core project of the Division. Progress should be measured by some metrics that enable the comparison between achievements and the plan.

(4) What are resources to be developed and research/ technological development to be undertaken in addition to those currently planned in the initial 4th Mid- to Long-Term Plan?

- Automation of updates of Web contents
- Follow-up survey on how the distribution of bioresources and information has contributed to the society
- Development of indicators for reassessing the quality of data provided
- Strengthen the security
- For design and development of a sustainable system, investigation of possible use of the cloud and SaaS (Software as a service) systems and a data analysis environment
- Performance issues should be addressed at the early stage of the Mid- to Long-Term Plan because they may occur with increased traffic
- To ensure long-term quality of Resource Description Framework (RDF), it is recommended that the Division should examine continuously setting metrics as follows: 1) sufficiency and appropriateness of annotations, 2) relevance of searches and commonality with other databases, and 3) constant monitoring.

2. SWOT analysis

(1) Are the results of the presented SWOT analysis valid?

- They are reasonable.
- It represents a step in the right direction towards data integration, although there are weaknesses in RDF technology. It is important to integrate data as data + ontology, as RDF technology is not essentially important.
- Similar issues have been pointed out as weakness and threat for many other data centers. As the strength of RDF-related technology is generally difficult to understand, easy explanation should be given for data integration research community.

(2) Are the countermeasures for the results of the SWOT analysis appropriate?

- It is appropriate.
- It is necessary to make plans for the Division to grasp user needs.
- Because target fields are extremely broad from medicine to agriculture, it is difficult to grasp users' needs by the Division alone. This is an issue that must be examined by whole RIKEN BRC.
- It is necessary to prioritize research plans in consideration of budget and human resource issues.

3. International exchange and cooperation

- (1) Is the international exchange being actively addressed, and is the Division functioning as a hub of international scientific technology?
 - The Division is actively undertaking eight international programs, including the Monarch Initiative, and seems to be functioning appropriately as a hub for science and technology internationally.
 - Collaboration with external databases for sharing of metadata and implementing cross-searches can be developed in the future.
 - Head of the Division is expected to demonstrate leadership, to promote Division's work more actively, and to increase international activities.

4. PI assessment

- (1) Is the PI fulfilling the role in line with the BRC mission?
 - The PI is fulfilling that role.
 - The PI is pursuing research and development which contributes to the application and development of basic technology for preservation and utilization of bioresources. Moreover, considering social and research needs, he has also prioritized the collection, preservation, and supply of bioresources of the world's highest standards. These initiatives are part of the BRC's 4th Mid- to Long-Term Plan. The PI is satisfactorily fulfilling the mission from the perspective of data resources, and he has great potential for the future.
- (2) Do the PI's achievements in research and development (R&D) satisfy international standards in light of the following three aspects? (i) Results output and impact, (ii) Contribution to specific missions of each laboratory regarding research support and collaborative exchange programs within RIKEN, (iii) Pioneering new fields of research, acquisition, and commercialization of intellectual property rights, social education for science, the fusion of different fields, and social contribution
 - International standards are being attained in each of (i)-(iii)
 - The PI is meeting all three aspects of the international standard, especially by focusing on (ii).
 - Development of the system allows users to search bioresources by disease name is particularly useful. The PI reaches international standards in the aspects of impact, mission, and novelty.

(3) Is the PI appropriately tackling the management and operation of the Division? In addition, does the PI make efforts for training and development of young talent?

- The management and operation of the Division is appropriate, and training of young talent is also being put in practice.
- The PI is working appropriately to recruit researchers for big data analysis. Personnel for metadata integration and data consolidation, as well as annotators and curators, should be employed stably in this Division.
- Since difficulties may arise in transferring personnel from pre-existed laboratories, the Director of BRC must take care of operation of the Division.

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