

**The 15th Committee for Genetic Resource
Evaluation and Suggestions**

(April 11, 2016)

Gene Engineering Division

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◎: Compulsory report items ○: Major report items ●: Optional report items

◎ 1-1a. *Have sufficient results been achieved? (The BRC's standing in the world, contribution to society.)*

- From the following perspectives, it can be evaluated as meeting or exceeding expectations:
 1. The Division has actively collected resources which serves an important role supporting research in the biosciences and has managed and provided those resources in an appropriate manner while seeking improvement in quality control.
 2. The number of resources that have been collected and provided have met target numbers, with a significant proportion (20%) provided to overseas users.
- The Committee points out and makes suggestions to produce sufficiently enhanced performance in the future:
 1. To become a “science and technology hub” and to further develop its capacity, the BRC must respond to the needs of a greater number of researchers on a worldwide basis. It must make improvements in a step-by-step manner without being bound to methods used in the past.
 2. For the purpose of advertising, it may be difficult for the BRC to participate in forums on its own. However, the BRC may participate in related international academic conferences and bio fairs as a member of NBRP. For this we must seek the support of MEXT and JAICA. Also, we suggest that RIKEN (through speeches by the President and the BRC Director) explains at forums, such as academic conferences, the

benefits of a national project for depositing and using resources, while seeking sufficient funding for this purpose.

3. To make sure an incident does not recur involving infringement of laws controlling export of certain microorganisms, measures need to be put in place. In addition to internet searches for the latest revisions of the relevant laws, routine contact with government ministries and agencies need to be enhanced so that the information is received beforehand.
4. To maintain high-quality resources which supports technology that is becoming increasingly diverse, the Division needs to promote research in genomic analysis and to develop the resources and the latest storage technology. Also, we expect that the importance of resources receive greater attention by increasing our collaboration with other institutes, users and the community.
5. The BRC's global ranking is likely to improve when sequencing and genomic analysis services are provided together with the resources by the Gene Engineering Division, including collaborative projects with other institutes.
6. Further reductions are expected in management, maintenance and supply costs.

© 1-1b. Responses to previous comments and advice

- In the following respects, we have rated our response highly.
 1. Use of English has increased; further effort is expected.
 2. Active research leading to collection of resources that involves clones related to CRISPR/Cas9 for genome editing, and vectors emitting visible fluorescent proteins, are commendable. Specific plans are needed for expanding the applications for use of resources.
- For further improvements, the committee recommends the following.
- (1) For further expansion into the international resource market, the following suggestions are made.
- i. Until now resource operations have been regarded as a “RIKEN project”. Transformation to a “national project” or a “project supported by national policies” will serve to reposition the operation as an activity benefiting the research community as a whole. For this, we need to consider changing the name of the BRC (candidates include “Bio-resources Community Center” and

- “Community Center for Bioresearch Materials”), with the possibility of starting a new organization independent of RIKEN, or changing the organizational structure so that RIKEN is no longer appears in the forefront.
- ii. At the least, provide leadership so that all biomaterials used for research in Japan are focused into one organization. For this purpose:
 - A) Convene a gathering of editors of relevant domestic journals attended by the center director and president (as well as MEXT officials). The purpose of the gathering will be to make sure that manuscripts of submitted papers contain correct citations on all deposited biomaterials used in the research.
 - B) In a manner similar to a) above, request that institutes and academic societies appoint officers in charge of deposited biomaterials. Take further measures, such as offering incentives to the officers.
 - C) Have researchers give citations in their papers stating that the biomaterials will be provided by XX (new organization’s name). Also whether or not deposited biomaterials will be used is to be added as a category in applications for Grants-in-Aid for Scientific Research (Kakenhi) proposals.
 - (2) Strategic measures currently in place should be continued by all means. On the other hand, decisions need to be made regarding obsolete resources.
 - For some portions that are deemed insufficient, the Committee points out and makes suggestions as follows:
 1. With respect to overseas resource organizations, specifically Addgene, there is a need to demonstrate our superiority, or at least coexist on equal terms (the former is more desirable). This should be considered the top priority of the BRC in the future.
 2. With respect to expansion into new fields, a high priority is given to the development of a reliable differentiation marker.

○ *1-2. Is the self-analysis of strengths and weakness adequate?*

- From the following perspectives, it can be evaluated as adequately analyzed. The Committee points out and makes suggestions for further improvement as follows:
 1. An action plan is necessary, taking into account the strengths and weaknesses.
 2. By holding technical lectures on a more regular basis, information on the effective use of resources may be more widely publicized.

Follow-up surveys are necessary to find out if lecture attendees used the services afterwards. In addition to targeting researchers presenting their papers, writers of experimental protocols and procedures should be contacted so that they can be introduced to the BRC.

- For some portions that are deemed insufficient, the Committee points out and makes suggestions as follows:
 1. Concerning a problem that has been given as a “weakness”, i.e. that the Division is not well known by the domestic research community, it is necessary to extend our analysis to problems in our organizational structure. That is, RIKEN is one of many scientific institutes in Japan, and the BRC provides a service by storing and providing material for RIKEN. However, Japan’s (and the world’s) research community does not consider the BRC a service that is available to them for storing and providing the material. This does not follow the government’s recent initiative to strengthen Japan’s science and technology and we need to publicize the fact that our services are broadly available for use by the scientific community. For this publicity, in addition to action by RIKEN and the BRC, we need the funding organizations, including MEXT, to cooperate by providing guidance for the research community.

© 1–3. *Is the plan reasonable for the medium to long term?*

- From the following perspectives, it can be evaluated as generally reasonable:
 1. The plan focuses on quality and ease-of-use. With regard to provisions on the direction to take, flexibility is the key.
 2. With respect to adjustment and collection of cancer cell genome stock DNA, it is necessary to clarify who is doing what research, and for what purpose.
 3. We recognize that there is a need to engage in R&D with an appropriate partner in a strategic manner. Also, to ensure the quality of clones, there is a need to post on our website precautions for handling and anticipated problems in words that are easily understood by beginners.
- For some portions that are deemed insufficient, the Committee points out and makes suggestions as follows:

1. The BRC needs to decide on its area of focus, and avoid dispersing its activity. Are we a research institute? Or are we primarily a science and technology hub?
2. In order to surpass Addgene functionally as well as operationally, we must operate very successfully as a hub. For this, we need to rebuild our organization, manage our priorities, and set a division of duties with partnering organizations in a clear manner. Funding and human resources must be secured.

© *2a. Have appropriate fields been earmarked for future prioritization?*

- The direction chosen is appropriate, in general. The committee gives the following suggestions for further improvement.
 1. When handling material derived from humans, ethical issues and ensuring source confidentiality are the biggest concern. We need to differentiate our services from those of biobanks, while also collaborating with them.
 2. With respect to genomic resources (especially metagenomics research) it is difficult to know what researchers really require. (We need to know, in specific terms, how the Division conducts market research.) Also, the purity and fragmentation of their genomic DNA varies. Therefore disclosure of data on the variation found in the methods and conditions of extraction for their DNA sources would be considered sufficient.
- The following area was found inadequate and this suggestion is made.
 1. Technologies employed for genome editing will advance quickly. Therefore methods that take this into consideration (especially for gene knock-in techniques) are desirable.

© *3-2. Are the policies for future resource infrastructure and technology development appropriate?*

- From the following perspectives, it can be evaluated as generally appropriate:
 1. There is a need to clarify selection criteria for collecting of resources.

3-3. Innovation hub

- *(i) Collaborations with industry, government, and academia*

- It can be evaluated as generally sufficient, but the Committee points out and makes suggestions as follows for further improvement:
 1. As resource facility development and storage – and supply services – are becoming increasingly important, collaborations within the BRC need to be enhanced, especially among those involved in infrastructure-related work.

○ *(iii) Continuous operation and attracting new users*

- From the following perspectives, it can be evaluated as sufficient:
 1. Looking at the characteristics of the users (such as purpose of use and possible ripple effects), and actively promoting exchange with the community and within RIKEN, will allow better prioritization of resources provided (leading to smooth operations) and an expansion of the user base. The Gene Engineering Division is requested to consider methods of optimal utilization for the resources currently in use. Furthermore, collaborations between locations and disciplines, and support services after provision of genome resources (such as sequencing and analysis), need to be promoted, which will lead to expanded use of resources and assessment of research patterns and problem areas. (Joint research is also possible, but fees must be charged to beneficiaries.)
- The following area was found inadequate and this suggestion is made.
 1. For our facilities to develop into a “science and technology hub” it is likely that we will need to radically change our current method of operation and devote our energy to refining our function as a hub. We think that the BRC needs to concentrate on a new initiative to develop resource platforms based on the research results of other institutes, which may involve joint projects with other institutes. Without such efforts it is unlikely that the BRC will be able to transform into a science and technology hub.