RIKEN BioResource Center Resource Committee of Gene Engineering Division Review Sheet
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Gene Engineering Division

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Summary

1. Achievements during the last three years (FY 2006 to FY 2008)—banking, research and development, international collaboration, public relations, training and education, and others

- **Evaluation**

  Achievements generally exceed expectations.

  Specific Comments:

  None

- **Advice and suggestions**
- The BRC activities achievements outweigh the costs invested.
  - It will be important to improve the positioning of gene engineering division within BRC.
  - The policy for collection and preservation DNA materials is better to be clearly presented every year.　Any changes of the policy of banking strategy and the action to address these changes are better to be provided.
  - The key lies in differentiating the collection of BRC's gene library from those of other banks and marketed products.
  - Twenty-five percent of the genes are provided to overseas institution, which is satisfactory, but merely 3% of them are provided to private companies. There must be some reason that the companies do not want to use the BRC resources, which should be investigated and discussed.
  - It would be much better to distribute as the expression vectors in *E. coli* or animal cells of human and mouse cDNAs.
  - Non-coding and microRNAs in human and mouse are also the candidates for the collection.
  - It is important to develop novel techniques for preservation of recombinant DNAs, which will eventually lead to maintain the stable banking activities of BRC financially.　The achievement of this technique will be one of the breakthrough in the storage of recombinant clones for a long period and as intact-lived preservation.　This new

technology can solve the problems of the huge waste of electricity and the large space for the storage.

- The achievements of technology development are significant more than we expected. The development of technology of two-vector systems is also excellent. The use of protein cleavage enzymes and other systems as the two-vector systems might be also interesting.
- In order to show the high level of research and development by RIKEN BRC, it is desirable to improve human resources and increase the budget allocation. Researchers are encouraged to conduct more adventurous research and development. BRC should request more personnel and budget needed to conduct such research and development from RIKEN and MEXT.
- Training programs that lead to stable employment should be promoted.
- Improvement in training programs provided to external researchers may result in more users.
- International exchanges of DNA resources should be promoted more effectively, particularly with institutions in other Asian nations (China, Taiwan, India, Korea, Southeast Asian nations, etc.) in order to expand DNA collection. Collaboration with them to share the resources and their resource informations is recommended. If DNA materials are supplied to China or other Asian nations, we had better ask the requirement of exchanging the DNA materials as international cooperation.
- Efforts to promote international cooperation with South America (Mongoloid DNA) should be continued because their resources are sufficiently interesting.

2. Responses to issues raised in the Resource Committee meetings of the past three years (FY 2005 to FY 2007)

- **Evaluation**

There has been a serious effort to respond to the comments, and BRC's operations have expanded as a result.

Specific Comments:

- Particularly noteworthy prompt and direct responses include the creation of backup copies of the library on a local level (Harima) for a short period of time and the start of developing a low-cost technique to preserve strains.

- **Advice and suggestions**
  - The importance of the banking of the DNA resources will be increased in near future.

To ensure persistency, MEXT should take backup in collaboration with academia.

- Views on complex issues are likely to change over time. The flexibility as well as the fixed policies is necessary sometimes in addressing these issues. Committees may take the lead to solve the problems in addressing these issues.
- Resources used less frequently but constantly should not be neglected. If evaluations will be made based on the total amount of distributed DNAs, such resources will be evaluated as less important. For this reason, the method of evaluating resources should be reviewed.
- One of the key requirements to maintain this project over the long term is to analyze and respond to the requests from the users like what DNA materials they are easy to use.
- If the key part of the project is outsourced, RIKEN BRC has take responsibility at least for storing many seeds without any obligation to provide them, instead of leaving everything to the contract agency.

3. What DNA materials we should collect, preserve and distribute within the next two to three years

- **Advice and suggestions**
  - The current policy and the direction of GED are valid.
  - In the future, more emphasis should be placed on expanding the reporter series and cloned cDNA set bank. BRC should provide information on how to use them, examples of their uses, and their effectiveness.
  - In order to make progress in iPS research, it will be important to prepare and preserve these genes of transcription factors and their related genes to show the initiation of nuclei.
  - Mongoloid DNA is precious. It should be collected from various countries around the world after obtaining consensus, and should also be analyzed. It is recommended to use another type of transformation of human cells like HPV (human papillomavirus). The genome of HPV can be maintained relatively stably in lymphocyte immortalization as those of EB viruses can.
  - DNAs from diverse organisms also serve as precious sources.
  - Collection and improvement of expression vectors of target proteins, cDNAs and lentiviruses are required.
  - DNA collection and preservation should be linked to projects to develop genome sequence data with the next (and third) generation sequencers and database of epigenetic analysis.
  - For example, as basic materials for cancer therapy.
    - It is recommended to prepare the genome clones and/or cDNA clones of protein toxin of bacteria, fungi (*actinomyces* etc.) and plants, such as *Pseudomonas aeruginosa* exotoxin, diphtheria toxin, and RIPs of plants. In supplying them, careful attention must

be paid to prevent them from being used for bioterrorism.

- If a set of integrin cDNAs (human, mouse, rat) and a set of various types of adhesion molecules and the CD series (to 300) (human, mouse, rat, cDNA) could be prepared, it would be greatly appreciated. If these cDNAs are provided in expression vectors, it would be very useful.

➢ Because the preservation and quality control of genetic products (proteins, etc. /only representative ones such as antibodies etc.) are difficult, banking plan of these products should be post-ponded for a while. The expression vectors of these proteins may be more useful than protein resources themselves (In a future it might be reconsidered the possibility of collection which are easy to use and highly stable such as antibodies).

4. Others

- **Specific Comments:**
- The 20%-discount for purchasers of 20 or more DNA resources is decided.**Advice and suggestions**
  - ➢ Actual expenses for companies may be raised.
  - ➢ The Hamada's cDNA clones are excellent. The collection of Dr. Hamada's library is welcome.
  - ➢ How should we respond to a demand for a larger number of clones? It is necessary to discuss how to address the users of DNA materials, for example, those who request a series of the large collections. .
  - ➢ Human targeted-antibodies are recommended to be collected in a future.
  - ➢ Any DNA clones that are currently marketed by the private companies might be terminated within 10 years. The useful clones among them might be better to be selected and collected. Although it is not currently possible, but in future, RIKEN BRC or other public institutions should be responsible for distributing them.
  - ➢ As mentioned before, the special budget for researches using BRC bioresources should be allocated by BRC or MEXT, in attempt to promote the sciences by feed-back use within Japanese academia,.