

# BioResource Now !

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No.49

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Hot News <NO.49>

## Launch of the Indonesian Culture Collection, Indonesian Institute of Science

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### Introduction

The territory of Indonesia consists of more than 10,000 islands, which spread 5,000 km from east to west along the equator, and its biological diversity is ranked second in the world. Academic exchange with Japan is active; many researchers in the field of microbiology have studied in Japan; and international, cooperative research is often being performed. The Indonesian Institute of Science (Lembaga Ilmu Pengetahuan Indonesia (LIPI)) is under the direct jurisdiction of the President of Indonesia and performs a wide range of research. In particular, the Research Center for Biology (RCB) and the Research Center for Biotechnology are famous in the field of biological science, with the former in charge of basic biology and the latter handling applied research. Recently, the Research Center for Biomaterials was also established. The Bogor Botanic Garden has a long history of research on biodiversity in Indonesia in terms of zoology and botany, and it has been continuous since Indonesia's time under Dutch rule. Philipp Franz von Siebold is said to have visited the Bogor Botanic Garden, bringing with him plants from Japan. The Japan International Cooperation Agency (JICA) constructed research facilities of zoology and botany in the Cibinong Science Center near Bogor City in 1995 and 2005, respectively, using Japan's official development assistance, and has laid the foundation for further specimen management and research. At that time, the construction of a microbiology research facility was still in the planning stage.

### Access to a microbial resource in a country that provides the resource

After the Convention on Biological Diversity came into effect in 1993, a country where a biological genetic resource is located is allowed to possess the sovereign right of the resource, thus complicating access to overseas genetic resources.

The Convention on Biological Diversity requests the conservation of biodiversity, the sustainable use of its components, and the fair and equitable sharing of benefits arising from their utilization (access and benefit-sharing (ABS)). In other words, the use of a genetic resource must follow the laws and regulations of the country where the resource is located. However, most countries have not prepared organizations or municipal laws to clearly indicate the procedure for ABS or to promote the use of genetic resources. Therefore, international cooperative research has been highly restricted.

Since microorganisms cannot be seen with the naked eye, these are difficult to manage as genetic resources. However, as microorganisms are important materials for ecological and applied research, it is necessary to establish an environment enhancing the international use of microorganisms so that developing countries can enjoy benefits arising from the use. Culture collections have played an important role in the collection, preservation, and provision of live microbial strains for researchers to obtain academic results by using microorganisms. With the Convention on Biological Diversity now in effect, culture collections are expected to play a new role as institutions managing microbial resources at the national level.

### Science and Technology Research Partnership for Sustainable Development project

In cooperation with LIPI, the National Institute of Technology and Evaluation (NITE) Biological Resource Center (NBRC) proposed the Science and Technology Research Partnership for Sustainable Development (SATREPS) project to support the Development of Internationally Standardized Microbial Resources Center to Promote Life Science Research and Biotechnology. The project proposal was adopted and ran for five years, through March 2016. This project was a joint project of JICA and the Japan Science and Technology Agency (JST), enacted to establish a microbial resources center in LIPI, to make the established center have functions

for supporting the international transfer of microbial resources as a research base for microorganisms in Indonesia, to introduce the diversity of microorganisms originating from Indonesia, and to promote the use of these microorganisms. I acted as the representative of Japan in this project, and in addition to NITE, the University of Tokyo and the RIKEN BioResource Center also participated in this project.



Lyophilizer for producing ampoules

The SATREPS project was not supported only by Japan. Local infrastructures were borne by Indonesia because these infrastructures require maintenance following the completion of the project. In the project, instruments required for preserving and taxonomically analyzing microorganisms were prepared, and knowledge and skills on managing and operating the microbial resources center were transferred from Japan to Indonesia. Handling methods and research approaches differ according to the type of microorganism; therefore, by isolating many strains of bacteria, archaeobacteria, yeasts, filamentous fungi, microalgae, and bacteriophages from the natural environment of Indonesia and taxonomically analyzing these strains, the project attempted to increase the number of microbial strains to be preserved and cultivate human resources for each taxon.

### InaCC

The Government of Indonesia, recognizing the importance of this project, constructed a research and preservation facility with a 3,500 m<sup>2</sup> floor area in the LIPI Cibinong Campus and established the Indonesian Culture Collection (InaCC) at LIPI. In this five-year project, more than 2,000 strains of microorganisms originating from Indonesia were collected, registered, and preserved via InaCC, and can, at present, be provided for research. Of the 2,000 strains, approximately 700 strains have also been preserved at NBRC and are open to the public. Japanese researchers can use the strains of microorganisms originating from Indonesia preserved in InaCC for their research.



Full view of the InaCC building in LIPI

For Japanese researchers to perform cooperative research with Indonesian researchers in the future, it is desirable that InaCC has a mechanism to support a legal transfer of the strains of microorganisms to Japan. In the opening ceremony of InaCC in September 2014, the Vice President and the Minister of Research and Technology of Indonesia announced in their congratulatory speeches that this facility is expected to become a business model for biotechnology in Indonesia, meaning that InaCC will be the foundation for the active use of genetic resources in Indonesia. I hope that the results obtained by using InaCC will promote more cooperative research between Japan and Indonesia in the future.

### Future perspective

NBRC can also be used to acquire the strains of microorganisms originating from Indonesia in Japan. ABS indicates the appropriate sharing of benefits arising from the use of genetic resources, with those benefits here including monetary benefits arising from the use of genetic resources by companies, cultivation of human resources, graduation of students studying abroad, and publication of joint papers.

If countries where genetic resources are located do not understand how to utilize benefits arising from the use of genetic resources, the only apparent role of the Convention on Biological Diversity is to restrict the access to genetic resources. It is regrettable that, since many developing countries do not have an appropriate scheme for providing genetic resources, the progress of young researchers and research on their own genetic resources will be hindered. In the SATREPS project, 18 original papers were published under the joint authorship between Japanese and Indonesian researchers, and new species of microorganisms were registered with InaCC. I hope that similar cases occur in other countries, that experts who can manage genetic resources located in their own countries are groomed, and that an environment where genetic resources can be used for international cooperative research and industries through simple procedures is established.

### Contact address of InaCC

(For details, please refer to reference material 3)  
 Head of Collection: Dr. Atit Kanti  
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### Acknowledgments

I am grateful to Japanese and Indonesian researchers for their participation in the SATREPS project, the executives of LIPI and NITE for their support, and the staff of LIPI and NITE for their cooperation.



Liquid-dried ampoules of InaCC

#### Reference materials (websites)

1. SATREPS project reports  
[http://www.jst.go.jp/global/kadai/h2211\\_indonesia.html](http://www.jst.go.jp/global/kadai/h2211_indonesia.html)
2. NITE Biological Resource Center (NBRC)  
<http://www.nite.go.jp/nbrc/index.html>
3. NBRC's bilateral relations with Asian nations  
<http://www.nite.go.jp/nbrc/global/asia/index.html>
4. Website of InaCC, LIPI  
<http://inacc.biologi.lipi.go.id/>
5. Survey reports on Indonesia and other countries by the ABS Task Force Team for Academia, National Institute of Genetics  
[http://nig-chizai.sakura.ne.jp/abs\\_tft/report/top/](http://nig-chizai.sakura.ne.jp/abs_tft/report/top/)

## Introducing the online research platform Benchling

Ongoing Column [No. 111]



In this article, I introduce Benchling, a life sciences online research platform. Benchling (<https://benchling.com/>), Inc., the company that provides this service, is a start-up established in 2012; since then, it has grown to provide services to over 40,000 scientists worldwide, as of October 2016.

The platform offers two plans: the free Personal Plan and the paid Enterprise Plan. In order to login to the Personal Plan, you can either use your existing Google account or create a new account in Benchling.

When you login for the first time, you will be asked to choose between creating a new lab notebook and start designing a primer or a CRISPR gRNA. The lab notebook allows you to perform the following functions (Fig. 1):

- Collect ideas, data, and research papers to a single location. You can add images and DNA sequences directly to the lab notebook by drag-and-drop.
- You can also place PDF files or presentations right next to your notes.
- You can easily create links to files and sequences in the notebook.
- You can search for files stored within Benchling. After creating a "To Do" checklist, you can review the activities performed during the current month.
- The lab notebook has a built-in version history, allowing you to view previous versions of the notebook.

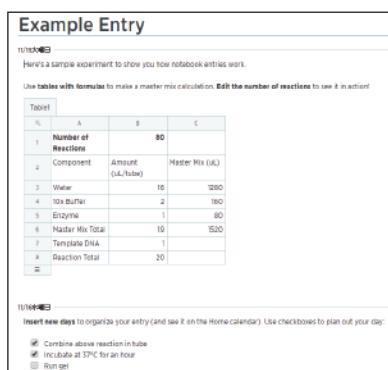


Figure 1. A sample lab notebook

Benchling provides a suite of microbiology tools for designing primers and can perform the following functions:

- Share registered plasmids and oligo DNA with other members of your laboratory.
- Obtain consensus sequences using the sequence alignment tool.
- All files have version history, and data can be exported in just a few steps.

For example, to use the DNA sequence of the E. coli MG1655 strain, first enter its accession number "U00096" in the search form and then click on the Import button, and the process is complete. As shown in Figure 2, the DNA sequence and gene information are displayed in a linear format on the left-hand side, while genes are displayed in a circular format on the right-hand side. By selecting sequences on the left-hand-side viewer, you can perform various actions, including BLAST search and primer design, using simple clicks of the mouse.



Figure 2. Viewing the DNA sequence of the E. coli

The platform offers many other functions besides the ones already mentioned, including laboratory sample management and the ability to make lab notebooks and sequence data public or share them for collaboration. Due to the online nature of the software, new functions are being added continuously. Why not give it a try?

(Gaku Kimura)

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### BioResource Information

(NBRP) [www.nbrp.jp/](http://www.nbrp.jp/)  
 (SHIGEN) [shigen.nig.ac.jp/indexja.htm](http://shigen.nig.ac.jp/indexja.htm)  
 (WGR) [shigen.nig.ac.jp/wgr/](http://shigen.nig.ac.jp/wgr/)  
 (JGR) [shigen.nig.ac.jp/wgr/jgr/UrlList.jsp](http://shigen.nig.ac.jp/wgr/jgr/UrlList.jsp)

### Editor's Note

Professor Suzuki, a specialist in taxonomy of bacteria who has made every effort to preserve microbial strains during his career, kindly introduced the establishment of a new microbial resources center in Indonesia. In particular, Professor Suzuki directly addressed problems with ABS, which obstruct international cooperative research using genetic resources, and laid the foundation for Japanese and Indonesian researchers to more easily perform cooperative research—a great achievement by Professor Suzuki. As Professor Suzuki wrote in the article, I also hope that other developing countries can effectively utilize their genetic resources through SATREPS projects. I am grateful to Professor Suzuki for his kind contribution during his busy schedule. (Y. Y.)

