

**ANNUAL REPORTS  
OF  
INTERNATIONAL CENTER FOR BIOTECHNOLOGY  
OSAKA UNIVERSITY**

**VOL. 39, 2017**

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The Annual Report is published to record the activity of the International Center for Biotechnology (ICBiotech) and issued once in each fiscal year. It contains scientific articles, progress reports, letters, and announcement from the Center. This volume includes publications by the former participants in UNESCO courses. The editor welcomes the submission of appropriate articles from all persons who are concerned with the activity of the Center. All the contributions, however, will be reviewed by editors before their acceptance. The scientific paper herein should be treated as personal communications and not treated as original publications. The Annual Report is distributed upon request to the International Center for Biotechnology, Osaka University, 2-1 Yamadaoka, Suita, Osaka 565-0871, Japan (e-mail: [info\\_icbio@icb.osaka-u.ac.jp](mailto:info_icbio@icb.osaka-u.ac.jp)).

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## **ACTIVITIES OF ICBiotech**

## ACTIVITIES OF INTERNATIONAL CENTER FOR BIOTECHNOLOGY FOR FY2017

The International Center for Biotechnology (ICBiotech) was founded in April 1995 as an independent institute in Osaka University with a mission to pursue academic advancement and collaborative research in biotechnology. ICBiotech has its origin from the “International Center of Cooperative Research Center in Microbial Engineering Japan (ICME)” which was established in the Faculty of Engineering, Osaka University in April 1978, through renaming to “International Center of Cooperative Research in Biotechnology (ICBiotech)” in April 1985 with the recognition of the wide acceptance and success of ICME’s activities and achievements.

ICBiotech is dedicated to promote international cooperation among Asian countries in the aspects of research and educational advancement in the field of Biotechnology by propelling academic interactions in Asian countries, and is committed to industrial biotechnology studies by means of microbial engineering and related sciences, focusing on the sustainable utilization of abundant natural resources in Southeast Asian countries.

ICBiotech serves as the seat of education and research in Asia, with the support of the Ministry of Education, Culture, Sports, Science and Technology (Monbu-kagaku-sho, MEXT), the Japan Society for the Promotion of Science (JSPS), the Japan Science and Technology Agency (JST), the Japan Student Service Organization (JASSO), and the auspices of the United Nations Educational, Scientific and Cultural Organization (UNESCO), with the cooperation of Department of Biotechnology, Graduate School of Engineering, Osaka University, and researchers from prestigious universities nationwide and abroad.

In 2002 Mahidol University-Osaka University Collaborative Research Center for Bioscience and Biotechnology: MU-OU:CRC was set up at Faculty of Science, Mahidol University as a collaborative research center to accomplish multidisciplinary research in the field of Bioscience and Biotechnology.

The activities of the ICBiotech include:

### 1. Research and Education

The main area of research is industrial biotechnology rooted in microbial engineering, whilst centering on the sustainable use of agricultural and forest resources in bioresource-rich countries such as those in Southeast Asia. Research is underway in the field of cell engineering with the objectives of analyzing the cellular functions of bacteria, fungi and plants, and developing and using functions of these cells for management and rational use of biological resources that exist on our planet. ICBiotech covers three areas of Biotechnology:

- 1) Discovery of new functions from biological resources.
- 2) Bio-conversion and process engineering of biological resources.
- 3) Conservation of biological resources.

For under graduate and post graduate courses, ICBiotech is involved in the education activities of Department of Biotechnology, Graduate School of Engineering as collaborating laboratories and currently covers several fields of biotechnology in education and research: Molecular Microbiology laboratory chaired by Prof. Takuya Nihira and Applied Microbiology laboratory chaired by Prof. Kazuhito Fujiyama.



2. Participating in FrontierLab@OsakaU 'Scientific Empowerment Program for International Students' which was created for international students to conduct thematic studies and achieve results under the guidance of supervisors while acquiring skills necessary for continuing research in one of Osaka University's internationally renowned science and technology laboratories for a period of up to 12 months.
3. Acting as collaborating laboratories with Department of Biotechnology, Graduate School of Engineering, Osaka University for 'Biotechnology Global Human Resource Development program', a five-year program for master's and doctor's degrees. The aim of this program is to expose graduate students (privately financed as well as the Japanese Government Scholarship students) to state-of-the-art research skills and in-depth knowledge of advanced biology, chemistry and physics to harness the potential of biotechnology.
4. Having been administrating and implementing the "UNESCO Biotechnology School in Asia" (2012-2016) at Department of Biotechnology, Graduate School of Engineering, Osaka University, taking over the long-termed "International Post-Graduate University Course in Microbiology" (1972-2003) and Postgraduate Inter-University Course in Biotechnology (2004-2007) with total of 459 alumni spreading all over Asia.
5. Serving as the secretariat for the UNESCO Regional Network for Microbiology and Biotechnology in Southeast Asia in accordance with a proposed memorandum resulting from a Consortium Meeting of the Project "Tropical Bio-Resources and Green Chemistry Strategy" (Osaka 2003).
6. Working as a member of the global network "Microbiological Resource Centers" (MIRCENs) operated by UNEP, UNESCO and ICRO; and as an original member of the "Regional Network for Microbiology in Southeast Asia" operated under the auspices of UNESCO through the Fund-In-Trust of the Japanese Government (J-FIT).
7. Promoting international cooperative researches in biotechnology with the Southeast Asian countries related to Biotechnology, under the support of Monbu-kagaku-sho Grant-in-Aids for International Scientific Research. In addition, ICBiotech cooperates in developing international organization and conducting academic seminars related to biotechnology.
8. Publishing Annual Reports of ICBiotech periodically.

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## I. COOPERATIVE RESEARCH STATION (CRS) IN SOUTHEAST ASIA

The ICBiotech, Osaka University launched out the Cooperative Research Station (CRS) in Southeast Asia at Chalermprakiat Building, Faculty of Science, Mahidol University in 2002 through the generous support by Mahidol University. The CRS's space and equipments are made available for Southeast Asian and Japanese researchers to undertake cooperative onsite researches on the development of the abundant natural biological and genetic resources and their sustainable utilization in Southeast Asian countries through JSPS core university program (ended in 2005), JST Special Coordination Funds for Promoting Science and Technology (2006-2009) and JSPS Asian CORE Program (2009-2014). The CRS also functioned as a lecturing and research station of the UNESCO International Post-graduate Inter-University program, which Osaka University operated in coordination with Thai universities. The CRS is considering support to the alumni of Osaka University and provision of university information for recruitment of students for study in Osaka University.

Mahidol University (MU) and Osaka University (OU) together established the Mahidol University-Osaka University Collaborative Research Center (MU-OU:CRS) for Bioscience and Biotechnology at Faculty of Science, Mahidol University in 2002, to strengthen the research cooperation in these fields which are amongst the most active fields of study and research in both universities.

Currently, MU-OU:CRS has coordinated a research projects under the jointly support of National Research Council of Thailand (NRCT), National Center for Genetic Engineering and Biotechnology (BIOTEC) and The Japan Society for the Promotion of Science (JSPS). Researchers from Mahidol University, Chulalongkorn University, Kasetsart University, King Mongkut's University of Technology Thonburi and BIOTEC participate in this project.

CRS is conducting researches on

1. Strain improvement of *Bacillus thuringiensis*.
2. Screening of actinomycetes for bioactive compound.
3. The soil metagenome for screening of potential polysaccharide-degrading enzymes.
4. Cell culture system for screening of bioactive compounds from Streptomycetes and environmental fungi.
5. Quorum sensing interference: Novel biocontrol strategies for pathogenic bacteria.

**The Ceremony for the 15th Anniversary of Cooperative Research Station in  
Southeast Asia  
International Center for Biotechnology, Osaka University  
and  
Mahidol University and Osaka University Collaborative Research Center  
for Bioscience and Biotechnology**

August 4, 2017

The Sukosol Bangkok Hotel  
Kamolthip 1, 2nd floor 477 Si Ayuthaya Road, Phayathai, Bangkok 10400, Thailand

## **Program**

08:00 -09:00 Registration

09:00 -09:10 Report on the activity of Cooperative Research Station in Southeast Asia (OU: CRS): Prof. Kazuhito Fujiyama, Director, ICBiotech. Osaka U  
Report on the activity of Mahidol U - Osaka U Collaborative Research Center for Bioscience and Biotechnology (MU-OU: CRC):  
Prof. Watanalai Panbangred, Head, MU-OU: CRC, Faculty of Science, Mahidol U.

09:10-09:20 Opening Address:

Assoc. Prof. Sittiwat Lertsiri, Dean, Faculty of Science, Mahidol U

09:20-09:50 Adresses:

Prof. Pornchai Matangkasombut, Emeritus Professor, Mahidol U

Prof. Toshiomi Yoshida, Emeritus Professor, Osaka U

Prof. Amaret Bhumiratana, Emeritus Professor, Mahidol U

Prof. Tatsuji Seki, Emeritus Professor, Osaka U

09:50-10:00 VDO presentation

10:00-10:15 Coffee / Tea break

10:15-10:45 Prof. Takeshi Omasa, "Next-generation therapeutic antibody production using CHO cell platform"

10:45-11:15 Asst. Prof. Choowong Auesukaree, "Molecular mechanisms of yeast adaptive responses to stresses associated with ethanol fermentation: from basic research to applications"

11:15-11:45 Prof. Masahiro Kino-oka, "Cell manufacturability for regenerative medicine"

11:45-12:15 Dr. Suparerk Borwornpinyo, "An introduction to Excellent Center for Drug Discovery (ECDD), the drug screening platform in Thailand"

12:15-12:35 Shimadzu lecture: Dr. Shin-ichi Kawano "Activitiy of Osaka University-Shimadzu Corporation Analytical Innovation Joint Research Laboratory"

12:35-14:00 Lunch

14:00-14:30 Prof. Eiichiro Fukusaki, "Application of metabolic fingerprinting for food evaluation"

14:30-15:00 Assoc. Prof. Manop Suphantharika, "Production and utilization of yeast extract and  $\beta$ -glucan from spent brewer's yeast"

15:00-15:15 Coffee / Tea break

15:15-15:45 Prof. Toshiya Muranaka, "Redesign of biosynthetic pathway of plant specialized metabolites by genome editing"

15:45-16:15 Assoc. Prof. Chuenchit Boonchird, "Medicinal herbs as new source of phytoestrogens"

16:15-16:30 Closing ceremony (Professor Takuya Nihira, Professor Watanalai Panbangred, Professor Kazuhito Fujiyama)

## II. UNESCO COURSES

### 1973-2003: UNESCO International Post-Graduate University Course in Microbiology

### 2004-2007: UNESCO Postgraduate Inter-University Course in Biotechnology

The two long-term training courses held in Japan launched in response to the recommendations concluded at a UNESCO General Conference Meeting. After the operation of 33 batches for developing human resources in Asia, total 459 young researchers from all over Asian countries are now playing active and leading roles in current biotechnology research and education in the region to contribute to the development of their own country, and consequently to Asian countries, and the establishment of the closer and stronger network in the region.

### 2011-2013: UNESCO training project Supported by ODA Grants for UNESCO Activities, MEXT (One-month lab revisit in summer)

The Program was designed to provide researchers related to the UNESCO course with the opportunities to acquire advanced skills and knowledge and to exchange ideas of research at Japanese universities and also to create, sustain and/or strengthen collaborative linkages with Japanese researchers. Purposes: (1) To provide the opportunity for the alumni and related young researchers to visit laboratories at Japanese universities to be exposed to leading-edge research, to upgrade research skills, and to facilitate exchange of researchers. (2) To rebuild up networks among researchers between Japan and Asian countries in the field of biotechnology. (3) To strengthen and sustain the network among the alumni of our UNESCO courses beyond generations and countries.

Participants from 2011 to 2013

Country	2011	2012	2013	Total
Bangladesh	2		1	3
China		1	1	2
India		1		1
Indonesia	3		3	6
Mongolia			1	1
Pakistan		1		1
Philippines	3	1	1	5
Thailand	4	4	6	14
Vietnam	3	1	1	5
<b>Total</b>	<b>15</b>	<b>9</b>	<b>14</b>	<b>38</b>

### 2012-2016: UNESCO Biotechnology School in Asia (JFIT Project)

The Program was launched in October 2012. This program was an activity of the “UNESCO Extra-budgetary Program for Human Resources and Research Network in Sciences and Technology” supported by the Japanese Fund-In-Trust (JFIT). The course was a program of the scientific training for young Asian university-graduates in the field of Biotechnology and related areas resulting in achieving master degree, and the participants were expected to make significant contributions to an educational or scientific institution in the coming years in their home countries. It aimed also to strengthen the network activities among the biotechnology scientists in the region.

1st Batch of school (2012 Aug - 2014 July)

Country	Affiliation	Allocated	U to study	Number
Cambodia	Royal U of Phnom Penh	Thailand	KMUTT	2
Cambodia	Royal U of Phnom Penh	Thailand	Mahidol U	2
Laos	National U of Laos	Thailand	Chulalongkom U	1
Laos	National U of Laos	Indonesia	Institut Teknologi Bandung	1
Vietnam	VNU, Ho-Chi Minh	Thailand	Kasetsert U	1
Thailand	Chulalongkom U	Japan	Osaka U	1
Indonesia	Institut Teknologi Bandung	Japan	Osaka U	1
Indonesia	Gadjah Mada U	Japan	Osaka U	1
Philippines	UPLB	Japan	Osaka U	1

2nd Batch of school (2013 Aug - 2015 July)

Cambodia	Royal U of Phnom Penh	Thailand	KMUTT	2
Cambodia	Royal U of Phnom Penh	Thailand	Mahidol U	2
Cambodia	Royal U of Phnom Penh	Thailand	Chulalongkom U	1
Vietnam	VNU, Ho-Chi Minh	Indonesia	Institut Teknologi Bandung	1
Laos	National U of Laos	Thailand	Kasetsert U	1
Thailand	Mahidol U	Japan	Osaka U	1
Indonesia	Gadjah Mada U	Japan	Osaka U	1
Philippines	UPLB	Japan	Osaka U	2

3rd Batch of school (2014 Aug - 2016 July)

Cambodia	Royal U of Phnom Penh	Thailand	KMUTT	2
Laos	National U of Laos	Thailand	Chulalongkom U	1
Laos	National U of Laos	Indonesia	ITB	1
Laos	National U of Laos	Thailand	KMUT	1
Laos	National U of Laos	Thailand	Chulalongkorn U	1
Vietnam	VNU, Ho-Chi Minh	Thailand	KMUTT	1
Mongolia	MUST	Thailand	Mahidol U	1
Indonesia	Institut Teknologi Bandung	Japan	Osaka U	1
Philippines	UPLB	Japan	Osaka U	1
Thailand	KMUTT	Japan	Osaka U	1

### III. WORKSHOP

#### **The 7th Workshop on Collaboration between Osaka University and Japanese companies for global human resource development in the field of biotechnology**

January 19, 2018

International Center for Biotechnology, Osaka University

Sponsorship; International Center for Biotechnology, Osaka University

Co-sponsored; International Research Initiative for Frontier of Industrial Biotechnology, Osaka University

The seventh Workshop on Collaboration between Osaka University and Japanese companies was held. Representatives of industries engaged in the biotechnology industry were introduced to the international students enrolled at Osaka University for the purpose of attaining international human resource development. A total of eight enthusiastic companies attended the meeting. Companies, faculty members and students introduced themselves and their activities to one another. Students were able to know about the Japanese companies and how to apply their scholarly works in the industrial biotechnology setting. Adding to the great success of this meeting are the lively discussions and exchange meetings which have resulted in a deepened understanding of each other.

14:00: Opening remark by Prof. Kazuhito Fujiyama

14:00-14:45: Special lecture “Company Introduction and its HR Strategy”  
by Yoshiro Numata (Nagase & Co)

14:45-15:05: Coffee Break

15:15-17:40: Group talking with individual company  
(45 min each, three rounds at  $\alpha$  building and  $\beta$  building in ICBiotech)

15:15-16:00: 1<sup>st</sup> Round

16:05-16:50: 2<sup>nd</sup> Round

16:55-17:40: 3<sup>rd</sup> Round

Attending companies are:

Ajinomoto General Foods, Inc. ( $\alpha$ -401), Kao ( $\alpha$ -502)

Lion Corp. ( $\alpha$ -401), Nagase & Co. ( $\alpha$ -504)

NS Solutions ( $\alpha$ -504), Rohto Pharmaceuticals ( $\alpha$ -506)

Shimadzu Corp. ( $\beta$ -303), Sysmex Corp. ( $\alpha$ -501)

17:45-19:30: Simple party with light meal at International saloon ( $\beta$ -102).

#### **IV. JASSO STUDENT EXCHANGE SUPPORT PROGRAM Scholarship for Short Stay/ Short Visit Program (SSSV)**

This is a field study program jointly operated with GLOCOL (Global Collaboration Center), Osaka University and several universities in Thailand. In 2017, 25 first year master's degree students of Osaka University visited 4 universities in Thailand between August 6 and September 14, and 24 postgraduate students from Thailand visited Osaka University between October 2017 and March 2018, which enhanced mutual interactions.

#### **V. JST Japan-Asia Youth Exchange Program in Science (SAKURA Exchange Program in Science)**

Purpose of the Program: Promoting science and technology is a key engine to materialize a bright future of Asia and it is vitally important to enhance the exchange of youths in Asian countries and Japan who will play a crucial role in the field of science and technology. Based on this concept, "Japan-Asia Youth Exchange Program in Science" (SAKURA Exchange Program in Science) is the program for enhancing exchanges between Asia and Japan of the youths who will play a crucial role in the future field of science and technology through the close collaboration of industry-academia-government by facilitating short-term visits of competent Asian youths to Japan. This program aims at raising the interest of Asian youths toward the leading Japanese science and technologies at Japanese universities, research institutions and private companies.

##### ***Schedule***

November 5	Arriving
November 6	Orientation, Lab visit, Cutting-edge biotechnology experiment: briefing and experiment
November 7	Seminar on advanced biotechnology research Cutting-edge biotechnology experiment: data analysis and discussion Guidance of English course Lecture of cutting-edge biotechnology: Prof. Yamasaki, Osaka Prefectural University
November 8	Lab Visit in RIMD, Institute for Protein Research, OU and Hitz
November 9	Visit to Kiku-masamune Sake Brewery Museum, Himeji Castle, and Kikkoman Takasago Factory
November 10	Visit to Shimadzu Company in Kyoto and Kinkakuji-Temple
November 11	Visit to National Museum of Ethnology and Museum
November 13	Presentation of task, Certificate award Closing Ceremony
November 14	Back home

#### **VI. SCIENTIST EXCHANGES**

##### ***Record of Scientist Exchange (FY2017)***

From Japan to counterpart countries / Between counterpart countries

\*Please refer to the office.



## VII. GUESTS/VISITORS

\*Please refer to the office.

## VIII. COMMITTEE MEETING 2017

Steering Committee Meetings of ICBiotech were convened as follows:

- September 26, 2017: Discussion on inviting Visiting Research Scholars:
  - Mr. Ronilo Jose Danila (October 1, 2017-September 30, 2017)
  - Mr. Surya Agung Priyambada (October 1, 2017-September 30, 2017)
- October 11, 2017: Discussion on inviting a Visiting Research Scholar:
  - Ms. Dian Anggraini Suroto (October 17, 2017- September 30, 2017)
- November 29, 2017: Discussion on the employment of the full-time researcher:
  - Dr. Ingorn Kimkong (February 16, 2018 - March 15, 2018)
  - Dr. Nutthachai Pongprasert (February 16, 2018 - March 15, 2018)

Nominating Prof. Takuya Nihira for Professor Emeritus
- December 19, 2017: Concluding the cross appointment agreement:
  - Dr. Vu Thu Trang (March 1, 2018 - August 31, 2018)
- February 27, 2018  
Report on:
  1. JST Sakura Exchange Program in Science
  2. 7th Workshops (January 19, 2018) on Collaboration between Osaka University and Japanese Companies
  3. JASSO Short-stay and Short-visit program 2017  
(Aug. 5, 2017 - Sept. 14, 2017 sending Japanese students to Thailand, Oct. 1, 2017 to March 31, 2018 accepting Thai students)
  4. Concluding MOU
    - \*August 3, 2017: Faculty of Tropical Medicine, Mahidol University, Thailand
    - \*February 5, 2018: School of Biotechnology and Food Technology, Hanoi University of Science and Technology, Vietnam
  5. Concluding the cross appointment agreement
  6. Two Visiting Research Scholars
    - Dr. Ingorn Kimkong from Thailand, February 16 - March 15, 2018
    - Dr. Nutthachai Pongprasert from Thailand, February 16 - March 15, 2018
  7. Adjunct Professors for the FY2018
  8. Evaluation Committee Meeting (February 27, 2018)

Discussion on:

  1. Revising the regulations of ICBiotech
  2. Conferring the title of Visiting Professors from abroad for FY2018
  3. Employment of a researcher by the cross appointment agreement
  4. Inviting Visiting Professors from Japanese universities for FY2018
  5. Inviting a visiting research scholars
  6. Inviting a part-time lecturer
  7. Selection of members of the Evaluation Committee Meeting