

The Asian CORE Program: Cutting-Edge Organic Chemistry in Asia

Somsak Ruchirawat*, Montakarn Chittchang and Poonsakdi Ploypradith

Chulabhorn Research Institute and Chulabhorn Graduate Institute, Vibhavadee Rangsit Highway, Laksi, Bangkok 10210, Thailand.

* Corresponding author, E-mail: somsak@cri.or.th

ABSTRACT: The Asian CORE Program: Cutting-Edge Organic Chemistry in Asia was established in 2005 with joint efforts among five core institutions in five Asian countries. The activities of the program are described and the outcomes and impacts on organic chemistry research in Thailand are discussed.

KEYWORDS: Organic chemistry research, international collaboration, international conferences, academic exchanges, educational activities.

INTRODUCTION

Science continues to exert its influence in modern society, and expands its boundary beyond recognition. Undoubtedly, science has unraveled mysteries and unlocked the magic of human understanding and perception of Mother Nature. However, there remain a vast number of scientific frontiers to explore and investigate. The significance of chemistry, especially in organic chemistry-related fields, has become increasingly and inevitably realized, because organic chemistry has been pivotal to the development of emerging multidisciplinary subjects of modern research. Collaborative effort across once separate and different fields has become an integral part of performing research, since combining expertise has proven beneficial and provided an important step for leaping beyond the conventional restricting limitations of each scientific discipline.

Chemical research in Asian countries, while not uniformly developed to a similar international standard, has deservedly received attention from national granting agencies to establish international scientific collaborations to strengthen their research programs in chemistry. Thus, the Asian CORE Program (ACP): Cutting-Edge Organic Chemistry in Asia was initiated in 2005 by Professor Dr. Minoru Isobe from the Nagoya University, Japan, who has had extensive personal and bilateral ties with chemists from many Asian countries. This program was originally established with joint efforts among 5 core institutions, including the Nagoya University (Japan), the Shanghai Institute of Organic Chemistry, Chinese Academy of Sciences (China), the Korean Advanced Institute of Science and Technology (South Korea), the Chulabhorn Research Institute (Thailand), and the National Tsing Hua University (Taiwan). The coordinators at various core institutions have subsequently expanded current memberships and

recruited additional 7 cooperating institutions in Japan, 14 institutions in China (including the Hong Kong Special Administrative Region), 5 institutions in Taiwan, 6 institutions in South Korea, and 10 institutions in Thailand. More recently, representatives from Singapore have been invited and already agreed to participate in the Asian CORE Program in 2006. Future developments to recruit additional institutions, countries, and regions have also been planned.

Despite cultural, socioeconomic, and educational diversity in each country, the main thriving goal of establishing an international collaborative program in Asia, based on the principle of equal partnership among all the participating countries, is to elevate the rigor of chemistry research in each participating country, to facilitate high-quality research in the field of organic chemistry and create lasting world-class research hubs, while concurrently nurturing the next generation of leading organic chemists in East and Southeast Asian regions. Sustainable collaborations among research/academic institutions in the member countries/regions will also be established.

It is worth mentioning that the scope of organic chemistry in this regard is not limited to the core areas of organic synthesis, methodology, and total synthesis, but also includes natural products chemistry, bioorganic chemistry, combinatorial chemistry, nano-chemistry, green chemistry, structural and material sciences, environmental chemistry, as well as the applications of these fields to ultimately benefit society and the economy of the Asian region.

MAJOR ACTIVITIES OF THE ASIAN CORE PROGRAM

International Conferences on Cutting-Edge Organic Chemistry in Asia

One of the main activities involved in this program is to organize a series of the International Conferences

on Cutting-Edge Organic Chemistry in Asia (ICCEOCA), which will serve as a major forum to showcase high-quality scientific achievements in organic chemistry continuously occurring in Asian countries, in order to propagate and inspire further research in this region. The conferences are held annually, and venues are rotated among the participating countries so that each country will have an opportunity to bring discussions on cutting-edge fields of organic chemistry from all over the world to their own regions. Thus, the training of local young chemists can be achieved. Additionally, these international conferences will also help bring the importance of organic chemistry to the attention of societies and governments.

In the initial phase of this program, five international conferences have been planned to be organized between 2006 and 2010 in Japan, South Korea, China, Thailand, and Taiwan, respectively. These conferences will cover all aspects of organic chemistry, but highlight a different theme each year. Participating organic chemists will acquire not only the knowledge and techniques involved in cutting-edge organic chemistry research of high international importance, but also have invaluable opportunities for intensive interactions with fellow research scientists from other countries, leading to the formation, strengthening, and expansion of an Asian network for organic chemistry in the future. Moreover, chemists with outstanding poster or oral presentations will be selected for the Lectureship Awards. The recipients will be financially sponsored for an international visit and lecture tour in the host countries.

Academic Exchanges

Another main activity under this program is to facilitate academic exchanges among the participating countries, based on mutual interests and agreements. The academic exchanges may be in the form of joint research, seminars and scientific meetings, or researcher exchanges. It has been anticipated that an increase in the frequency of academic exchanges will not only help elevate the level of science in partnering countries, but also enhance the number and quality of organic chemistry students.

Educational Activities

In parallel with the ICCEOCA, workshops on various aspects of organic chemistry, chemical techniques, and current research trends will be organized with the aim of enhancing the level of organic chemistry and research in less-developed Asian countries, which are currently not members of this network. This will foster the development of science and science-based enterprises in those countries, thus catalyzing their progress into the chemistry research scene of the 21st

century.

OUTCOMES AND IMPACTS ON ORGANIC CHEMISTRY RESEARCH IN THAILAND

During the first two years of the five-year Asian CORE Program: Cutting-Edge Organic Chemistry in Asia, the responses have been very satisfactory in all participating countries, as indicated by the unremittingly increasing number of participants in the program, which will continue to grow as the program expands its boundary. In Thailand, approximately 125 organic chemists have voluntarily become the members of this program.

In October 2006, 17 ACP members from Thailand, along with approximately 150 participants from other countries, attended the 1st International Conference on Cutting-Edge Organic Chemistry in Asia (ICCEOCA) held in Okinawa, Japan. It was a very special conference at which the Nagoya Medal Special Award was presented to Professor Dr. Her Royal Highness Princess Chulabhorn Mahidol, the President of the Chulabhorn Research Institute, Thailand. She is the first female scientist who has received this award in recognition of her vision, dedication, and efforts in promoting science in general and organic chemistry in particular.

The 1st ICCEOCA featured not only the Nagoya Medal Special Award Lecture delivered by H.R.H. Princess Chulabhorn Mahidol, but also keynote lectures by two Nobel Laureates in Chemistry (namely, Professor Yuan Tseh Lee from Taiwan and Professor Ryoji Noyori from Japan), as well as 5 plenary lectures. Additionally, Thai ACP members contributed 4 out of 39 lectures, as well as 12 out of 93 posters presented at this conference. Towards the end of the conference, two professors from Chulalongkorn University and Mahidol University in Thailand were granted four Lectureship Awards to visit and give lectures in China, South Korea, Taiwan, and Singapore in 2007. These lecture tours have been recently completed.

Immediately following the 1st ICCEOCA, a four-day post-conference symposium was organized in Hsinchu, Taiwan, and attended by over 200 participants, including 3 scientists from Thailand. The aim of this post-conference symposium was to offer a venue to share important aspects of modern organic chemistry, including development of new synthetic methods, structure and synthesis of natural products and bioactive molecules, as well as synthesis and properties of molecule-based functional materials. In total, 2 keynote lectures, 28 invited lectures (including 2 by the participants from Thailand), and 55 posters were presented at this symposium.

More recently, the 2nd ICCEOCA was organized in September 2007 in Busan, South Korea. Due to the

budget limitations, 9 representatives from 6 major universities in Thailand and the Chulabhorn Research Institute were nominated to participate in this meeting, along with around 130 participants from the other member countries. The conference featured 34 invited lectures and 90 posters, including 4 oral and 5 poster presentations by Thai participants. The success of Thai scientists at this conference was impressive, as indicated by four Thai ACP members being selected for six Lectureship Awards to conduct lecture tours in the other 6 member countries/regions in 2008.

Apart from the opportunities to showcase their currently ongoing research in organic chemistry at these multinational conferences, Thai delegates were also able to interact extensively with fellow organic chemists from the other member countries, thus stimulating and strengthening scientific ties within the Asian community. Moreover, they also gained insights into the cultural, social, and economical perspectives of the Asian region.

One of the major outcomes of the Asian CORE Program so far is an establishment of Chinese-Thai and Taiwanese-Thai collaborations, which have already led to a number of academic exchanges. Additionally, a special conference on "Chinese Medicinal and Natural Products Chemistry" was organized by the Chulabhorn Research Institute in January 2007, with financial support from the National Research Council of Thailand (NRCT), the Thailand Research Fund (TRF), as well as the National Natural Science Foundation of China (NSFC). Almost 200 participants, including research scientists, professors, and graduate students from various institutions in Thailand, had great opportunities to learn about the ongoing research in medicinal chemistry and natural products chemistry from lectures by 5 invited speakers from China and 30 poster presentations by local participants.

In addition to the aforementioned benefits gained from participating in the Asian CORE Program, some major problems related to chemical research in Thailand could be critically identified through self-evaluation and comparisons. Discussions with scientists from other member countries have revealed some general observations on chemical research in highly-regarded member countries, such as Japan, China, and South Korea. The corresponding Chemical Society and Science Society of these countries have taken more active roles than those of Thailand in providing necessary funding for various aspects of chemical research and development, as well as in supporting the Asian CORE Program and establishing the Chemistry, An Asian Journal. The lack of contribution from the Chemical Society of Thailand and the Science Society of Thailand in both aspects may have cost the country not only international recognition, but also

opportunities to officially take part in the Asian collaborative frontier in organic chemistry-related multidisciplinary fields.

Development of chemical research in Thailand has also been hampered by the lack of chemical industries, which would otherwise produce small molecules crucial for both basic and applied research. Chemical research in Thailand has largely depended on the availability of chemicals from Europe, North America, and other Asian countries, such as Japan. Due to more restricted regulations for safety and chemical weaponry, importing chemicals have encountered more technical problems. Thus, implementation of a self-sustainability plan for chemical industries is inevitable and essential for the progress of research and development in chemistry. Chemical industries, on the other hand, are the recipients, who can translate the advancement in basic research to practical applications.

In conclusion, the participation of Thai delegates in the Asian CORE Program: Cutting-Edge Organic Chemistry in Asia has been truly successful and beneficial. Nevertheless, organic chemistry research in Thailand deserves more recognition and support from various national science-promoting agencies, both in terms of funding and facilitating systems, in order to compete at the international levels.

ACKNOWLEDGEMENT

The Asian CORE Program: Cutting-Edge Organic Chemistry in Asia has been generously supported by the National Research Council of Thailand (NRCT), as well as the science-promoting agencies in the other participating countries.