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Welcome Addresses

Yoon-Mo Koo, Professor
Secretary General of AFOB

The origin of AFOB (Asian Federation of Biotechnology) goes back to the first APBioChEC (Asia Pacific Biochemical Engineering Conference), Gyeongju, 1990 started by Prof. Ho Nam Chang, KAIST and Prof. Shintaro Furusaki, the University of Tokyo, who are now both retired. As the name indicates, the APBioChEC was an organization just for the biochemical engineers in Asia, but since then it evolved into AFOB, expanding its horizon towards a much broader spectrum of biotechnology in Asia. This marvelous growth is all in thanks to those who have devoted so much of their invaluable time since 1990. We all know that this contribution to AFOB does not bring any worldly benefits (at least defined by us, academicians), such as publications and grants. Those who have devoted to the APBioChEC and AFOB surely knew of this from the start.

Measuring the time and effort dedicated to these societies of ours, I feel a certain inequality in the mass (value?) balance in their commitment for last 30 years. AFOB might have brought new friends and old as time passed, and accompanying funs depending on their tastes. Still there remains a missing part when comparing the amount of their devotions to and worldly outcome from the AFOB. At this point, I dare to explain this missing part using a Korean term, or possibly ‘업’ (OP, 傳) which can be defined as a destined job, or personally destined to do this job. This thought hit me a month ago when I attended the ARS (AFOB Regional Symposium) in Manila, Philippines, in the middle of invocation during the opening ceremony. I am not sure of the appropriateness of this thought, but it really assures me to be the only explanation to fill the gap of this unequal balance.

Through this AFOB Newsletter, as the herald and workhorse of the AFOB, I wish many members with the spirit of ‘OP’ will come year after year to make AFOB the supreme society of BT in Asia and finally in the whole world.

Secretary General, AFOB
Member, National Academy of Engineering, Korea
Dean, Graduate School
Department of Biological Engineering
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As I prepare “Introduction to Emerging Areas in Bioengineering” of Wiley’s Biotechnology and Bioengineering Series (WBBS) during 2013~2016 (in press), I realized the importance of biotechnology history and its future potential. The history tells us starting of biotechnology from the domesticated crops (10,000BC), animals (8~9,000BC), brewed beer (6,000BC), leavened bread (4,000BC) long before the emergence of modern science and technology to zymotechnology for mass beer production in Germany of 19th Century, acetone-butanol production during the first world war (1914~1917), penicillin production during the second world war (1940~1945) and current recombinant-DNA based human genome biotechnology (1917~).

In billion tons (dry), the total amounts of plant biomass are 1,841 and produced 172.5/year, respectively. The total procaryotes estimated are 350~550; marine biomass (fish) 0.8~2; terrestrial biomass (humans 0.105; cattle 0.211; ants 0.100) and current human population is 7.4 billion. Now biotechnology has immense renewable resources and human needs a longer life sustained by well being.

Networking among nations, disciplines are not new at all; this will become more efficient and easier because of progress in ICT and transportation of goods. Now focusing on biotechnology lies in Asia and other world (EU, USA and other countries) in terms of manufacturing, huge resources and consumer markets. The networking among Asian nations may consist of Phase I: 1990~2008 APBioCheC (Asia, Academia, no Secretariat), Phase II: 2008~2016 AFOB buildup (Academia, Secretariat, 13 member nations, EFB), Phase III (Academia and Industry, Food, Pharmaceuticals, Disease Control, Cosmetics, 4th Industrial Revolution in Biotechnology), etc. The first significant successful outcome of Phase I is YABEC that was held every year after its start in 1995 up to now, although its participation was limited mostly to the participants of China, Japan, Korea and Taiwan. Some APBioCheC meeting was delayed a year or two owing to the lack of communications among the organizer and biotech leaders of other Asian countries. This can happen again in the absence of Secretariat. In Phase II, ACB (3 times), ARS (Asia Regional Symposium), and collaboration with EFB is getting better with succeeding events. Phase III event was already started in Qingdao, China in the form of AFOB summer forum in July, 2016 and the second of its kind is scheduled to be held in 2018 in Incheon, Korea.
In my presidency of AFOB I proposed two publications: AFOB Newsletter and AFOB Review Letters. AFOB Newsletter will convey or disseminate information and knowledge from AFOB conferences through its ACB, ARS and YABEC to AFOB members and around the world to promote cooperation and collaboration among world biotech community. AFOB Review Letters, not started yet, is to inform significant research contributions of AFOB members to foreign biotechnology groups. Unfortunately nothing happened yet because of poor manpower (one person) and financial status of the AFOB Secretariat. Unless AFOB members of Korea and other countries work together on this matter, AFOB will remain just as organization of managing ongoing conferences.

In Korean common saying goes that “Beginning is Half of the Work done”. With help of AFOB members and member countries, starting from this newsletter, AFOB Newsletter will contribute to Asia and beyond using its well-built biotech network of the last 26 years.

Best regards,

Ho Nam Chang, PhD.
2nd President of AFOB (2012~2016)

Professor Ho Nam Chang was born in a small island of Namhae (1944), Korea; met Korean war (1950) for 3 months; Primary School (1951~1957); lived in Busan for middle and high school (1957~1963); Majored in Chem E at Seoul National Univ (1963~1967); 3 years’ military service(1967~1970); Stanford University (1970~1975) for MS and PhD in Chem E; his PhD thesis was on engineering aspects of blood platelets using rabbits’ blood (3 degrees in Chemical Engineering).

His current research interests are on MSC-HCDC (Multi-stage Continuous High Cell Density Culture) and Δπ=0 reverse osmosis that enable bioreactor to have a very high productivity and to enrich a low titer fermentation broth to a near saturation titer with low energy consumption. His academic publications are 365 (h-index 60; citations 11,974; Google scholar 13/12/2016). He is currently Emeritus Professor, CBE department at KAIST (2015~) and serving as Chairman, Korea Bioenergy Forum and CTO, Lab2m.com (2016~); Lifetime Fellow of Korea Engineering (NAEK: 2011~), S&T Academies (KAST: 2016~): Chairman and CEO, Korea NRC for Industrial S & T (2012~2014); President of AFOB (2012-2016); President 15th IBS (September 16~21, Daegu, Korea; 2010~2012): Honorary Professor, Nanjing University of Technology, China (2007~). HN Chang and S Furusaki of U. of Tokyo organized the first APBioChEC held in Kyungju, Korea (1990).
Welcome Addresses

YOSHIDA, Toshiomi
Emeritus Professor, International Center for Biotechnology, Osaka University, Japan

Asian Federation of Biotechnology (AFOB) is a non-profit-making international association for academic professionals, institutes, and all interest parties in Asia to dedicate the promotion of research and development activities in the field of biotechnology. It was established in 2008 by notable endeavor by Korean scientists based on long-year exertion of various types of the international collaboration in the field of biochemical engineering and biotechnology, including International Fermentation/Biotechnology Symposium, International Cooperation in Biotechnology promoted by JSPS Core-University Program, Asian Pacific Biochemical Engineering Conferences (APBioChEC), and Annual Meetings of Young Asian Biochemical Engineers Community (YABEC) operated in Asian region.

In the period of start-up, during the last 8 years since the establishment, AFOB has held regular conferences, Asian Congress on Biotechnology, AFOB Regional Symposia, and other meetings with the themes chosen from contemporary trendy interests.

It is crucially important, even critical, for acceleration of development of AFOB to provide a devices for more intimate communication among the members of the Federation, and also to raise awareness of the Federation to the outside introducing information by use of various resources in the Federation. Professor Ho Nam Chang has dedicated his special efforts to start the publication of AFOB News Letter, which has come out now. I am very pleased to congratulate it.

Further trials may be made for activation of the Federation such as cosponsoring meetings jointly with our institutional members of the Federation, other academic and industrial research institutions in Asian region, and also outside international federation or organizations such as EFB or SIMB. AFOB may strengthen various activities including, organization of more open forums, workshops, seminars, symposia etc., publishing review journals, strengthening activities of the divisions of the Federation, operating tutorial or training courses, and collaborating with industrial sectors as well.

We will certainly see more active and steady development of AFOB from now on.

With my best wishes,

April, 2017

http://www.icb.osaka-u.ac.jp/org_e.html
1st President of AFOB(2008~2012)
tyoshida0801@icb.osaka-u.ac.jp
Chul Ha Kim  
Vice Chairman & CEO, CJ CheilJedang Center

On behalf of CJ CheilJedang, I would like to express my sincere congratulations to you on the publication of the first edition of the Asian Federation of Biotechnology (AFOB) Newsletter. I believe that AFOB’s expertise and professionalism as an organization representing biotechnology in Asia will provide a quality report and comprehensive analysis to its readers.

As many of you are aware, CJ CheilJedang is the nation’s top food originated company and a core subsidiary of the CJ Group. For the past 60 years, CJ CheilJedang has led the development and has achieved outstanding growth in food and food ingredient sector, feed and livestock sector as well as bioengineering sector.

With its long-accumulated knowledge in fermentation technology, CJ CheilJedang’s bio business unit opened up a new frontier in biotechnology business in Korea by commercializing MSG (Monosodium Glutamate) in 1968. CJ CheilJedang then moved further on to diversify its business portfolio by commercializing nucleic acids (food additive) in 1977, followed by lysine for feed additive in 1988, threonine in 2000, tryptophan in 2010 and L-methionine in 2015. Such moves led CJ CheilJedang to become one of the world’s top three companies in the field of Amino Acid and Feed. CJ CheilJedang now owns R&D center and manufacturing facilities in many parts of Asia.

Since 2007, CJ CheilJedang actively sought new business opportunities, aggressively expanded production capacity, and pursued global expansion. As a result, CJ CheilJedang is currently preparing several new projects such as new drugs besides existing business in bulk chemicals. In order to do this, it is important that CJ CheilJedang should recruit top talents and the technologies in Asia.

CJ CheilJedang holds high expectations for the Asia Federation of Biotechnology Newsletter. It is my hope that the member countries and the members of AFOB to actively exchange knowledge and experience through this Asian Federation of Biotechnology Newsletter. I would like to conclude my congratulatory remarks with strong faith that the Newsletter will continue to contribute even further to the enhancement of biotechnology in Asia.
Education
1986.09-1992.02 Food Processing, Korea University, Seoul, Korea (M.S./completed)
1971.03-1975.02 Microbiology, Seoul National University, Seoul, Korea (B.S.)

Professional Career
2016.09 - present CJ CheilJedang Corp., Vice Chairman & CEO
2011.05-2016.09 CJ CheilJedang Corp., President & CEO
2009.01-2011.05 CJ CheilJedang Corp., Chief Executive Vice President, CEO / BIO & Feed Biz.
2007.05-2009.01 CJ CheilJedang Corp., Executive Vice President, Head of BIO R&D Institute
2005.01-2006.11 Daesang Corp., Executive Director, Head of BIO Biz. Unit. & Head of R&D Institute
1999.12-2004.12 Daesang Corp., Director of the Fermentation production
1996.01-1999.11 Daesang Corp., Director of the Pharmaceutical Biz. Unit
Chinese Wuhan RBO setup on May 16, 2017

Chinese RBO (regional branch office) of AFOB was set up in Wuhan, capital city of Hubei Province of Mainland China, on May 16, 2017. The population of Hubei province was 57.237 million ranks 9 among 31 1st administrative divisions (provincial level) of China and is more than the average per province (43.19 M), the contribution of GDP ranks 9 and its economic growth rate is 8th. GDP per capita is 8,312$, ranks 12th, which is 48% of the highest (rank 1) region, Tianjin’s 17.410$ (2016) and its area is 1.8 times of South Korea and 88% of North and South Korea combined. Wuhan is the capital city of Hubei Province and RBO also is in Wuhan City.

Mainland China consists of 31 province level administrative divisions, but Hong Kong, Macao are excluded from this division. Chinese 2016 GDP (nominal) is 11.2 billion US$. Nominal GDPS per capita, dividing the total by population 1.339 billion, is 8,361$. The annual growth rate is 6.7% over 2015. The GDP contribution by provinces are; Guangdong (7.8%, 1st), Shandong (7.2%, 2nd), Henan (河南, 7.0%, 3rd), Sichuan (四川, 6.0%, 4th), Jiangsu (江苏, Suzhou, Nanjing; 5.9%), Hebei (河北, 5.4%), Hunan (湖南, 4.9%), Anhui (4.5%), Hubei (湖北, 4.3%), and the last 31st is Tibet, 0.2%.

Guangdong (Shenzhen) shares border with Hong Kong; Henan (河南), Hebei (河北) Provinces are close to Beijing, Tianjin and Hunhe (黄河) river. Jiangsu, Zhejiang, Hunan, and Hubei provinces in the region of Yangtze river (扬子江) and close to Shanghai. Economy growth rates of provinces are: Chongqing (重庆) 10.7%, 1st, Yunnan (云南), Guizhou 10.5%, Tibet, 10.0%, Tianjin and Jiangsu 9.0%, Fujian (福建) 8.4%, Hubei and Henan 8.1%, and the last is Liaoning Province (-2.5%).

Industry VPs attract attention of biotech Industries

Four years after 2008 of its foundation, a need of diversification from conventional bioprocessing and biofuel has been slowly growing up. A change of its name from “biochemical engineering” to biotechnology extended its interests of participants to medical biotechnologies. Since the election of current Gao Fu president, AFOB summer forum was successfully held in Qingdao, China 2016 by inviting many speakers of Korea and China from industries of cosmetics, food, pharmaceuticals, contagious diseases of human and animals although the participants were limited to around 150. The 22nd YABEC was held in Miyazaki, Japan on October 26-28, 2016 where many participants enjoyed together with a new President of BEST (Taiwanese industry). This event confirmed the need of industry vice presidents and approved at 11th board meeting of AFOB held in Songdo, Incheon.

The following emails show that the progress of vice president in China after YM Koo and HJ Kim attended the foundation of Chinese RBO in May 16~18, Wuhan, China.

Dear Dr. Hailong Lin, (May 25, 2017)

We had a good time at SDIC, Beijing, especially with your kind presence. As you mentioned in your email below, the nomination of Dr. Yue to the Industry Vice-president of Chinese AFOB is thought to be very appropriate. Regarding the aforementioned Chair of the Division of Bioindustry Promotion and Bioeducation (BPB) for Dr. Yue, it is my consideration that the 12 AFOB divisions including BPB were formed rather
by academic classification, with division chairs mostly from academia. In addition, BPB is also to do with bioeducation, not only bioindustry. As such, I see in near future that the industry vice-presidents (currently 5 nominated) from 14 regions will make their own committee, such as AFOB Industry Committee, and Dr. Yue may have a leading role depending on his contribution and desire. We can talk more on this at ACB-2017, Thailand coming July. Looking forward to seeing you soon. Sincerely, Yoon-Mo Koo, Secretary General, Asian Federation of Biotechnology Professor, Department of Biological Engineering, Inha University, Korea, ymkoo@inha.ac.kr

Dear Prof. Yoon-Mo Koo and Ms. Hyun Jung Kim, (May 22, 2017)

I hope you enjoyed your stay in China last week. It has been a great pleasure to meet you in Beijing. According to the meeting held in SDIC, we wish Dr. Guo Jun Yue could be nominated at vice-president of AFOB and the chairman/president of Bioindustry Promotion & Bioeducation Division. We understand the nomination and appointment will follow a certain procedure internally in AFOB. So, if there is something we can do to support the procedure, please do not hesitate to inform us.

Secondly, I would ask you another favor. May I have the members lists of the other 11 “Divisions” as the reference? Therefore, I could think about what partners I should consider for setting up the new division.

Best regards;
Dr. Hailong Lin, PhD, Chief Engineer, SDIC Biotech Investment Co., Ltd.
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● Bangladesh becomes 14th member of AFOB

Bangladesh was elected as the 14th member of AFOB at the 11th AFOB board meeting held on April 7, 2017 at room 104, Ghent University Global campus, Incheon, Republic of Korea.

Bangladesh (“The country of Bengal”), officially the People's Republic of Bangladesh is a country in South Asia. It shares land borders with India and Myanmar (Burma). Nepal, Bhutan and China are located near Bangladesh but do not share a border with it. The country's maritime territory in the Bay of Bengal is roughly equal to the size of its land area. Bangladesh is the world's eighth most populous country. Dhaka is its capital and largest city, followed by Chittagong, which has the country's largest port.

Bangladesh forms the largest and eastern part of the Bengal region. Bangladesh includes people of different ethnic groups and religions. Bengalis, who speak the official Bengali language, make up 98% of the population. The politically dominant Bengali Muslims make the nation the world's third largest Muslim-majority country. Most of Bangladesh is covered by the Bengal delta, the largest delta on Earth. The country has 700 rivers and 8,046 km (5,000 miles) of inland waterways. Highlands with evergreen forests are found in the northeastern and southeastern regions of the country. Bangladesh has many islands and a coral reef. It is home to the Sundarbans, the largest mangrove forest in the world. The country's biodiversity includes a vast array of plant and wildlife, including critically endangered Bengal tigers, the national animal.

Statistics of Bangladesh is population 163.187 million (2017 estimate, 8th); area 147.610 thousand km²; density 1,106/km² (10th in the world); GDP (ppp) total 0.686 trillion, $4,207 per capita; GDP (nominal) based on money exchange rate 0.248 trillion (33rd) and DGP per capita is 1,524$ (148th).
Sang Yup Lee of KAIST, Korea elected as US NAS member

On May 2, 2017, the National Academy of Sciences elected 84 new members and 21 foreign members in recognition of their distinguished and continuing achievements in original research. Professor Sang Yup Lee of KAIST is one of 21 foreign members. US NAS lists as Professor Sang Yup Lee of new member of US academy of sciences. Lee, Sang Yup; distinguished professor, dean, and director, department of chemical and biomolecular engineering, Korea Advanced Institute of Science and Technology, Daejeon, South Korea. He has been a member US NAE (academy of engineering) since 2010.

The lists cover social sciences, mathematics, computer sciences, natural sciences (physics, astronomy, chemistry, biology, physiology):

Addadi, L; Biological Ultrastructure, Weizmann Institute of Science, Rehovot, Israel (Israel/Italy); Charpentier, EM, Max Planck Institute for Infection Biology, Berlin, Germany (France); Chen, C-J; Academia Sinica, Taiwan (Taiwan); Chu, C.Y. Cyrus; Institute of Economics, Academia Sinica, Nankang, Taipei (Taiwan); Csibra, G; cognitive science, Central European University, Budapest, Hungary (Hungary); Folke, C; Ecological Economics, Royal Swedish Academy of Sciences, Stockholm, Sweden (Sweden); Freeman, KC.; Astronomy and Astrophysics, Australian National University, Weston Creek (Australia); Guinea, F, (IMDEA Nanoscience), Madrid (Spain); Haldane, FM, physics, Princeton University, Princeton, N.J. (United Kingdom); Hoare, T; Microsoft Research, Cambridge, England (United Kingdom); Lee, Sang Yup; chemical and biomolecular engineering, KAIST, Daejeon, South Korea (South Korea); Levitzki, A; cellular signaling, biological chemistry, The Hebrew University of Jerusalem, Jerusalem (Israel); Mattaj, I; European Molecular Biology Laboratory, Heidelberg, Germany (United Kingdom); Mori, S; Research Institute for Mathematical Sciences, Kyoto University, Kyoto, Japan (Japan); Peiris, J, Medical Science, The University of Hong Kong, Hong Kong, People’s Republic of China (Sri Lanka); Robinson, CV, Physical and Theoretical Chemistry Laboratory, University of Oxford, Oxford, England (United Kingdom); Schluter, D; zoology department, University of British Columbia, Vancouver, Canada (Canada); Singer, W, Max Planck Institute for Brain Research, Frankfurt, Germany (Germany); Starobinsky, A, Landau Institute of Theoretical Physics, Moscow (Russia); Thesleff, I, developmental biology program, Institute of Biotechnology, University of Helsinki, Helsinki (Finland); Underdal, A, department of political science, University of Oslo, Oslo, Norway (Norway). The National Academy of Sciences is a private, nonprofit institution that was established under a congressional charter signed by President Abraham Lincoln in 1863. It recognizes achievement in science by election to membership, and — with the National Academy of Engineering and the National Academy of Medicine — provides science, engineering, and health policy advice to the federal government and other organizations.

Election to the National Academy of Sciences, National Academy of Engineering, or National Academy of Medicine is considered one of the highest professional honors among scientists, engineers, and health professionals. Each year, new members are elected by current members based on outstanding achievement and commitment to service. Visit the NAS, NAE, and NAM membership sites for more information.

Those elected today bring the total number of active members to 2,290 and the total number of foreign associates to 475. Foreign associates are nonvoting members of the Academy, with citizenship outside the United States.

As of 2016, the National Academy of Sciences includes about 2,350 members and 450 foreign associates. The current members annually elect new members for life. Approximately 200 members have won a Nobel Prize. The National Academy of Sciences (NAS) is a United States nonprofit, non-governmental organization. NAS is part of the National Academies of Sciences, Engineering, and Medicine, along with the National Academy of Engineering (NAE) and
the National Academy of Medicine (NAM). This means that the three academies are independent organizations and work together. NAS founded in March 3, 1863 (154 years ago) by Alexander Dallas Bache and Abraham Lincoln while NAE was founded in 1964 and NAM in 1970. The numbers of NAE and NAM are also around 2000s. Founded in 1964, the National Academy of Engineering (NAE) is a private, independent, nonprofit institution that provides engineering leadership in service to the nation. The mission of the National Academy of Engineering is to advance the well-being of the nation by promoting a vibrant engineering profession and by marshalling the expertise and insights of eminent engineers to provide independent advice to the federal government on matters involving engineering and technology. [1964, foreign associates mentioned] The NAE has more than 2,000 peer-elected members and foreign members, senior professionals in business, academia, and government who are among the world’s most accomplished engineers. They provide the leadership and expertise for numerous projects focused on the relationships between engineering, technology, and the quality of life.

Beom Soo Kim of Chungbuk National University was appointed as deputy assistant of AFOB Newsletter to Publication Committee

Beom Soo Kim

Beom Soo Kim is a professor of chemical engineering at Chungbuk National University, Cheongju, Korea. He was born in Seoul in 1966, studied chemical engineering at Seoul National University (1988), obtained a PhD in biochemical engineering at Korea Advanced Institute of Science and Technology (KAIST) (1993), completed postdoctoral work at MIT Prof. Robert Langer's lab (1998). He started his lab at Chungbuk National University (2001) and spent sabbatical research in Dr. Ching T. Hou's lab at National Center for Agricultural Utilization Research (NCAUR), United States Department of Agriculture (USDA), Peoria, Illinois (2005). Beom Soo Kim has published over 120 papers (Google scholar citations 4,600 and h-index 32 as of August 2017). Beom Soo Kim served as Editor-in-Chief, Korean Society for Biotechnology and Bioengineering Journal and also is an Editorial Board member of several journals such as Biocatalysis and Agricultural Biotechnology, Korean Journal of Chemical Engineering, and Journal of Microbial & Biochemical Technology. His research interests include high cell density culture, biodegradable polymers, polyhydroxyalkanoates, biosynthesis and applications of nanomaterials, and biorefinery.

Each member country regions may have AFOB Newsletter Chairman (Vice President of Each Country) and deputy chairman who will communicate with Professor Beom Soo Kim (bskim@chungbuk.ac.kr) regarding article submission and all other matters of AFOB Newsletter. Each country may form AFOB Newsletter committee of 5–10 members to be listed in the Newsletter (Name, Organization, Country).
In the News- People

Korea

Sang Yup Lee

Distinguished Professor Sang Yup Lee at Korea Advanced Institute of Science and Technology (KAIST) won the 2016 James Bailey Award. The Society for Biological Engineering's James Bailey award recognizes outstanding contributions in the field of biological engineering. In memory of Professor James Bailey for his many pioneering contributions to biotechnology, this award is presented to an individual who has had an important impact on biological engineering and whose achievements have advanced the profession. Professor Lee is also appointed as the Co-Chair of the Global Future Council on Biotechnology by World Economic Forum. He will work with the council members to analyze the global roles and impact of biotechnology in the era of the fourth industrial revolution. Professor Lee is currently serving as an executive board member and Co-Chair of the Systems and Synthetic Biotechnology Division of AFOB. He published more than 560 papers (h-index of 98, Google Scholar as of Aug 12, 2017) and 70 book/book chapters, and 630 patents either registered or filed.

Tai Hyun Park

Professor Tai Hyun Park at Seoul National University is appointed as Vice President of AFOB. He has been working for AFOB as Deputy Secretary General of Publication Committee, Executive Board Member, and Korean RBO Manager. He is also appointed from Korean Government as President of Korea Foundation for the Advancement of Science and Creativity (KOFAC), whose term will be 3 years starting from December 27, 2016. He is also appointed as Fellow of the University of Tokyo. He is currently serving as a member of Biotechnology Subcommittee of International Union of Pure and Applied Chemistry (IUPAC). He is also serving Korean Government as Member of National Science & Technology Council and Appointed Director of National Research Council of Science & Technology. He served as President of The Korean Society for Biotechnology and Bioengineering (KSBB), President of Advanced Institutes of Convergence Technology (AICT), and President of Bio-MAX Institute. He is a member of The Korean Academy of Science and Technology (KAST) and also The National Academy of Engineering of Korea (NAEK). He is serving as Editor of “Biotechnology Journal (Wiley)” and “Enzyme and Microbial Technology (Elsevier)”, Editorial Board Member of "Biotechnology and Applied Biochemistry (Wiley)" and "Biotechnology and Bioprocess Engineering (Springer)", and Advisory Board Member of “Advanced Biosystems (Wiley)”. Recently he delivered Plenary Lectures several times on “Bioelectronic Nose” at AIChE (American Institute of Chemical Engineers) Annual Meeting in November, 2016 and also other international conferences such as ACB 2015, ECB 2016, APCOT 2016, and Wartburg Symposium 2016. His book “Bioelectronic Nose: Integration of Biotechnology and Nanotechnology” was published by Springer in 2014.
In the News - Organization

Japan

Manufacturing Technology Association of Biologics (MAB) project (Japan)
Prof. Takeshi Omasa (Osaka U. / Tokushima U).

Manufacturing Technology Association of Biologics (MAB) is a cooperative technology research association developing production technology for next-generation biopharmaceuticals. Regulated by Japanese research and development partnership law, MAB focuses on specific R&D topics. In 2015, more than 40 technology research associations were established, focusing on: space technology, new-energy, stem cell, motor, fuel cell, semi-conductors and so on. Established in 2013, MAB is an association of 25 companies, 2 organizations, 1 national research and development agency and 2 universities (Kobe University and Tokushima University). Under leadership of Prof. Takeshi Omasa (Osaka U. / Tokushima U.) MAB manages a National project for production of biologics. The project is a part of a larger project focused on developing key technologies for discovering and manufacturing of pharmaceuticals used for the next-generation treatment and diagnosis (sponsored by the Ministry of Economy, Trade and Industry (METI), Japan (2013&4) and by the Japan Agency for Medical Research and Development, AMED, Japan (2015)). MAB’s project has 5 large categories covering up-stream and down-stream production technology development: (1) Development of construction techniques for productive mammalian cells, (2) Development of high-performance cell culture techniques, (3) Development of advanced downstream techniques, (4) Development of advanced quality assessment techniques, and (5) Establishment of the next generation platform technology that meets international standards. A related symposium was held at SBJ meeting in 2015 (Oct 28) with more than 40 presentations given on the project’s research topics.

Figure: Kobe research laboratory in MAB.
In October 2015, the Department of Biotechnology, Government of India, announced the decision to establish a Center of Excellence for Biopharmaceutical Technology (CBT) at IIT Delhi. This is in recognition of the importance of Biotechnology for India, particularly that of producing affordable biotech therapeutics for the country.

The vision of CBT is to deliver innovation in biopharmaceutical technology to effectively address the challenges faced by the Indian biotech industry and thereby assist in the “Make in India” initiative of the Government of India by making India the global hub of manufacturing economical, safe and efficacious therapeutics. The Centre will work in collaboration with other academic organizations to achieve this tall order. The Centre will aim to serve as the primary source for innovation, development and transfer of novel technologies and approaches as well as of trained manpower. The scope of activities with respect to technology development will include development of recombinant organisms of high productivity, fermentation, purification, analytical characterization, formulation and stability of biopharmaceutical products. Besides these topics, the training component will include other “practice related” topics such as scale-up, technology transfer, GMP, process validation, regulatory filings, regulatory inspections and other subjects relevant to successful development and commercialization of biopharmaceutical products.
Key objectives of the newly formed CBT include: Development in all areas related to biopharmaceutical development.

- Partner with the Indian biotech industry in implementing technology solutions that are created at CBT. Gather industry feedback to ensure that the chosen projects are "high impact".
- Training via short courses in fundamentals of biopharmaceutical development as well as in other "practical" areas.
- Partner with global biotech leaders as well as regulators to offer high quality training programs.
- Partner with other National Centres working in complementary areas to collaborate and deliver affordable healthcare.
- Partner with International Centres to collaborate towards creating technology solutions and best practices for the biopharmaceutical industry.
- Collaborate with the Indian regulators to ensure that the best practices in manufacturing are being adhered to by the domestic manufacturers.

Keeping us with the collaborative spirit by which it was formed, CBT in collaboration with AFOB plans to organize a 5 day course from 12th to 16th December 2016. The course is intended for a batch of 40-60 participants and will be taught jointly by faculty from IITD, AFOB and industry representatives. The following modules are likely to be included (approximately half a day each):

- **Fundamentals:**
  - Computational drug design
  - Upstream process development (Fermentation, Mammalian Cell Culture)
  - Downstream process development (Centrifugation, Microfiltration, Depth Filtration, Chromatography, Ultrafiltration/Diafiltration, Refolding, Sterile Filtration)
  - Process scheduling
  - Protein stability and formulation

- **Applications:**
  - Analytical characterization of protein products
  - Quality by Design (QbD) and Process Analytical Technology (PAT)
  - Multivariate Data Analysis (MVDA)
  - Process and Cleaning validation
  - Quality risk assessment and management

For more information and queries, kindly contact Prof. Anurag S. Rathore, Coordinator, Pharmaceutical Technology Group, IIT Delhi. He can be reached at +91-9650770650 or asrathore@biotechcmz.com.
Amore Pacific Becomes World's 7th-Biggest Cosmetics Maker
http://english.chosun.com/site/data/html_dir/2017/04/18/2017041801517.html

Recently Digital Chosun Inc. reported that Amore Pacific has become the world's 7th biggest cosmetics maker thanks chiefly to booming sales in Asia. Amore Pacific is the first Korean cosmetics firm to feature in the top 10 at all, beating even established behemoths Johnson and Johnson, Chanel and Avon, as well as Kao and Guerlain to rise five notches last year.
Perennial leader L’Oréal took the top spot, followed by Unilever, Procter & Gamble, and Estée Lauder. LG Household and Healthcare's global ranking also rose from 19th in 2015 to 17th last year.
Industry bible Women's Wear Daily published the global rankings based on sales. It was only in 2007 that Amore Pacific entered the top 20.
Park Jong-dae, an analyst at Hana Daetoo Securities, said, "The cosmetics industry has been a leading top-end industry dominated by the U.S., Europe and Japan, and if Amore Pacific wants to make further headway it has to succeed not just in China but in the U.S. and Europe as well."
Shiseido, already world-wide famous, ranks No.5. Now Asia has three cosmetics companies among top. Shown below are ranks with sales volume, and growth rate.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Company</th>
<th>Sales 2016</th>
<th>Growth Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>L’Oreal</td>
<td>28.6 billion</td>
<td>+2.3%</td>
</tr>
<tr>
<td>2</td>
<td>Unilever</td>
<td>20.52</td>
<td>+0.5%</td>
</tr>
<tr>
<td>3</td>
<td>P&amp;G</td>
<td>15.4</td>
<td>-12.5%</td>
</tr>
<tr>
<td>4</td>
<td>Esterloader</td>
<td>11.4</td>
<td>+2.7%</td>
</tr>
<tr>
<td>5</td>
<td>Shiseido</td>
<td>7.69</td>
<td>-2.3% [Japan]</td>
</tr>
<tr>
<td>6</td>
<td>Beiersdorf</td>
<td>5.93</td>
<td>+1.1%</td>
</tr>
<tr>
<td>7</td>
<td>Amorepacific Group</td>
<td>5.58</td>
<td>+18.2% [Korea]</td>
</tr>
<tr>
<td>8</td>
<td>Chanel</td>
<td>5.53</td>
<td>-1.1%</td>
</tr>
<tr>
<td>9</td>
<td>Kao</td>
<td>5.48</td>
<td>+6% [Japan]</td>
</tr>
<tr>
<td>10</td>
<td>Coty</td>
<td>5.4</td>
<td>+26.2%</td>
</tr>
</tbody>
</table>
South Korea consists of 8 special cities and 9 provinces.


Provinces (Gyeonggi-do, Gangwon-do, Chungcheongnam-do, Chungcheongbuk-do, Jeollabuk-do, Jeollanam-do, Gyeongsangnam-do, Gyeongsangbuk-do, Jeju special self-administrative city)

The largest city is Seoul Capital City (9.954 million, 605.25 km²), 2nd largest is Busan City (3.507 million, 706 km²) and recently Incheon (3.000 million, 1,049 km²) has become third largest city surpassing Daegu in population (2.5 million, 883 km²).

Seoul Metropolitan area including Incheon has a population of 25.425 million, about the half of the total Korean population. Seoul’s population was over 10 million but now it is decreasing year by year as people moved from Seoul to nearby cities where large industrial complex are located (more jobs with better pay).

Regardless of population size, Sejong city (100,000) and Jeju-do (less than million) are self-administrative because of their special function (nearly all the central government administrative functions are carried out in Sejong city while Jeju-do is mainly for sightseeing and tourism). Many Chinese people (rich) have their second house in Jeju or Busan.

Incheon is the 3rd largest Metropolitan City (population over 1 million) of Korea.

1. Seoul Capital City
2. Incheon Metropolitan City
3. Daejeon Metropolitan City
4. Daegu Metropolitan City
5. Ulsan Metropolitan City
6. Busan Metropolitan City
7. Gwangju Metropolitan City

*8. Sejong Special Autonomous City

Do (Province) system
경기도~ Gyeonggi do
강원도~ Gangwon-do
충청남도~Chungcheong-namdo
충청북도~Chungcheong-bukdo
전라남도~Jeonra-namdo
전라북도~Jeonra-bukdo
경상남도~Gyeongsang-namdo
경상북도~Gyeongsang-bukdo

* 제주도~Jeju Special Autonomous

* Sejong city and Jeju do not meet qualification of city or do in population, but they have special functions.
Dangi Calendar (檀紀) 4350 and Short History
Korea used “Dangi” (Korea’s innate calendar) before Seogi (西紀, Gregorian) was introduced in 1962. Seogi 2017 corresponds to Dangi 4350 and the difference is 2333 years. In a period of 1962 ~ 2012, both were used, but only the Seogi became legal calendar by the court ruling. October 3 is the Korea’s National Foundation Day (holiday). Korean history consists of only 4 dynasties: The oldest Korean kingdom is Gochosun (古朝鮮, BC 2333~BC 57); 3 country dynasty, Goguryeo (高句麗, BC 37~668), Baekje (百濟, BC 18~660), Shilla (新羅, BC 57~935), followed by Goryeo (高麗, 935~1392) and Chosun (朝鮮, 1392~1910).
Goguryeo is founded by Ko jumong (高朱蒙) who had two wives. The first son of the first wife became the second king of Goguryeo, and two sons of the second wife moved to current Seoul region (second son, Onjo 昇祖) and Incheon region (first son, Biryo). “Onjo” founded Bakje kingdom in Seoul where you may see some remains of old baekje-kingdom in the region south east of Hangang river (Pungnap-dong).

Incheon in the Korean history
Era of 3 kingdoms (BC 57~ AD 935, beginning ~ fall of Shilla kingdom, Gyeongju old city). Incheon was called Michuhol and capital city of Biryu Baekje (founded by elder son Biryu of the second queen, Soseono of Gojumong (高朱蒙), the founder of Goguryeo kingdom). “Michuhol” may have three meanings: watery town, too damp for people to live, coarse town, capital city; and is used as the street name “Michuhol Daero (big street) in Yeonsu-gu District of Incheon City. Many Neolithic remains were uncovered. The second son Onjo settled in Uire castle (southeast of Seoul, south of Han gang river) as the founder of Baekje, that was the territory of Baekje for 500 years, Jangsung King of Goguryeo occupied this region that was governed by Goguryo since AD 475, later became the territory of United Shilla in the middle of 6th century after Bakje fell to the united forces of Shilla (新羅) and China Tang (唐) Empire. Goryeo Kingdom (AD 918~1392): Mongol Empire invaded Goryeo kingdom in 1232 and the Goryeo moved its palace to Gwanganha island (island in front of Incheon City) and stayed there 39 years. Chosun Kingdom (1392~1910) : the city was named first time as “Incheon” in 1413. From the late 19th to modern Incheon of today turbulent history of Incheon as port city has begun since 1875. As a result of Japanese Unyo Gunboat incident, Incheon port, together with Wonsan and Busan, was opened to outside as the trade port. In 1945 after the liberation from Japan “Incheon was named to “Je(Che)mulpo (濟物浦, trade port), but the city was renamed back to Incheon in 1949.
**Gateway to Yellow Sea**

Goguryeo started kingdom with its capital at Jolbon (BC37–AD03) and moved to Gungnae (AD3–427) both in current Jirin Province of China, and finally to Pyongyang (AD427–AD668), current capital city of North Korea. This southward movement caused frequent wars among Goguryo, Bakje kingdom and Shilla kingdoms for the control of “Hangang river area” at their advantages. Bakje kingdom had to move its capital southward from Seoul to Gogiu (AD475) and Buyeo (AD 538) until its fall to the united forces of the Shilla and Tang (唐) empire (AD 660). Goryo (the 3rd Dynasty of Korea) set its capital at Gaesung (開城), border city of North Korea, quite close to the 38th (parallel line) DMZ (DeMilitarized Zone).

Incheon (down, right), Ganghwa-do (up North), and Yeongjong islands (airport city, front of Incheon) are shown in the map. Hangang river empties its water into Yellow Sea, to the north of Ganghwa-do island joined by Imjingang river coming from North Korea.

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https://en.wikipedia.org/wiki/Incheon

Port City Incheon

In the middle of 19th century, the western powers that already advanced to China and Japan successfully, requested Korea (Chosun) “trade” and invaded Chosun twice by France (1866) and the United States (1871). Chosun successfully defended these two aggressions and reinforced its “closed-door policy” against western powers. In 1883 Chosun government opened the marine customs in “Jemulpo” of Incheon city.

The Japan–Korea Treaty (1876) following the Unyo Gunboat Incident in Ganghwa island of 1875, three Korean ports of Incheon, Wonsan & Busan were forced to open up Korea to Japanese trade, and the rights granted to Japan under the treaty were similar to those granted to Western powers in Japan following the visit of Commodore Perry in 1854.

Why “Ganghwa” was a hotter spot in Korean history than “Incheon”.? The capital of Goryo dynasty, Gaesung is closer to Gangwha island which Mongol army was afraid of crossing a narrow canal between the inland and the island. The Hangang river empties its water into Yellow sea through this canal, not through Incheon. Thus the waterway from yellow sea to capital Seoul (Hanyang, old name) has been this canal throughout the Korean history. Now a new waterway from Incheon to Seoul was built in 2011 and opened by President Lee Myung Bak, but it is rarely used. “Port Incheon”. The difference between ebb and flow is as high as 8.2~10.27 m because of its shallow yellow sea (less than 100 m) and peculiar narrow bay. Actually you can see that Incheon is neither suitable for a good beach (swimming) nor a good harbor. Actually you can see a big breakwater facility between Daewolmi-do and Sowolmi-do.

Incheon is the closest port to Seoul and it was the most important port until recently modern high speed way and rapid train to Busan became available.

https://commons.wikimedia.org/w/index.php?curid=5647363
Incheon

● ● China Town Area

Incheon's Chinatown area came into being with the opening of the Incheon Port in 1883 and Incheon's designation as an extra-territoriality of the Qing Dynasty. In the past, the area held many stores trading goods imported from China, but most Chinese businesses are now restaurants. Today, the Chinese residents of Chinatown are mostly 2nd or 3rd generations of early Chinese settlers. While not all traditional cultures of the first generation have been preserved, the area still harbors many of the flavors of China.

Boundary Stairs between leased territories by Qing Dynasty and Japan. In early ages of Korea’s opening to foreign powers (1883) Japan leased 7,000坪 (1坪 = 3.3 m²) and set up its consulate at the current Jung-gu (中區) Office. Likewise Qing dynasty leased territories. The dividing these two territories are named as the street and the boundary stairs where 孔子 stature is erected. The buildings of the left side are of Chinese style while those on the right side are clearly of Japanese style.

More Stories of China Town can be read from the following website. Or type “Chinatown in Incheon” at Google image.

http://www.ichinatown.or.kr/sight/travel.asp

https://en.wikipedia.org/wiki/Incheon_Chinatown

Image of 孔子 stature at boundary stairs between leased territories by Qing dynasty and Japan (1883)
Can be seen in Google image (“인천시공자동상”) 20/08/2017
History of Korea’s ‘Jajangmyeon’

A Chinese noodle food, Jakjangmyeon (炸酱面), called as Jajangmian (Chinese) or zakzaangmyeon (Korean reading) that you rarely find in today’s China appears to be neither well known nor popular even to Chinese people. In Korea it is called “짜장면” where “ㅉ” is a kind of hard sound found in Hangul of g(ㄱ), gg(ㄲ), k(ㅋ), d(ㄷ), ㄸ, t(ㅌ), b(ㅂ), ㅃ, ㅍ, s(ㅅ), ss(ㅆ), zh(ㅈ), “ㅉ”, “ㅊ”.

Some people may think that Jajangmyeon is a Chinese food, but it is a Korean food sold in Chinese restaurant in Korea. When current Korean oldies were young or children, Jajangmyeon was the best food that Korean parents can treat their children.

An interesting story about development in Korea is that Chinese workers from Shandong (山東) province brought their Zakzangmyeon (炸酱面) to Incheon’s China town and modified this noodle food to the Koreans’ taste that led to the todays’ “Jajangmyeon”. In appearance “Zakzangmyeon (炸酱面) maintains its noodle’s white color while “Jajangmyeon” is brownish black and taste sweet.

“Korea’s Jajangmyeon is No.1 Chinese food loved by every Korean and originates from Incheon China Town.

Incheon International Airport

Yeongjong District of 13,833 ha will be developed by 2020 as environment-friendly new airport city for people working in the airport, visitors and people of logistics industries and the district will serve best tourism and logistics in connection with airports. The expected residence will be 144,800 and will be completed by 2016. Seo-gu District Cheongra new city is specialized for residential areas, and theme Park, athletic facilities, flower industries and international financing. This is also one of IFEZs and located in the land side that connects Yeongjong island and Seoul through Incheon-Seoul highway, Rapid express train and Ara-liner (Seoul-Incheon canal) from Seoul and the Airport. Incheon 17th Asian Game (2014)’s main stadium is here and the population already exceeded 100,000 in 2016.

Airport Rankings
http://www.worldairportawards.com/awards/world_airport_rating.html
Incheon

By passenger reputation (2016) (Among 100 airports)


By passenger traffic (2015) T=1000 (Among Top 50)

By Cargo Traffic (2015) T=1000 tons (among Top 30)

Incheon International Airport will open its second terminal at the end of 2017 for PyeongChang Winter Olympics. The additional capacities for passengers and cargo will be 18 million, 1.3 million, corresponding 1/3 of the first terminal. The total passenger and cargo capacities will be 72 million and 5.80 million, respectively. In terms of ranking Incheon may rank 6th from current 22nd (after Haneda, Japan) and cargo traffic ranking may get closer to No.1 again (current No.1 Hong Kong, Incheon No.5).

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Incheon Bridge

The Incheon Bridge is Korea’s foremost bridge, 21.38 km (18 km) in total length, connecting the Incheon Int’l Airport and the Songdo Int’l Business District (2009). This bridge reduced from Seoul/Kyunggi-do to the airport by 40 minutes. After 2009, many more bridges was built in China and most of world records, as far as bridges are concerned, lie in China. The longest bridge is 164.8 km long Danyang–Kunshan Grand Bridge, part of Beijing–Shanghai High-Speed Railway; the longest bridge of any type in 2011 (Guinness book) followed by Chianghua-Kaoshiung bridge (157.3 km, 2007), Tianjin Grand Bridge 113 km (2010); among top 10 (China 6, Taiwan 1, Thailand 1, US 2) 10th bridge is Hongzhou bay bridge (2007) linking Ningbo to Jiaxing (Shanghai) which is used as express way and cut down travel time by car from 4 hours (400 km) to 2 hours (180 km). Lengthwise Incheon ranks Bridge 24th, 79th Gwangan Bridge 7.9 km and Suhae Bridge 82th.

Ranking bridges over seas, the Hongzhou bay bridge ranks No.1 (35.67 km, 32 km) as the longest sea-crossing bridge.
Incheon

in the world. It cuts down traffic time of Ningbo to Shanghai from 4 hours (400 km) to 2 hours (180 km). Incheon Bridge ranks No.3 in this respect.

What is the highest bridge in the world? The Beipanjiang Bridge in China which hangs over 1,800 feet above a river. The two edges of the impressive bridge were linked allowing the structure to become China’s highest bridge. The bridge spans 2,362 feet between mountains, 560 m, 200 stories high, 1,854 (9560 m) feet above the Beipan River (December, 2016).

What is the highest bridge over seas? The answers are Yisoonshin bridge (80 m, 2.26 km), Incheon Bridge (73~66 m, 18 km), Machang Bridge (64 m, 560 m). The clearhead or overhead clearance refers to the height from the lower deck of bridge to the sea level.

What makes Incheon Bridge No.1 unique in the world? Many shorter bridges between big cities and nearby islands may have an overhead clearance of 300 m high, but excluding trans-oceanic bridges less than 10 km Incheon Bridge can become No.1 in the world.

● Songdo Biotech Cluster

International Free Economic Zone (IFEZ) is, designated in 2003 officially by Republic of Korea, divided into three segments of Songdo, Cheongra and Yeongjong including the Incheon International Airport and Ports (132.9 square km), and aims to develop logistics, business, leisure and tourism hub of Northeast Asia. People move to 147 major cities over 1 million population by within 1~3 hours. Among the region there exists consumer markets of 2 billion people.

The Songdo International Business District, a member of IFEZ, was developed by reclamation of nearby tidal land and will be completed by 2020. The international financial and trade, eco-friendly resort, to residential areas and knowledge-based industries (13,162 acres) are planned to accommodate a population of 252,000. In Songdo District there are Central Park, Northeast Asia Trade Tower, Songdo Convensia, Incheon National University, Yonsei Univ Songdo campus; Global campus of SUNY Korea, George Mason Univ., Ghent Univ., Univ. of Utha, AFOB, GCF (Global Climate Fund), Korea Institute of Technology (research institute), Korea Polar Research Institute (KOPRI), biotech industries such as Celltrion, Samsung biologics, cosmetic and biomedical instrument industries in near Namdong Industry Park. The residential population are 103,000 as of July, 2016.

Many of Songdo TechnoPark images are to be paid for use. The following image is Sondo Central Park.of https://www.youtube.com/watch?v=sns97-BAdaU
Asia, https://en.wikipedia.org/wiki/Asia

Asia (ˈeɪʒə, ˈeɪʃə) is the Earth's largest and most populous continent, located primarily in the eastern and northern hemispheres. Asia covers an area of 44,579,000 square kilometers, about 30% of Earth's total land area and 8.7% of the Earth's total surface area. It has historically been home to the world's first modern civilizations and has always hosted the bulk of the planet's human population. Asia is notable for not only its overall large size and population, but unusually dense and large settlements as well as vast barely populated regions within the continent of 4.4 billion people (60% of 7.4 billion, 2016 world population). The boundaries of Asia are traditionally determined as that of Eurasia, as there is no significant geographical separation between Asia and Europe. The most commonly accepted boundaries place Asia to the east of the Suez Canal, the Ural River, and the Ural Mountains, and south of the Caucasus Mountains and the Caspian and Black Seas. It is bounded on the east by the Pacific Ocean, on the south by the Indian Ocean and on the north by the Arctic Ocean.

Population—4.4 billions, Land—44.579 million km², Population density 87 km²

More images of Asian Continent
### Statistics of Members’ Nations (Regions)

<table>
<thead>
<tr>
<th>Nation (Region)</th>
<th>Capital city</th>
<th>Population (million)</th>
<th>Land Area (1000km²)</th>
<th>Total (trillion USD) and per capita GDP Nominal/PPP (USD), 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>China, Mainland</td>
<td>Beijing</td>
<td>1,375.0</td>
<td>9,596</td>
<td>11.383: 8,239/15,095</td>
</tr>
<tr>
<td>Japan</td>
<td>Tokyo</td>
<td>127.1</td>
<td>377.9</td>
<td>5.106: 40,408/40,090</td>
</tr>
<tr>
<td>Korea (South)</td>
<td>Seoul</td>
<td>50.8</td>
<td>100.2</td>
<td>1.404: 27,633/37,948</td>
</tr>
<tr>
<td>Korea (North)</td>
<td>Pyongyang</td>
<td>24.8</td>
<td>120.5</td>
<td>0.025: 1,000/ 1,800</td>
</tr>
<tr>
<td>Taiwan</td>
<td>Taipei</td>
<td>23.4</td>
<td>23.4</td>
<td>0.588: 24,985/48,703</td>
</tr>
<tr>
<td>India</td>
<td>New Delhi</td>
<td>1,316.0</td>
<td>3,287.0</td>
<td>2.607: 1,965/7,197</td>
</tr>
<tr>
<td>Malaysia</td>
<td>Kuala Lumpur</td>
<td>31.4</td>
<td>330.8</td>
<td>0.375:12,127/28,490</td>
</tr>
<tr>
<td>Indonesia</td>
<td>Jakarta</td>
<td>263.54</td>
<td>2,904.5</td>
<td>0.940:3,635/11,609</td>
</tr>
<tr>
<td>Thailand</td>
<td>Bangkok</td>
<td>67.9</td>
<td>513.1</td>
<td>0.409: 5,938/16,706</td>
</tr>
<tr>
<td>Nepal</td>
<td>Kathmandu</td>
<td>26.4</td>
<td>147.1</td>
<td>0.024: 837/2,573</td>
</tr>
<tr>
<td>Mongolia</td>
<td>Ulaanbaatar</td>
<td>3.0</td>
<td>1,566.0</td>
<td>0.0125: 4,353/11,204</td>
</tr>
<tr>
<td>Singapore</td>
<td>Singapore</td>
<td>5.6</td>
<td>0.719</td>
<td>0.396:56,053/87,082</td>
</tr>
<tr>
<td>Vietnam</td>
<td>Hanoi</td>
<td>92.7</td>
<td>332.6</td>
<td>0.219: 2,371/6,377</td>
</tr>
<tr>
<td>Philippines</td>
<td>Manila</td>
<td>102.9</td>
<td>300.0</td>
<td>0.348: 3,280/8,223</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>Dhaka</td>
<td>168.9</td>
<td>147.0</td>
<td>0.246: 1,503/4,204</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Country</th>
<th>Area ($10^3$)km²</th>
<th>Water density</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Russia</td>
<td>17,098</td>
<td>720.5</td>
</tr>
<tr>
<td>2. Canada</td>
<td>9,984</td>
<td>891.1</td>
</tr>
<tr>
<td>3. China</td>
<td>9,596</td>
<td>270.5</td>
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<td>4. U.S.A.</td>
<td>9,525</td>
<td>377.4</td>
</tr>
<tr>
<td>5. Brazil</td>
<td>8,515</td>
<td>55.3</td>
</tr>
<tr>
<td>6. Australia</td>
<td>7,692</td>
<td>58.4</td>
</tr>
<tr>
<td>7. India</td>
<td>3,287</td>
<td>314.0</td>
</tr>
<tr>
<td>9. Kazakhstan</td>
<td>2.724</td>
<td>25.2</td>
</tr>
<tr>
<td>12. S. Arabia</td>
<td>2.814</td>
<td>0.0</td>
</tr>
<tr>
<td>14. Indonesia</td>
<td>1.910</td>
<td>93.0</td>
</tr>
<tr>
<td>18. Mongolia</td>
<td>1.564</td>
<td>0.0105</td>
</tr>
</tbody>
</table>

Total area: the sum of land and water areas within international boundaries and coastlines.
Land area: the aggregate of all land within international boundaries and coastlines, excluding water area.
Water area: the sum of the surface areas of all inland water bodies (lakes, reservoirs, and rivers) within international boundaries and coastlines.
World Rankings by Population

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>Population</th>
<th>Country</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>China</td>
<td>1,376</td>
<td>Russia</td>
<td>143</td>
</tr>
<tr>
<td>2</td>
<td>India</td>
<td>1,326</td>
<td>Mexico</td>
<td>128</td>
</tr>
<tr>
<td>3</td>
<td>USA</td>
<td>324</td>
<td>Japan</td>
<td>126</td>
</tr>
<tr>
<td>4</td>
<td>Indonesia</td>
<td>260</td>
<td>Philippines</td>
<td>102</td>
</tr>
<tr>
<td>5</td>
<td>Brazil</td>
<td>209</td>
<td>Vietnam</td>
<td>94.4</td>
</tr>
<tr>
<td>6</td>
<td>Pakistan</td>
<td>192</td>
<td>Thailand</td>
<td>68.1</td>
</tr>
<tr>
<td>7</td>
<td>Nigeria</td>
<td>186</td>
<td>S. Korea</td>
<td>50.5</td>
</tr>
<tr>
<td>8</td>
<td>Bangladesh</td>
<td>162</td>
<td>N. Korea</td>
<td>27.4</td>
</tr>
</tbody>
</table>

Ranks of other member nations: 16. Germany 80.1; 17. Iran 80.0; 19. Turkey 79.6; 37. Iraq 37.5; 40. Afghanistan 33.3; 41. S. Arabia 30.3; 44. Malaysia 30.7; 45. Uzbekistan 30.3; 57. Sri Lanka 20.8; 64. Kazakhstan 18.0; 71. Hong Kong 15.8; 105. Laos 6.9; 113. Singapore 5.6

For China, the above website shows that Guangdong province ranks No.1 with a 10.76% share of total GDP followed by Jiangsu 10.36%, Shandong 9.31%, Zhejiang 6.34%, Henan 5.47%, Sichuan 4.29%, and Qinghai ranks 30th (0.36%), and Tibet ranks 31st (0.15%) among the 31 provinces. The large city provinces are counted separately from nearby provinces: Shanghai ranks 12th with 3.69% closely followed by Beijing 13th (3.39%), Tianjin 19th (2.44%) and Chongqing 20th (2.32%).

US, Washington DC, population of 324.7 million, land area: 98,333 km², Total GDP 18.558 Trillion USD, 57,220$/57,220$.

Bangladesh: Dhaka, population 168.9 million, land area 147.5km², Total GDP 0.957 USD, 1,284$/3,581$.

GDP can be shown in two numbers of PPP (purchasing power parity) and nominal; the former based on purchasing power while the latter on currency exchange rates. Here nominal/PPP values are given together. Nations with nominal GDP may have lower PPP-GDP while the reverse is true for nations of lower nominal GDP may have higher PPP-GDP.

Since these two GDPs are based on those of the U.S.A., Nominal and PPP are the same. In Asia Singapore ranks No.1 both in PPP and nominal GDPs. Japan ranks No. 2 in nominal GDPs while Korea ranks No. 3 after Japan in nominal GDPs, and Taiwan ranks No.2 in PPP ahead of Japan and Korea. PPP-GDP means “buying power” meaning that you can buy more things in Taiwan than in Japan with the same dollar currency.
Asia & AFOB

Classification of Conferences

Type A: Currently YABEC, ARS and ACB belong to Type A; Different hosting countries and accounting by AFOB secretariat (Incheon, Korea), AFOB summer Forum (temporary)
Fliers on AFOB Newsletters (free)

Type B: Same hosting countries and accounting by organizers
Fliers on AFOB Newsletters (donation recommended after the conferences) Shanghai ICMS (2016), Nepal BB (2016)

Type C: ECB, IBS, etc. Fliers fee (Type B, to be paid) Some international/ member countries local biotech or biotech related meetings may be announced through “Events” section

After the conferences to be submitted to AFOB Newsletter

1. Comments based on Organizer’s comment
2. Participant’s comment
   - Before and after conference tour
   - Any event (e.g. Overnight beer drinking party by YABEC)
3. Oral presentation files (titles, abstracts)
4. Poster presentation files (titles, abstracts)
5. Important photos (titles, abstracts)
Events and Organizations

**Conferences**
The following conference events will be covered in AFOB Newsletter No.2 to be published on December 2, 2017.

Type A: Manila ARS; Miyazaki YABEC; AFOB Summer Forum (Qingdao), Hue ARS  
Type B: Nepal-BB 2016 (Katmandu)  
Type C: Melbourne IBC, Krakow EFB, AIChe meeting

**Organizations**
SKLMM (Bai)  
Memo: Type A: registered through AFOB, Type B: co-organized, Type C: any relevant conferences of member’s interests (such as industrial biotechnology)

**International Conference on Metabolic Science**

[ICMS-2016, October 20-23, 2016, Shanghai, China]

The success of the International Conference on Metabolic Science (ICMS-2016, October 20-23, 2016, Shanghai, China) was characterized by 2 plenary sessions with 6 world renowned plenary speakers, 2 theme sections on metabolic science and bioprocess engineering, respectively, and each with 7 well-organized sessions for more than 400 registered participants. In addition, a celebration symposium with 3 sessions was specially organized by Biotechnology Advances (Elsevier) in the honor of Prof. Murray Moo-Young at the University of Waterloo, Canada who founded the journal in 1983 and served as its Editor-in-Chief for 33 years till 2015. The future ICMS series will include more sessions for industrial processes and applications, which are quite helpful to metabolic engineering researchers who do not have much experience in industry.

**State Key Laboratory of Microbial Metabolism, at Shanghai Jiatong University (SJTU), China**


The State Key Laboratory of Microbial Metabolism at Shanghai Jiao Tong University was established in 2011. Our lab is led by Prof. Zixin Deng with 67 fellows, which consist of 33 professors and research fellows. We are investigating bioactive secondary metabolites of microorganisms including Synthesis and Degradaative pathways and their interactive model by various state-of-the-art approaches involved in molecular biology, microbiology, biochemistry, genomics and synthetic biology. Another focus of our researcher is DNA sulfur modifications. A growing effort is underway to reveal the genetics of microorganisms and subsequently make use of it to improve antibiotics.
1. Introduction

SKLMM was approved in April, 2011 by the Ministry of Science and Technology, The People’s Republic of China, and open to public in October, 2013. Prior to those events, intensive research in microbial metabolism had been performed for more than 30 years at the SJTU School of Life Science and Biotechnology, and a milestone was made in the discovery of DNA sulfur modifications in bacteria by Prof. Zixin Deng, the Director of SKLMM, which not only stabilize DNA against degradation, but also confer it many other biological functions to be understood. With advanced research facilities and platforms, SKLMM stands at the forefront of metabolic science, and takes leading roles in diverse areas of microbial metabolism with extensive investigation into mechanism underlying microbial anabolism and catabolism to elucidate their physiological functions, regulatory networks and interactions or connections with environments, and ultimately address challenges raised with the sustainable socio-economic development in China. At present, about 70 full-time faculties are working at SKLMM, and young talents are being recruited worldwide. During 2011-2015, SKLMM was granted more than RMB 250 millions (~USD 40 millions) by public funding agencies and industries, and more than 700 articles were published in reputed international journals including Nat Microbiol, Nat Commun, PNAS, Angew Chem Int Edit, J Am Chem Soc and ISME J. The knowledge gained would lay solid foundations for optimizing and reprogramming metabolic pathways to maximize their potentials, and consequently foster technological innovations.

2. Research Areas

2.1. Microbial Anabolism

Fig. Exploring potentials of microbial biosynthesis for innovations in biomanufacture
2.2. Microbial Catabolism

Fig. Deciphering mechanism underlying pollutant bioremediation for reutilization

2.3. Microbial Metabolic Interactions

Fig. Unraveling metabolic interactions of microbes for developing robust biosystems

3. International Collaborations

SKLMM fosters academic exchanges by organizing specific forums and international conferences such as ICMS 2016 co-sponsored with AFOB on October 20–23, 2016 in Shanghai, and encourages international collaborations on commonly interested topics, providing platforms for established scholars as well as young talents for academic degrees and professional training. For more details, please visit its homepage: www.skmll.sjtu.edu.cn or email to mml@sjtu.edu.cn.
Gallery

Sample photos

ARS 2016

ICBB 2016

2016 AFOB International Symposium

9th AFOB Board Meeting

ECB 2016 - AFOB EFB Delegate Meeting

AFOB Summer Forum 2016

10th AFOB Board Meeting
CJ, A Leading world Amino Acids manufacturer

Prior to the introduction of CJ group, it becomes necessary how this group was started. CJ group ranks No. 19 among 45 Chaebol groups in Korea and its assets are 24.8조(1兆, jo equals roughly 1 billion US $). When In 1987 the founder, Lee Bung-chul of Samsung group (No.1 chaebol) died, Samsung group was separated into Samsung group, Shinsegae(新世界), CJ and Hansol group.

CJ group has business in foods and food services (restaurants), biotechnology and heath care, entertainment and media, logistics (home shopping), infrastructure, sports, contribution to societies.

CJ is No.1 amino acids producer in the world and recently succeeded in producing methionine by fermentation using metabolic engineering and synthetic biology. Previously methionine was produced only by chemical methods. Another interesting story is that CJ EM company has many cable television stations; makes movies and has cinema network, CJV. TVN station is very popular because it makes many interesting TV series. Their ratings frequently were over 10% that exceeds those of regular broadcasting TV stations.

Several chaebol groups have their origins at a small region, town called “Changyoung (창녕), 昌寧” near Nagdong (洛東江) river, western part Gyeongsangnam-do (慶尚南道). The family names associated are “Lee, Koo-Huh, Shin, Cho”. Samsung was founded by Lee Byung-chul in 1938 as a trading company. Another important chaebol created by Chung Ju-Yung in 1946 is Hyundai group consisting of Hyundai Motors (Hyundai and Kia), etc. He was born at Tongcheon (current North Korea) in 1915 and did many businesses such as selling wood and construction, etc and died in 2001 at 85. Koo (LG) and Huh (GS Caltex), linked by marriage, developed LG, and Cho founded Hyosung group ( Hankook Tire). The assets of Lee, Chung, Koo-Huh, Shin, Cho amounts to 1147.3조(兆) read as “jo,兆”(1.0E12 won, 1$=1100~1200won) and accounts for 48.2% of total assets of 45 chaebol (2378.4조).

Shin was born in 1921 at Ulsan, eastern part and moved to Japan. He started his business “Lotte gum” and set up his business in Korea in 1967 慶南. The assets of Korean Lotte are about 10 times that of Japan Lotte. The founders of Korean chaebol had very large number of families; for instance, Chung had 5 brothers and 11 children and many nephews.


Fortune global 500 shows that No.1 company by revenue is Walmart ($482.1Billion=B), No.10 British Petroleum (225.9B), No.100 No.200 (45.6B), No.300 (34.4B), No.400 (26.5B), No.500 (20.9B).

Samsung (177.4B) ranks 13. By country USA 134, China 103, Japan 52, France 29, Germany 28, UK 26, S. Korea 15, Switzerland 15, Netherland 12, Canada 11. Among top 10, 3 US, 3 China, 2 UK, 1 Netherland, 1 Germany, 1 Japan; 5 Oil companies, 2 automobile, 2 electronics (Apple) and electricity, 1 Retail
FOR THE ANIMALS
WITH NEW
SUPERIOR PRODUCTS

CJ is the only company offering 6 L-Amino Acids for the global feed industry

- L-Lysine
- L-Methionine
- L-Threonine
- L-Tryptophan
- L-Valine
- L-Arginine

✓ L-Methionine is not only produced from eco-friendly method but also a natural form of Methionine
✓ L-Arginine improves the breast meat and reduces abdominal fat in broilers
✓ L-Valine supports nutritionists to formulate low CP diets

www.cjbio.net
Lab to Market, Inc. was founded in March, 2015 by Professor Yoon Seok Chang (CEO) of Korea Aerospace University (KAU) and is a startup venture evolved from two government funded projects: Ubiquitous Technology Application Research of KAU (www.utac.or.kr) [Research fund : KRW 1,400,000,000 (1,100 KRW=1 USD) (2012–2017)] and ICT-UAV Logistics Convergence Information Technology Research Center (funded by Ministry of Science and ICT and Future Planning) [Research fund : KRW 195,000,000 (2013–2017)]. Currently Lab to Market has two business areas: advanced intralogistics has sales of 2015 sales (KRW 200,000,000), 2016 sales (KRW 400,000,000), 2017 sales (KRW 1,000,000,000, projected) and Refuse resource biotechnology was developed at KAIST for 30 years by Professor Ho Nam Chang; KAIST’s patents were transferred to Lab to Market, and are under commercial development (exclusive license from KAIST). Refuse Resource Technology has 4 business areas of Sensor networks based on SMART Monitoring & Operation System; Microbial biodiesel solution; Food waste treatment solution and Sea water Desalination; Two US Patents of MSC-HCDC (multistage continuous high cell density culture), Food waste treatment of high rise apartments and restaurant, and one PCT (US, others under application) of osmotic pressure free reverse osmosis (Δπ=0) characterize uniqueness and excellence of Lab to Market’ commercial technologies.
Solution of company

Business Area & Solution – Refuse Resource Biotechnology

① Microbial biodiesel Solution
- Technology: Locally collectable waste biomass (food waste, seaweeds, etc.) are anaerobically digested to volatile fatty acids (AA, PA, BA), which were converted to low cost microbial biodiesel using MSC-HCDC (high productivity and high titer).
- Application: Microbial biodiesel, ethanol, butanol

② Food waste treatment Solution
- Technology: Food wastes from high-rise apartments and restaurants are converted to CO₂ and H₂O, and environmentally friendly discharges having name HEROS character: HEROS (Hygienic & Hands-free; Energy-saving, Residue-free, Odor-free and Space-saving using MSC-HCDC technology)
- Application: treatment of Foodwastes of high rise apartments and large-scale restaurants.

③ Sea Water Desalination Solution
- Technology: Δπ=0 RO makes possible a 100% recovery of water and salts regardless of osmotic pressures of solution osmotic pressures
- Application: Seawater desalination and enriching of low-titer fermentation broth.

④ Sensor networks based SMART Monitoring & Operation System
- Technology: SW solution of monitoring and system operation of multi-plant facilities based on IOT information (eg. food waste treatment facilities).
- Application: System Operation, Monitoring and Management of multi-plants facilities (4th Industrial Revolution type)
### Type C

- **Type A**: CJ (Fall 2017 No. 1)
- **Type B**: Lab2m (Fall 2017 No. 1)

#### Suppliers of Chemicals and Equipment to Research Laboratories

**Korea**

<table>
<thead>
<tr>
<th>Serial #</th>
<th>Companies</th>
<th>Home pages</th>
<th>Tel</th>
<th>Products</th>
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<tr>
<td>1</td>
<td>BKT21</td>
<td><a href="http://www.bkt21.co.kr">http://www.bkt21.co.kr</a></td>
<td>82-070-5050-5555</td>
<td>membrane, wastewater treatment</td>
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<tr>
<td>2</td>
<td>sunbio2 Co, LTD</td>
<td><a href="http://sunbio2.com">http://sunbio2.com</a></td>
<td>82-31-945-0201</td>
<td>oxygen generator, etc.</td>
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<td>3</td>
<td>LOKAS</td>
<td><a href="http://lokas.co.kr/">http://lokas.co.kr/</a></td>
<td>82-42-932-3170</td>
<td>fermentation off-gas</td>
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<td>4</td>
<td>Pure envitech</td>
<td><a href="http://www.pure-envitech.co.kr/eng/">www.pure-envitech.co.kr/eng/</a></td>
<td>82-31-495-0574</td>
<td>hollow fibers</td>
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<td>5</td>
<td>labmarket</td>
<td><a href="http://www.labmarket.co.kr">www.labmarket.co.kr</a></td>
<td>82-2-2274-4817</td>
<td>glassware, fabrication</td>
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<tr>
<td>6</td>
<td>lab2m</td>
<td>lab2m.com</td>
<td>82-2-3158-2094</td>
<td>adv. logistics, refuse resource biotechnology</td>
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<tr>
<td>7</td>
<td>SrLab</td>
<td><a href="mailto:srlab@korea.com">srlab@korea.com</a></td>
<td>81-10-6505-82-5965</td>
<td>chemicals and equipment supplier</td>
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<tr>
<td>8</td>
<td>C.H Tech(씨에이치테크)</td>
<td><a href="mailto:sembong@hanmail.net">sembong@hanmail.net</a></td>
<td>82-42 670 4542</td>
<td>chemical and bioprocessing, pilot plant</td>
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<tr>
<td>9</td>
<td>Iontech(이온테크)</td>
<td><a href="http://www.membranes.co.kr/">http://www.membranes.co.kr/</a></td>
<td>82-2-585-8656</td>
<td>membrane module supplier</td>
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<td>10</td>
<td>samchun pure chemical</td>
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<td>82-2-2265-8910-1</td>
<td>pure chemicals</td>
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<td>11</td>
<td>Sepratech</td>
<td><a href="http://www.sepratek.com/">http://www.sepratek.com/</a></td>
<td>82-10-6321-1231</td>
<td>membrane technology</td>
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Prof. Ho Nam Chang (KAIST/Lab2m) Refuse Resource Biotechnology

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<th>Home pages</th>
<th>Fax</th>
<th>Dealing Items</th>
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<tr>
<td>1</td>
<td>YMS</td>
<td><a href="http://www.ymskorea.com/">http://www.ymskorea.com/</a></td>
<td>82-2-422.4938</td>
<td>chemicals and products supply</td>
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<td>2</td>
<td>Daeiltech(대일 가스)</td>
<td><a href="http://www.lab114.co.kr/inc/">http://www.lab114.co.kr/inc/</a></td>
<td>82-2.466.2618</td>
<td>Arcodisc, filter consumables</td>
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<tr>
<td>3</td>
<td>Arang gas supply</td>
<td><a href="http://www.%EC%82%B0%EC%97%85%EC%9A%A9%EA%B0%80%EC%8A%A4.com/">http://www.산업용가스.com/</a></td>
<td>82-2.2618.9226</td>
<td>CO2, N2 gas</td>
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<td>4</td>
<td>genotech</td>
<td><a href="https://www.genotech.co.kr/">https://www.genotech.co.kr/</a></td>
<td>82-42.862.8406</td>
<td>Oligo-mers and Sequencing</td>
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<tr>
<td>5</td>
<td>vision innovation</td>
<td><a href="http://www.visionbionex.com/">http://www.visionbionex.com/</a></td>
<td>82-32.672.3098</td>
<td>centrifuge, chemicals</td>
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<td>6</td>
<td>Hib2all</td>
<td><a href="http://www.hib2all.co.kr/_front.php">http://www.hib2all.co.kr/_front.php</a></td>
<td>82-2-3471-6633</td>
<td>office supplies</td>
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<tr>
<td>7</td>
<td>Dream cell (드림셀)</td>
<td><a href="http://www.dreamcell.co.kr/">http://www.dreamcell.co.kr/</a></td>
<td>82-2-2293-8870</td>
<td>DMEM, FBS, cell growth media</td>
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Prof. Tai Hyun Park (SNU) Biosensor