

# KOREAN SOCIETY FOR BIOINFORMATICS (KSBI)

Kwang Hyung Lee, Doheon Lee, Chul Min Kim, Jong Park, Hong Gil Nam, Kyoung Tai No,  
Sang Joo Lee, Jong Shin Yoo, Suki Kang, Dongsup Kim, Jang-Ho Hahn, Hyun-Woo Han,  
Seok-Ki Im, Hyun-Kyu Shin, Bong Joong Kang, and Sang Yup Lee  
(all at Korean Society for Bioinformatics)

**K**orean Society for Bioinformatics was founded on November 27, 1998 with a mission to improve the competitiveness of South Korea through bioinformatics. More specific missions are to establish bioinformatics infrastructure in South Korea, advance bioinformatics research, contribute the advancement of bioindustry using bioinformatics, and develop basic and advanced bioinformatics education system. The founding president of the KSBI was Dr Moon-Hee Han, and the current president is Dr Kwang Hyung Lee. The KSBI carries out the following tasks:

1. Annual international conference in a series called BIOINFO
2. Many symposia on specific topics such as proteome informatics, DNA chip informatics, systems biology and biotechnology, microbial genomics, etc.
3. Publishing an official journal and bioinformatics books
4. Carrying out government and industry-funded research projects
5. Developing educational programs and international collaboration schemes
6. Supporting industries with bioinformatics
7. Offering educational bioinformatics courses

## KSBI Conferences

KSBI began its annual symposium in 2000. Though it was the first Korean symposium on bioinformatics, it attracted around 400 participants in the city of Pohang. After three symposiums, where only invited talks of leading scientists were presented, KSBI has held its first conference in 2003 at Daejeon. In the conference, 36 papers were selected from 54 submissions, i.e., 67% selection ratio. Those papers were presented in oral sessions along with four impressive invited talks by Dr Michael Gribskov, ISCB president at the time, and other leading scholars. KSBI has also hosted the international joint conference of AASBi, InCoB, and KSBI (BIOINFO2005) in 2005. It was an incredible success accommodating around 200 foreign bioinformatics colleagues from neighborhood countries, as well as more than 300 Korean participants. The Korean presidential scientific advisor also attended the event, and gave an encouraging speech in the conference. Continuing these exciting events, KSBI is planning to hold BIOINFO2007 in the summer season at Seoul.

Year	Venue	Type	General Chair	Participants
2000	Pohang	Symposium	Hong-Gil Nam	400
2001	Pohang	Symposium	Sam-Myo Kim	500
2002	Busan	Symposium	Sam-Myo Kim	400
2003	Daejeon	Conference	Hong-Gil Nam	400
2004	Seoul	Conference	Hong-Gil Nam	250
2005	Busan	Conference	Kwang-Hyung Lee	500
2006	Pohang	Conference	Kwang-Hyung Lee	250
2007	Seoul	Conference	Kyoung Tai No	-

### Bioinformatics and Biosystems: Official Journal of KSBI

After several unsuccessful efforts, KSBI finally launched its official journal, "*Bioinformatics and Biosystems*." It published its first issue on February 2006. As the name of the journal suggests, the journal aims to provide an international forum, both in print and on the web, for exchange of information in all areas of bioinformatics and related research areas on biosystems informed by the fusion character of biological sciences and information technology. The key objective is rapid exchange of information, and the journal accepts self-reviewed papers for that purpose. The scope of the journal covers the following topics:

- Bioinformatics and computational biology including genome analysis, sequence analysis, structural bioinformatics, gene expression, computational systems biology, biological networks, data and text mining, databases, and ontology
- Other related informatics areas including medical informatics, cheminformatics, and neuroinformatics
- Related "omics" areas including genomics, proteomics, metabolomics, and physiomics
- Related bio-fusion areas including biostatistics, biochips, biocomputings, biomedical research, bio-imaging, and bio-nanotechnology

The journal *Bioinformatics and Biosystems* is under the leadership of the editor-in-chief, Dr Jang R Liu of Korea Research Institute of Bioscience and Biotechnology (KRIBB). It has 7 editors and 17 editorial board members. As of November 2006, KSBI has published the three issues of the volume 1 so far. It will publish the fourth issue at the end of November 2006.

### Korean Academy of Bioinformatics Education (KABE)

Korean Academy of Bioinformatics Education (KABE) was founded on September 22nd, 2005, with the initial 14 graduate and undergraduate school members having bioinformatics programs. KSBI founded preliminary meetings and work forces to developing KABE in 2004. The preliminary committee surveyed all the educational institutions for South Korea. Finally, 14 major universities and colleges having distinct educational programs or departments for bioinformatics education were included.

The distribution of the programs and departments of bioinformatics were widespread. Some has independent colleges or institutions. Others are departments of programs in college of natural sciences, medical schools, engineering schools or interdisciplinary

programs. The 14 members are from Changwon University, Chonnam National University, Chungbuk National University, Ewha Women's University, Inje University, Korea Advanced Institute of Sciences and Technology, Korea University, Myungji University, Postech, Pusan University, Sangmyung University, Seoul National University, Soongsil University and Sookmyung University.

KABE hosted the first workshop for development on November 18th, 2005 at Chungbuk National University. KABE agreed on the five short range plans, (1) writing the mission statement, (2) creating a common brochure for the KABE institutions for the shared promotion effort in recruiting students and raising research funds, (3) developing a shared web site for the integrated exchange of educational and administrative information for the KABE institutions, (4) creating an international society for Asia-Pacific bioinformatics education, and (5) developing standard curriculum for the students and trainees.

KABE holds its regular meetings in parallel with the KSBI meetings as well as many ad hoc meetings. KABE now functions as a subsidiary organization for the KSBI. KABE members submit annual reports for the recent development about their programs and ideas.

### **KAIST Bioinformatics Research Center**

The KAIST Bioinformatics Research Center (BiC) was established in 2003. It is located in Chung Moon Soul Building of KAIST, Daejeon, Korea. The main objective of the BiC is carrying out world-class academic and industrial researches rather than simply providing bioinformatics database services. The BiC coordinates active collaborations among the biologists, computer scientists, biotechnologists, biochemical engineers, and other scientists and engineers who are interested in bioinformatics research. This allows efficient implementation of bioinformatic findings on real biological and biotechnological systems.

A number of professors at the Department of BioSystems, Department of Chemical and Biomolecular Engineering, Department of Biological Sciences, Department of Physics and other departments of KAIST are participating in various center activities. Undergraduate and graduate students as well as post-docs and researchers are developing their careers to become bioinformatics experts. Currently, the BiC carries out not only academic and national research projects, but also industrial and consulting projects.

Systems biology and systems biotechnology are important disciplines that the BiC is very much interested in. Using the outcomes of bioinformatics research, BiC is developing various platform technologies in systems biology and systems biotechnology. Systems biotechnology is the way biotechnology should be developed and practiced from now on. Up-stream (strain, cell and organism development), mid-stream (fermentation and other unit operations), and down-stream processes of biotechnology will benefit significantly by taking systems biotechnological approaches. In the cases of mid- to down-stream bioprocesses, it resembles systems engineering approach that has been successfully applied in chemical industries (core subject of chemical engineering). Now, it is time to take systems biotechnological approaches in developing up-stream processes such as strain development, which will ultimately lead to successful biotechnology development when combined with systems engineering of mid- to down-stream processes.

There are hundreds of biological information repositories accessible through the web, and the number and the size of these websites are increasing continuously. Since one essential aspect of bioinformatics lies in combining various biological findings

to extract integrated knowledge and infer novel facts, automated integration of such information repositories is imperative. However, each repository has its own access protocol, data organization, and semantics. BiC has been investigating modeling and integration techniques to cope with such heterogeneity and diversity based on XML, Web, and Agent technology.

One of the essential parts of bioinformatics is to find useful but hidden patterns from massive biological data, which provide clues to uncover the secrets of biology. It includes classification, clustering, association analysis, and link analysis. BiC has been developing various bio-data mining programs using decision trees, regression trees, artificial neural networks, Apriori-variants, and so on.

There have been a lot of endeavors to model bio-processes such as metabolic processes, signal transduction, and gene regulation to achieve better understanding of biological systems. Various mathematical models are employed, which includes directed graphs, Petri nets, Bayesian networks, and Boolean networks, to name a few. BiC has been investigating the characteristics of various models, and developing systematic frameworks where various models can be fused into integrated analysis environments.

Recently, new and high-throughput experimental technologies generate huge amount of data on molecular interactions within a living cell. These interaction data can be formulated as a biological network where each molecule is a node and the interaction between these nodes are considered as a link in the network. There are various types (levels) of biological networks including protein-protein interactions, signaling and transcription-regulatory networks, and metabolic networks. These networks are not independent of each other, but they are rather interrelated in a hierarchical way. Although the collected data are believed to be incomplete and noisy, the availability of massive network data gives us a new insight for system-level understanding of biological systems. One of the major findings is that most biological networks are scale-free, which means that their connectivity (the number of links of each node) distribution follows a power law. In other words, they do not have any specific scale, and the corresponding distribution has a long (fat) tail, guaranteeing that there exists some nodes (called hubs) with a large number of neighbors. In addition, it has been found that these hubs play important roles in biological functions. The large-scale organization principles and functional properties of the biological systems (like how these molecules are interacting with each other to maintain the robustness of cellular functions) can be understood by studying the topological and dynamic properties of biological networks.

*Contact Details:*

Contact Person: Professor Sang Yup Lee Director  
Address: Bioinformatics Research Center,  
Korea Advanced Institute of Science and Technology,  
373-1 Guseong-dong,  
Yuseong-gu, Daejeon 305-701, Korea  
Tel: +82 42 869 8866  
Fax: +82 42 869 8800  
Email: leesy@kaist.ac.kr

### **Korean Bioinformation Center (KOBIC)**

KOBIC is the national bioinformation center of Korea located at KRIBB, Daejeon. KOBIC manages biological information from bioversity (<http://bioversity.org>), bioresource and omics (including genomics, proteomics, expressomics etc., <http://omics.org>).

Its function is the national focal point of biological science and technology network of Korea. It also functions as a designated national correspondent to official international collaborations in bioscience and biotechnology through MOUs, international research funds and bioinformation exchange. KOBIC has been collaborating with various biotechnology institutes in South East Asia.

KOBIC's main web service includes various web server sites including <http://www.kobic.re.kr>, <http://biospecies.org> and <http://biopedia.org>. KOBIC has dual responsibility as a national bioinformation management and bioinformatics research center. Its major research area includes genomics, proteomics, transcriptomics, interactomics, and variomics (<http://variome.net>).

KOBIC's mission includes openfree dissemination of programs, databases and knowledge to the public. Therefore, any academic collaboration is welcome inside and outside of South Korea to share resources and information. KOBIC has 45 bioinformatics researchers and 5 administration staff. It has over 100 terabyte storage space with over 700 CPUs in various clusters and servers. It is conveniently located and affiliated with KRIBB (Korea Research Institute of Bioscience and Biotechnology) which is the representative national center of bioscience and biotechnology of Korea in Daejeon, South Korea. KOBIC aims to become one of the major participants of the growing Asian bioinformation network in the 21st century. For more information please visit: <http://www.kobic.re.kr/>

### **School of Interdisciplinary Bioscience and Bioengineering (I-Bio Program) at POSTECH**

Most biological studies have so far been more or less limited to descriptive nature. However, thanks to the breath-taking advancements achieved in life sciences such as the successful completion of genome project, platforms to lead the explorations into the essence of life phenomena in more comprehensive and quantitative directions have now been established. Particularly, with the help from such leading-edge technologies such as nano-science, more and more researches of higher caliber are being conducted.

To produce scientists capable of spearheading this new trend in research and development, we need to create educational system of new concept beyond the conventional boundaries of disciplines for educating and training future scientists and engineers with strong interdisciplinary orientation, who are equipped with quantitative, systematic, and integrative thinking and research abilities. They are also required to be empowered with knowledge of various fields in order to conduct researches of convergent, interdisciplinary nature and to apply the deciphered knowledge on life phenomena to pharmaceutical industry and/or biomedical field.

#### **Mission**

POSTECH's missions are to educate and train creative and pioneering scientists and engineers in bioscience and bioengineering, who can contribute to the improvement of human healthcare, welfare and natural environment, and to foster stronger global competitiveness in South Korea's biotechnology.

### Overview

The School of Interdisciplinary Bioscience and Bioengineering (I-Bio Program) was launched in 2006 as an interdisciplinary graduate program in bioscience and bioengineering at the Pohang University of Science and Engineering (POSTECH) for the development of state-of-the-art bioengineering technology of interdisciplinary nature. Its mission is to educate and train world-class scientists and engineers in unique educational systems, who, equipped with quantitative, systematic, and integrative orientations and hands-on experience, can lead the new trends of integrative bioscience and bioengineering in the future.

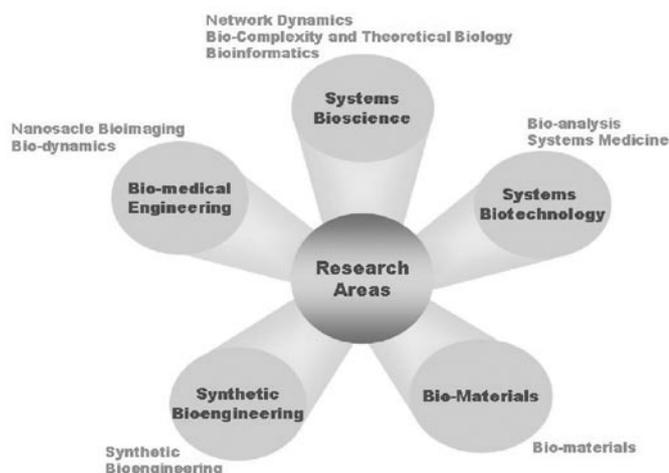
Highly focused on a selective number of students in bioscience and bioengineering, the program aims at developing state-of-the-art bioengineering technology of interdisciplinary nature, and producing futuristic, world-class scientists and engineers who, equipped with the knowledge, techniques, and insights from core sciences such as biology, physics, chemistry, and mathematics as well as a variety of disciplines including electronic and electrical engineering, computer science and engineering, mechanical engineering, materials science and engineering, chemical engineering, and environmental engineering, can conduct innovative research of a new trend.

This new program is expected to create a new paradigm for understanding, analyzing and adapting life phenomena and to serve as a role model for a successful bioscience and bioengineering program.

The I-Bio Program of POSTECH particularly enjoys the great advantages of being close to the National Core Research Center for Systems Bio-Dynamics (SBD-NCRC) designated by the Ministry of Science and Technology (MOST), the POSTECH Biotech Center (PBC), the Pohang Accelerator Laboratory (PAL), and other state-of-the-art educational and research infrastructures in the campus, all working to educate and train creative and pioneering next-generation scientists and engineers in the field of bioscience and bioengineering.

### Research Areas

The research interests of the I-Bio Program faculties include nano and molecular scale-bioimaging, network dynamics, bio-dynamics, bio-materials, bio-analysis and biomedical engineering, bio-complexity and theoretical biology, bioinformatics, bio-engineering, and synthetic biology.



**Academic Programs, Need-based Track System**

To maximize the effect of interdisciplinary education and the efficiency of educating students with diverse academic backgrounds, the I-Bio Program provides customized curricula by providing two tracks of specialization based on the student's undergraduate majors and future research areas of interest and career goals. The track of each student is decided by the curriculum committee in consideration of the student's choice and the advisor's suggestion. The core curriculum, including two required courses and one of the three required electives, is geared to providing fundamentals of interdisciplinary biosciences, while the track-based curriculum offers more specific knowledge and technologies related with each track. These two parts combined together, the core curriculum and the track-based, work in an open system and serve as a systematic bridge between education and research.

*Track 1: Systems Bioscience and Biotechnology*

This track provides quantitative, systematic and dynamic education and research opportunities in various life phenomena, ranging from the level of molecules to that of organisms by adapting the theories, logic, techniques of mathematics, chemistry, life science, physics, electronic and electrical engineering and computer science. The analysis of biological complexity, a system- and dynamics-level investigation and theoretical interpretation and modeling on molecular biology, cytology and biochemistry interactions between molecules serve as a good example of the research of this track. In addition to that, education and research in biotechnology based on the quantitative, systematic and dynamic understanding of the phenomena of living organisms, eg., the development of new concepts in medicines, bio materials, and the control of metabolism, will be carried out.

*Track 2: Systems Bioengineering*

This track provides education and research opportunities in two areas. Incorporating the methodology, knowledge and technology of the fields of life science, material science and technology, mechanical engineering, industrial engineering, electronic and electrical engineering and chemical engineering, one area introduces engineering-oriented interpretation and devices in order to understand and apply life phenomena. The other area adapts biological knowledge to accomplish engineering oriented goals. In the former case, the education and research on bioimaging techniques, substitute biomaterials, and NEMS/MEMS-based medical engineering serve as an example. In the latter case, the education and research on computer simulation of a neural network of a living organism and development of the equipment to simulate the movements of organs of living organisms, animals and plants will be targeted.

**Web links:**

<http://ibio.postech.ac.kr>

<http://www.postech.ac.kr/lab/life/bioinformatics>

<http://cim.postech.ac.kr/>

<http://www.postech.ac.kr/~chjun>

<http://pse.postech.ac.kr/>

*Contact Details:*

Contact Person: Professor Hong-Gil Nam, Director  
Address : I-Bio Program, Jigok Research Building,  
POSTECH, 31 San, Hoyja,  
Namgu, Pohang 790-794 Korea

Tel: +82 54 279 8405~6

Fax: +82 54 279 8409

Email: [i-bio@postech.ac.kr](mailto:i-bio@postech.ac.kr)

### Bioinformatics and Molecular Design Research Center

Bioinformatics and Molecular Design Research Center (BMDRC) is a non-profit organization (<http://www.bmdrc.org>). It was founded in 1997, based on the passionate supports and collaboration of scientific institutes, companies, and universities. BMDRC is now located at Yonsei Engineering Research Complex in Seoul. BMDRC mainly focus mainly on the development of CAMD technologies including drug and material design, ADME/Tox prediction, PK prediction, environmental toxicity prediction, and systems biological approaches on several biological systems. BMDRC periodically, about ten times a year, provides training courses to industrial and academic researchers.

The objectives of the BMDRC are:

- To develop CAMD S/W and technologies in life and material science
- To provide education and training of CAMD technologies
- To transfer CAMD technologies to industries
- To incubate and support venture companies that use CAMD technology
- To cooperate internationally to form Asia Hub for e-Drug Discovery (AHeDD)

BMDRC's chairman is Yung-Bog Chae, former minister of Ministry of Science and Technology of Korea, and the advisory board that consists of world famous scientists in CAMD field. BMDRC has now five divisions; drug discovery (Dr Hanjo Kim), chem. & bioinformatics (Dr Sung Kwang Lee), material design (Dr Mee Kyung Song), basic research (Dr Kyoung Tai No), and administration (Ms Hye Sun Lee). Dr Kyoung Tai No is the director of the center.

About 20 full-time and 15 part-time researchers are working at BMDRC. Most of the pharmaceutical companies in Korea have collaboration experiences with BMDRC and participate in CAMD training courses. Since 1997, more than 1,500 scientists have attended CAMD training courses provided by BMDRC.

BMDRC leads several national research projects related to CAMD technologies, such as:

- BioGRID project
- Virtual Screening with Korea@home project
- e-Science project, Human Genome to Chemicals (HG2C)
- Korea Chem DB construction since 2000
- CAMD Technology Innovation Center, 1999~2002
- Environmental Toxicity Prediction Project for preparing REACH

BMDRC, as a co-founder of AHeDD with Japan (CBRC, Dr Yutaka Akiyama) and China (DDDC, Dr Hualiang Jiang) organized AHeDD symposiums in Korea (2005 in Jeju Island, and 2006 in Seoul). In 2007 (in April), AHeDD symposium will be held in Shanghai, China by DDDC and East China University of Science and Technology (ECUST).

BMDRC have developed several software and databases for CAMD:

- PreADME 1.0, ADME Prediction
- PreADMET 2.0, ADME/Toxicity Prediction, <http://preadmet.bmdrc.org>
- ChemDB Organic Chemical DB for CAMD <http://chemdb.kisti.re.kr>
- ChIPS, Customizable in-house chemical database
- HG2C, Human Genome to Chemical <http://www.hg2c.org>

- Korea@home, @Home project for massive virtual screening <http://www.koreaathome.org>
- Lead Explore Integrated e-Drug Discovery System
- e-Metabon, Prediction of xenobiotics metabolism

In Korea, CAMD technologies are more popular than ever in the fields of drug discovery, material design, environment, and medical science. It will grow to be much more important in every field of industry and science.

## Center for Computational Biology & Bioinformatics (CCBB)

### Mission and Roles

Construction of IT-based Bioinformatics Infrastructure

- Construction of bioinformatics content (databases, analysis tools, recent news on research trend) and services
- R&D in bioinformatics

### Organization Chart and Members' Specialty

Total	Degree	Subtotal	BT	IT	Chemistry	Physics	Math/Statistics	Etc
21	Ph.D	7	2	1	2	1	-	1
	M.S.	13	2	9	2	-	-	
	B.S.	2	-	2	-	-	-	

### Research Areas

- Development of the Integrated Bioinformatics System
  - Unification of bioinformatics database (70 databases)
  - Unification of bioinformatics analysis tools (56 analysis tools)
  - Development of the management system for DB search results and analysis results
  - Development of client program for advanced users
- Development of BioWorkflow System
  - Development of XML representation for Workflow
  - Development of Java- and Web-based Workflow Execution Engine
  - Development of GUI-based Workflow Builder
- Bioinformatics Services and User Support
  - Providing Bioinformatics DBs, analysis tools, and recent news on research trend
  - Construction of bioinformatics literature network (BioInfoNet)
  - Providing high-performance computing system and necessary technical support

- Bioinformatics Research
  - Protein folding study using hydrophobicity of amino acid residues
  - Structural change from B-DNA to Z-DNA
  - Basic Studies on protein classification system and protein folding
  
- National Node of Biodiversity Information Facility
  - Mirror Site of Global Biodiversity Information Facility(GBIF) and providing service
  - Management of Korean Biodiversity Information Facility(KBIF)
  - Construction of bio-resource databases and services
  
- Consortium of BIT institutes
  - Standardization of data on biology
  - Establishment of collaborative network among institutes
  - Information sharing and construction of common database

**Research Achievements (recent four years)**

Year	Classification	Achievements
2006		<ul style="list-style-type: none"> <li>• Developed the integrated bioinformatics system</li> <li>• Constructed bioinformatics literature information network (BioInfoNet)</li> </ul>
2005		<ul style="list-style-type: none"> <li>• Chosen as the mirror-site of Global Biodiversity Information Facility in Asian area</li> <li>• Co-held International Symposium on Computational Biology and Bioinformatic 2005 (Tokyo, Oct. 28)</li> <li>• Co-held BIOINFO 2005 (Busan, Sep. 22-24)</li> <li>• Concluded the memorandum of understanding with Weizmann Institute ISPC (June 17), and built mirror sites of GeneCards and OCA</li> </ul>
2004		<ul style="list-style-type: none"> <li>• Built MHCBN: Information about Major Histocompatibility Complex (MHC) Binding, Non-binding peptides and T-cell epitopes</li> <li>• Concluded the Memorandum of Understanding with R&amp;D Program for BIT Fusion Strategy of Advanced Technologies, POSTECH (Aug. 13)</li> <li>• Constructed Genome/Protein databases and developed bioinformatics-related technology</li> <li>• Concluded the Memorandum of Understanding with Computational Biology Research Center, Japan (March 22)</li> <li>• Held Bioinformatics 2004 symposium</li> </ul>
2003		<ul style="list-style-type: none"> <li>• Developed 2D-gel ViPS(Virtual Proteomics Systems): Visualization service for protein distribution</li> <li>• Become a partner Institute of National Genome Information Center (NGIC), designated by Ministry of Science and Technology (MOST)</li> <li>• Constructed Genome/Protein databases and developed search system using Bio-KRISTAL</li> <li>• Held Bioinformatics 2003 symposium</li> </ul>

**Collaborations with Domestic and Foreign Institutes**

	<b>Name of Institute</b>	<b>Classification</b>	<b>Activity</b>
Domestic	R&D Program for BIT Fusion Strategy of Advanced Technologies, POSTECH	University	Workshop
	Genome Research Center, Chungnam National University	University	
	National Institute of Agricultural Biotechnology	Governmental Institute	
	The Research Institute of Bioinformatics & Molecular Design	University	
	National Genome Research Center, KCDC	Governmental Institute	Collaboration
	Korea Research Institute of Bioscience & Biotechnology	Government Supported Research Institute	Collaboration
Foreign	Computational Biology Research Center, Japan	Government Supported Research Institute	Symposium
	Weizmann Institute ISPC, Israel	Government Supported Research Institute	Mirror-site

**Websites**

<b>Name of Department</b>	<b>Content</b>	<b>URL</b>
Center for Computational Biology & Bioinformatics	Various content on Bioinformatics: databases, analysis tools, recent news on research trend, etc.	<a href="http://www.cccb.re.kr">http://www.cccb.re.kr</a>
	Integrated bioinformatics system for databases and analysis tools	<a href="http://ibs.cccb.re.kr">http://ibs.cccb.re.kr</a>
	Open access literatures on Bioscience	<a href="http://biofonet.cccb.re.kr">http://biofonet.cccb.re.kr</a>
	Korean Biodiversity Information Facility	<a href="http://www.kbif.re.kr">http://www.kbif.re.kr</a>

**Main Activity and Future Plan (annual)**

<b>Date</b>	<b>Classification</b>	<b>Activity</b>
October or November	Symposium or workshop	Help international symposium

**More Information**

We will start a new project: building national e-Science infrastructure for BT & NT community.

*Contact Details:*

Contact Person: Dr Sang J. Lee  
 Address: Center for Computational Biology & Bioinformatics,  
 Korea Research Council of Public Science & Technology  
 Korea Institute of Science and Technology Information  
 Eo-eun-dong 52-11, Yuseong, Daejeon 305-333, S. Korea  
 Tel: +82 42 828 5174  
 Fax: +82 42 828 5179  
 Email: ccbb@kisti.re.kr  
 URL: http://www.ccbb.re.kr

**Division of Bio-Medical Informatics at KNIH**

**Mission**

- Development, collection, analysis, and administration of health care and bio-medical information
- Development and management of health and disease-related genomic information management system
- Collection and administration of research information based on disease-related human and pathogenic microbial genomics
- Health care and bio-medical information service
- Genetic epidemiology and bioinformatics-related research

**Organization Chart and Members' Specialty**

Total	Degree	Subtotal	Bio-related	Computer science	Chemistry	Physics	Math/Statistics	Etc
20	Ph.D	7	3	1	1	-	1	1
	M.S.	7	1	3	-	-	3	-
	B.S.	6	3	-	-	-	1	2

**Research Areas**

- Statistical analysis of bio-medical information
  - Construction of integrated data service system based on epidemiology and genomics information
  - Developing the statistical method and techniques to find the relationship between the disease and integrated information system
  - Construction of the support environment for the South Korean genomics research
  
- Analysis of Risk Assessment Model in health care
  - Analysis of diagnostic-markers based on bio-medical integrated information
  - Functional SNP analysis in *silico*
  - Combined research for the relationship among the genome variation, biological function and disease information

- Infra construction for the bio-medical information service
  - Information system for public health care and disease control
  - High performance data management and processing
  - Information security administration and planning
  
- Bio-medical data integration DB system
  - kGene Database system
  - Development of algorithms for bioinformatics
  - A Solution Development for Artifact Standard of Bio-Medical Information related DB
  - Making the standard document form/template using reference guides based on the domestic standards of DB construction
  - Collection of the terms in Center for Genome Science (CGS)'s DB artifacts to standardize the terms and make the terms dictionary
  - On the CGS level, development of the standard method to calculate DB amount and data count

### Research Achievements

Year	Classification	Contents
2005	Education S/W	<ul style="list-style-type: none"> <li>• Neural network research for proteomics structure and interaction prediction using proteomics DB</li> <li>• Development of information strategy planning about bio-medical and informatics</li> <li>• Construction of high-speed information network system environment to accelerate the use of the disease-related genomic/genetic information systems</li> <li>• Establishment of information and network access control policy based on the domestic and international standards</li> <li>• Enhancement of information flow usability by duplex configuration of information security system</li> <li>• Introduction of high performance supercomputer</li> <li>• Making of the video lecture for bioinformatics</li> <li>• Development kGene DB browser for integration of human related genes</li> </ul>
2006	Education Poster  Workshop Seminar	<ul style="list-style-type: none"> <li>• The award of certificate of education to students (the 1<sup>st</sup>, 2<sup>nd</sup> education) (2006.6.19~10.18)</li> <li>• The 3rd video lecture for bioinformatics (work in progress)</li> <li>• ISMB2006 (2006.8.6~10)               <ul style="list-style-type: none"> <li>D-1 : Development of prediction system in type 2 diabetes using molecular epidemiological data</li> <li>D-6 : Analysis for single nucleotide polymorphism related Type 2 diabetes in insulin signaling pathway</li> </ul> </li> <li>• BIOINFO 2006 (2006.9.14~16)               <ul style="list-style-type: none"> <li>BMI-11 : Haplotype analysis of the INSR, IRS1 and IRS2 Genes for Type 2 diabetes susceptibility</li> <li>BMI-9 : An approach to identify functional SNPs with genome structure information</li> </ul> </li> <li>• GIW2006 (2006.12.18~20)               <ul style="list-style-type: none"> <li>Systematic Analysis of Functional SNP with Type 2 diabetes mellitus (T2DM) in the South Korean Population</li> </ul> </li> <li>• The 1<sup>st</sup> Workshop for bio-medical and informatics team's future strategy (2006.1.19~20)</li> <li>• The 1<sup>st</sup> Seminar on Bioinformatics and Functional Genomics Analysis (2006.6.1~2)</li> </ul>

### Collaboration with Domestic and Foreign Institutes

	Name of Institution	Classification	Content	Results (or Products)
Domestic	Kangwon National University	University	Public row data service	
Foreign	Computational Biology Research Center (Japan)	Research Institute	research collaboration	
	National Institutes of Health (USA)	Research Institute	research collaboration	

### Websites

Department	Content	URL
Center for Genome Science	Introduction about Center for Genome Science	<a href="http://www.ngri.go.kr">http://www.ngri.go.kr</a>
Center for Genome Science	KSNP information	<a href="http://www.ngri.go.kr/SNP">http://www.ngri.go.kr/SNP</a>
Center for Genome Science	Disease-related genome Information of the Korean	<a href="http://healthinfo.nih.go.kr">http://healthinfo.nih.go.kr</a>

### Future Plans

Date	Type	Contents
2007. 4.	Workshop	The 2nd workshop on bio-medical and informatics
2007. 5.	Education	The 4th video lecture for bioinformatics
2007. 7.	Workshop	The first international workshop on bio-medical informatics
2007. 11.	Study Group	The first study group on bio-medical and informatics

### More Information

Bio-Medical and Informatics Team(BMIT) provides gene/protein information to the medical institution and researchers by analyzing and utilizing the various genes and proteins. Especially, BMIT is constructing the service system for disease prediction and disease prevention from the analysis. To establish such system, BMIT has integrated four major gene databases(NCBI, Ensemble, UCSC, and H-INV) and provide domestic researchers useful information for various disease by integrating various domestic disease databases to the major gene databases.

Furthermore, we focused on the research of the interaction model of gene/protein causing disease to be cured the disease by taking various approaches (genomics, proteomic, and bioinformatics) to explain the cause of the disease. Additionally, we are developing various algorithms for the analysis of gene/protein function and single nucleotide polymorphism(SNP).

To support these researches efficiently, we introduce a clustering computer with a very high computing power which has 100 nodes and many workstations.

As the leading group of the domestic bioinformatics, BMIT will contribute to improvement of bioinformatics and will serve the researchers with useful information for various diseases.

\* NCBI : National Center for Biotechnology Information

\* UCSC : UCSC Genome Browser

\* H-INV: H-Invitational Database

## Korea Basic Science Institute (KBSI)

### Mission

KBSI are supporting the data analysis and building of the data analysis system in biotechnology.

- Development of data analysis algorithm using bioinformatics technology
- Construction of bio-information database and development of data analysis softwares
- Supporting the data analysis in biotechnology

### Organization Chart and Members' Specialty

Total	Degree	subtotal	BT	IT	Chemistry	Physics	Math/Statistics	Etc
3	Ph.D	1	-	-	-	1	-	-
	M.S	1	-	-	1	-	-	-
	B.S.	1	-	1	-	-	-	-

### Research Areas

- ▶ Proteome data analysis
  - Development of data analysis algorithm for proteome
  - Data analysis support in proteomics research
  
- ▶ Construction of mass spectrometry database system
  - Construction of database for the protein mass analysis
  - Development of algorithms and softwares for data analysis of high-resolution mass spectrometry
  
- ▶ Systems biology research
  - Research on the integrative analysis methods of genome, transcriptome, proteome, metabolome data
  - Development of analysis tools supporting the systems biology

## Research Achievements

Year	Classification	Contents
2006	Software development	<ul style="list-style-type: none"> <li>• SLIM : We developed the database search system for FT-ICR spectra in proteomics</li> <li>• Developed the hierarchical database system for proteome database search / applied PCT patent: Kyung-Hoon Kwon, Jong Shin Yoo, 'A Method for Reconstructing Protein Database and a Method for Identifying Proteins by Using the Same Method' ( PCT/ KR2006/003261 )</li> </ul>
	Publication	<ul style="list-style-type: none"> <li>• G. W. Park, K.-H. Kwon, J.Y. Kim, J. H. Lee, S.-H. Yun, S. I. Kim, Y.M. Park, S. Y. Cho, Y.-K. Paik and J. S. Yoo, "Human plasma proteome analysis by reversed sequence database search and molecular weight correlation based on a bacterial proteome analysis", <i>Proteomics</i>, 2006, <b>6</b>,1121–1132.</li> <li>• Kyung-Hoon Kwon, Jin Young Kim, Gun Wook Park, Young-Ki Paik, Jong Shin Yoo, "Improvement of protein identification performance by re-interpreting the precursor ion mass tolerance of mass spectrum", <i>Bioinformatics and Biosystems</i>, 2006, <b>1</b>, 109–114.</li> </ul>
2005	Software development	<ul style="list-style-type: none"> <li>• MACH : Upgraded THRASH, spectrum analysis software for FT-ICR mass spectrometer</li> <li>• PotMon : applied PCT patent: Young Hee Ahn, Kyung-Hoon Kwon, Jong Shin Yoo, 'An additive scoring method for modified polypeptide' (PCT/KR2005/003037)</li> </ul>
2004	Software development	<ul style="list-style-type: none"> <li>• Building the database search software of tandem mass spectrum</li> </ul>
2003	Software development	<ul style="list-style-type: none"> <li>• Development of "Remote-control system using GRID technology"</li> <li>• Development of 2D-gel image analysis program</li> </ul>
	Publications	<p>K.-H. Kwon, M. Kim, J.Y. Kim, K. W. Kim, S. I. Kim, Y. M. Park, J. S. Yoo, "Efficiency improvement of peptide identification for an organism without complete genome sequence, using expressed sequence tag database and tandem mass spectral data," <i>Proteomics</i> 2003, <b>3</b>, 2305–9.</p>
2002	Software development	<ul style="list-style-type: none"> <li>• Constructed the database for ICAT mass spectrometral analysis</li> </ul>
2001	Software development	<ul style="list-style-type: none"> <li>• Constructed proteomics database</li> </ul>

**Collaboration with Domestic and Foreign Institutes**

	<b>Name of Institution</b>	<b>Classification</b>	<b>Content</b>	<b>Results</b>
Domestic	Yonsei Proteome Research Center	Research institute	Collaboration	Disease proteome project
	Korea Research Institute of Bioscience and Biotechnology	Government support institute	Collaboration	proteome analysis projects
	Korea Institute of Science and Technology	Government support institute	Collaboration	Frontier project
	Korea Institute of Science and Technology Information	University	Collaboration	Participating e-Science
Foreign	Medical Proteome Center, Bochum, Germany	Research institute	Collaboration	Participating HUPO HBPP
	Univ. of Michigan, Ann Arbor, USA	University	Collaboration	Participating HUPO HPPP
	Fred Hutchinson Cancer Research Center, Seattle, USA	Research institute	Collaboration	Participating Internet. Cancer Biomarker Consortium

**Website**

<http://www.kbsie.kr>

**Future Plans**

<b>Date</b>	<b>Type</b>	<b>Contents</b>
Spring, 2007	workshop	Proteome Informatics Workshop
Winter, 2007	training	Proteomics Training Course

**More Information**

Two researcher positions are opened in bioinformatics

URL : <http://www.kbsi.re.kr>

*Contact Details:*

Instrument Development Division  
 National Science & Technology Council  
 KRCF (Korea Research Council of Fundamental Science & Technology)  
 Korea Basic Science Institute  
 Contact Person: Dr Jong Shin Yoo  
 Address: Korea Basic Science Institute,  
 52 Yeoeun-dong, Yuseung-ku,  
 Daejeon 305-333, Korea  
 Tel: +82 42 865 3432  
 Fax: +82 42 865 3929  
 Email: [jongshin@kbsi.re.kr](mailto:jongshin@kbsi.re.kr)

## National Agricultural Biotechnology Information Center (NABIC)

### Mission and Roles

- To provide full service of agricultural bio-information to domestic and foreign researchers
- To expand the global bioinformation center and develop new and high-valued biotechnology information for competitive researches & advanced technology
- In the National Agro-biodiversity Information Center,
  - Crop and microorganism genetic resources information (National Genebank) and Korean Agricultural Culture Collection (KACC)
- In the Agricultural Biosafety Information Center,
  - Domestic and foreign biosafety information, GMO experimental data, environmental risk assessment policy, etc.
- In the Genome Information Center,
  - Integration and management of agricultural genome information
  - Service of information retrieval on plant and microbial genomes

### Organization Chart and Members' Specialty

Total	Degree	Subtotal	BT	IT	Chem	Phys	Math	Etc
7	Ph.D	3	3	-	-	-	-	-
	M.S	2	1	1	-	-	-	-
	B.S	2	-	2	-	-	-	-

### Research Areas

National Agricultural Biotechnology Information Center (NABIC, [www.niab.go.kr](http://www.niab.go.kr)) was found in December, 2002. The center has developed core bioinformatics systems, and it has provided the integrated agricultural biotechnology information, such as genomic information, genetic resources, biosafety information and biotechnology research information, to the researchers in the field of biology.

- Agricultural biotechnology information infrastructure of bioinformatics
  - Building, maintaining and providing of biological genome databases and information services.
  - Integrating research data from our genome sequencing projects and functional genomic research, and its information service.
- Database construction and service of agricultural biotechnology information
  - Bioresource information for crop and microorganism in South Korea including short and long term conservation.
  - Collection, preservation and distribution of agriculture related microorganisms.
  - Providing the information on GMO biosafety management and LMO risk assessment policy.
  - Analysis tools for agricultural genome information.

- ▶ Research information management of the National Biotechnology Agricultural Biotechnology
  - Construct and provide the enhanced service of agricultural biotechnology news, research results and papers.
  - Provide information on biotechnology patents and special grant research.

### Research Achievements (Recent 5 years)

Year	Section	Achievements
2002	Paper/Report	<ul style="list-style-type: none"> <li>• T. Sasaki, T. Matsumoto, Jang-Ho Hahn, Ho-Il Kim, Moo Young Eun, <i>et al.</i> The genome sequence and structure of rice chromosome 1. <i>Nature</i> <b>420</b>:312–316. November 21 (2002).</li> <li>• Report on the survey of current status in bioinformatics technology development. RDA (2002)</li> </ul>
2003	Software	<ul style="list-style-type: none"> <li>• Software development: four items including genome browsing system by integrated information</li> </ul>
2004	Software	<ul style="list-style-type: none"> <li>• Software development: four items including the gene expression profiling system</li> </ul>
	(IMT-2000)	<ul style="list-style-type: none"> <li>• Genetic resources information analysis system.</li> <li>• Agricultural genomic information analysis system.</li> <li>• Comparative genomics and marker analysis system.</li> <li>• Matabolic pathway and protein analysis system.</li> <li>• Microarray expression analysis system.</li> <li>• High-performance parallel cluster server system</li> </ul>
	Paper/Report	<ul style="list-style-type: none"> <li>• ChangKug Kim and Jang-Ho Hahn. The Development of Agricultural Biosafety Clearing House (ABCH) in Korea. <i>Korean J. Intl. Agri.</i> <b>16</b>(2): 186-190 (2004).</li> <li>• Young-Jin Park, Byoung-Moo Lee, Jang-Ho Hahn, Gil-Bok Lee, Dong-Suk Park. Sensitive and specific detection of <i>Xanthomonas campestris</i> pv. <i>campestris</i> by PCR using species specific primers based on <i>hrpF</i> gene sequences. <i>Microbiological Research</i> 159 : 419–423 (2004).</li> </ul>
2005	Software	<ul style="list-style-type: none"> <li>• Software development : 7 items including Brassica genome information management system</li> </ul>
	Paper/Report	<ul style="list-style-type: none"> <li>• Matsumoto, T., Jang-Ho Hahn, Kim Ho-Il, <i>et al.</i> The map-based sequence of the rice genome. <i>Nature</i> <b>436</b>(7052): 793–800 (2005. 8).</li> <li>• Byoung-Moo Lee, Youn-Jin Park, Jang-Ho Hahn, <i>et al.</i> The genome sequence of <i>Xanthomonas oryzae</i> pathovar <i>oryzae</i> KACC10331, the bacterial blight pathogen of rice. <i>Nucleic Acid Research</i> 2005, <b>33</b>(2)577–586</li> <li>• Report on the analysis system for expressed sequence (Reg : 11-1390564- 000035-01) (2005. 2)</li> </ul>

**Collaboration with Domestic and Foreign Institutes**

	<b>Name of institute</b>	<b>Classification</b>	<b>Activity</b>
Domestic	Korean Bioinformation Center(KOBIC)	Government	Comparative genome research
	Biotechnology Research Center	University	Genome research
	Center for Computational Biology and Bioinformatics (CCBB)	Government	Interchange Information
	Biological Research Information Center(BRIC)	University	“
Foreign	The Institute for Genome Research(TIGR)	Government supported research institute	Genome research
	Beijing Genomics Institute(BGI, China)	Government Supported research institute	“

**Websites**

<b>Name</b>	<b>Contents</b>	<b>URL</b>
NABIC	Agricultural research biotechnology Information and analysis tools service	<a href="http://www.niab.go.kr">http://www.niab.go.kr</a>
RDA Genbank	Short and long term conservation center for crop and microorganism genetic resources in Korea.	<a href="http://www.genebank.go.kr">http://www.genebank.go.kr</a>

**Main Activity and Future Plans (Annual)**

<b>Date</b>	<b>Classification</b>	<b>Contents</b>
2007. 2	Education	Genome information system for education at user
2007. 5	Semina	Genome annotation analysis for agricultural crops
2007. 7	Workshop	Microarray experiment and analysis information of crops

*Contact Details:*

Ministry of Agriculture and Forestry,  
National Agricultural Biotechnology Information Center(NABIC),  
Ministry of Agriculture and Forestry, Rural Development Administration,  
National Institute of Agricultural Biotechnology  
Contact Person: Dr Hahn, Jang-Ho, Director  
Address: (225th, seodun-dong) 224 Suwon Gyeonggi-do, Republic of Korea  
Tel: +031 299 1651  
Fax: +031 299 1664  
Email: niab@rda.go.kr  
URL: <http://www.niab.go.kr/>

## **Korea Food Research Institute (KFRI)**

### **Mission**

- Improvement in quality of national diet
- Strengthening global competitiveness of food industry
- Development of food science and technology
- Raising value-added of agricultural products

### **Research Areas**

#### **1) Food Material Processing Technology Division**

##### **1-1) Plant resource research team**

- Development of new processing technologies with plant resources
- Biological solubilization technology of intracellular components
- Control of interactions among components

##### **1-2) Animal resource research team**

- Processing, preservation and distribution technologies for animal products
- Development of bio-active functional material and health foods
- Hygienic management and quality assessment technologies of animal products

##### **1-3) Marine resource research team**

- Search for unused marine resources
- Quality and safety control of fishery products
- Quality improvement of traditional fishery products

#### **2) Food Function Research Division**

##### **2-1) Biomaterial research team**

- Screening and structural analysis of bioactive functional materials
- Design of functional materials and health foods

##### **2-2) Biofunction research team**

- Metabolism of functional materials
- Evaluation of functionality ( *in vivo* & *in vitro* assay, biochips, etc.)
- Enhancement of effectiveness of functional components in human body

##### **2-3) Molecular function research team**

- Molecular mechanism of functional materials
- Information structure of molecular functions of functional materials
- Development of functional materials for metabolic modulation

#### **3) Traditional Food Research Division**

##### **3-1) Kimchi research team**

- Grading raw materials
- Micro-organism control related with kimchi fermentation
- Physiological activity of kimchi

**3-2) Fermented food research team**

- Regulatory mechanism of fermentation
- Genomics of fermentation micro-organisms
- Metabolites of micro-organism

**3-3) Ginseng research group**

- Screening of new useful components in Korean ginseng
- Development of new functional materials and products
- Polysaccharides from ginseng

**4) Food Industry Promotion Division**

**4-1) Food service & school meal research team**

- Search for traditional foods suitable for large quantity service
- Improvement of nutritional quality for school food service
- Improvement of food safety at food service site
- Training for food service personals

**4-2) Food standard research team**

- Development of Korean standards for processed foods
- Development of national standards for 'Korean traditional foods'

**4-3) Food standard evaluation & management team**

- Certification of KS and 'Korean traditional foods'
- HACCP consulting and training

**4-4) Food economics research team**

- Food market analysis (demand, supply & market structure)
- Food and food industry policy
- Economic feasibility study

**5) Strategic Program Division**

**5-1) Rice research group**

- Post-harvest technologies for rice
- Unit operation technologies for 'rice processing complex'
- Assessment of rice quality

**5-2) Post-harvest technology research group**

- Technologies for post-harvest pretreatment, packaging, storage
- Surface sterilization, discoloration inhibition and functional packaging

**5-3) Food nano-technology research group**

- Nanocapsules and nanospheres
- Nutrient delivery system
- Nanoimaging
- Nanobiosensor

**6) Food Safety Research Division**

**6-1) Food hazard control research team**

- Advanced food hazard control technologies
- Industry applicable hazard reduction technologies
- GAP, GLP, HACCP, etc.

**6-2) Food hazard assessment research team**

- Hazard assessment and reduction technologies
- Rapid detection method for foodborne hazard
- Efficacy of evaluation technologies

**6-3) Food analytical research team**

- Analysis and monitoring of hazardous components in foods
- Detection of pathogenic and food poisoning micro organisms
- Quality assessment of imported and exported foods

**5. Research Results (or Products)**

- Rice processing complex (RPC)
- Human milk fat analogue to infant formula
- Production of hygienic powdered red pepper
- Iron supplement from transferring in swine blood
- Enantiomeric synthesis of fruit flavor using lipase
- Calcium absorption stimulating agent from egg yolk
- Anti-cancer effects of traditional Doenjang and Chungkugjang
- Agent suppressing cirrhoses from turnip
- Production of apple juice from Korean apples
- Development of detection technique of microorganism for production of high quality food
- Invention of a water-cooling, continuous pre-chilling machine for the distribution of fresh agricultural products in local areas
- Development of microbial reduction technologies of *Enterobacter sakazakii* for ensuring food safety
- Anti-duodenitis IgY fortified egg
- Grape resveratrol-enriches by using metabolism modulation
- Meat with high CLA content

**Collaboration with Domestic and Foreign Institutes**

	Name of Institution	Classification	Content	Results
Domestic	Korea, Sungkyunkwan, Ewha Womans, Dankook, Chung-ang, Konkuk, Hallym, Pukyong National, Kyungpook National, Chonbuk National, Jeonju, Woosuk, Kangwon, etc.	University		
	Samsung medical center Korea cancer center hospital, etc.	Hospital		
	Dongwon F&B, Woongjin foods, Songdo techno park, Our home, Samsung tesco, etc.	Industry		
	Korea ocean research & development institute, Jeollabuk-do center for biotechnology and bioventure, etc.	Institute		

Foreign	Danish Veterinary and Food Administration (Denmark) National Food Research Institute (Japan) National research & Chorleywood food Research Association (U.K.) Japan Food Research Laboratories (Japan) RIKILT-institute of Food Safety (Netherlands) Richard B. Russel Research Center (America) Hunstech Food Research & Production Corporation (Mongolia), etc.	Institute		
	Beijing University	University		

**Websites**

Department	Content	URL
KFRI	KFRI main page	<a href="http://www.kfri.re.kr">http://www.kfri.re.kr</a>
Food information center	Food information	<a href="http://infocenter.kfri.re.kr">http://infocenter.kfri.re.kr</a>
KFRI	Consortium homepage	<a href="http://kfricon.kfri.re.kr">http://kfricon.kfri.re.kr</a>
Kimchi research group	Kimchi	<a href="http://kimchi.kfri.re.kr">http://kimchi.kfri.re.kr</a>
Foodomics research center	Foodomics	<a href="http://www.foodomics.re.kr">http://www.foodomics.re.kr</a>
Food function research division	Development of functional food/ biomaterials for expansion of healthy life-span	<a href="http://wellness.re.kr">http://wellness.re.kr</a>

**More Information**

*Public service:*

- ‘Nutrition Facts’ labeling service
- Hygiene inspection of food (other than animal products)
- Hygiene inspection of animal products
- Patent diagnosis services
- Evaluation of venture business

*Contact Details:*  
 Ministry of Science and Technology  
 Contact Person: Dr Suki Kang  
 Address: 463-746) San 46-1, Baekhyun-dong, Bundang-gu, Songnam-s, Gyeonggi-do, Republic of Korea  
 Tel: +82 31 780 9114  
 Fax: +82 31 709 9876  
 Email: [master@kfri.re.kr](mailto:master@kfri.re.kr)  
 URL: <http://www.kfri.re.kr>

## National Animal Bioinformatics Center (NABC)

### Mission

- Development of novel techniques to identify useful DNA markers from genetic information
- Animal genomic mapping and characterization of indigenous animal gene
- Detection and characterization of desirable genes
- Proteome analysis related to expression of economic traits in livestock
- Establishment of animal genomic information DB and bioinformatics analysis system

### Organization Chart and Members' Specialty

Total	Degree	subtotal	BT	IT	Chemistry	Physics	Math/Statistics	Etc
12	Ph.D.	9	9	-	-	-	-	-
	M.S.	1	-	-	1	-	-	-
	B.S.	2	1	1	-	-	-	-

### Research Areas

- ▶ Development of genetic markers
  - Development of genetic markers to distinguish Hanwoo meat from foreign breeds
  - Excavation of genes of pig and Hanwoo for improving meat quality
  - Research on selection of useful molecular breeding markers
- ▶ Excavation of genetic markers for accumulating intramuscular fat of Hanwoo
  - Development of DNA markers and analysis of clustering and annotation of ESTs for manipulating meat quality of Hanwoo beef
  - Selection of 18 useful differently expressed genes in the early and the late fattening stages of Hanwoo
  - Selection of differently expressed genes by growth stages and by breed specificities
- ▶ Swine whole genome sequencing through international consortium

## Research Achievements

Year	Classification	Contents
2006	Journal	<ul style="list-style-type: none"> <li>• AU: Seung-Hwan Lee, Eung-Woo Park, Yong-Min Cho, Ji-Woong Lee, Hyoung-Yong Kim, Jun-Heon Lee, Sung-Jong Oh, Il-Cheong Cheong and Du-Hak Yoon</li> <li>TI: Confirming Single Nucleotide Polymorphisms from Expressed Sequence Tag Datasets Derived from Three Cattle cDNA Libraries</li> <li>SO: <i>J of Biochem and Mol Biol</i>, 2006;<b>39</b>(2):183–188.</li> </ul>
	Publication	<ul style="list-style-type: none"> <li>• User's manual for animal genomic information system</li> </ul>
	Service	<ul style="list-style-type: none"> <li>• Livestock DNA chip management system (<a href="http://chip.nabc.go.kr/DNAChip">http://chip.nabc.go.kr/DNAChip</a>)</li> <li>• Livestock proteome DB system (<a href="http://www.nabc.go.kr/protmedia">http://www.nabc.go.kr/protmedia</a>)</li> </ul>
	Software	<ul style="list-style-type: none"> <li>• WGS pro: Program for online registration of mass volume trace data</li> <li>• QTL express file conversion: Program for converting of genomic data format for gene mapping</li> <li>• QTL permutation checker: Program for checking consistency of data for gene mapping</li> <li>• Web CRI-MAP: Web interfaced program for livestock gene mapping</li> </ul>
2005	Journal	<ul style="list-style-type: none"> <li>• AU: J.W. Lee</li> <li>TI: Association of Marker Loci and QTL from Crosses of Inbred Parental Lines</li> <li>SO: <i>Asian-Australian J of Animal Sci</i> 2005, <b>18</b>:772–779.</li> </ul>
	Service	<ul style="list-style-type: none"> <li>• EST data management and analysis system (<a href="http://anot.nabc.go.kr">http://anot.nabc.go.kr</a>)</li> <li>• BAC library data management and analysis system (<a href="http://bac.nabc.go.kr">http://bac.nabc.go.kr</a>)</li> <li>• Comparative genome analysis system</li> </ul>
2004	Publication	<ul style="list-style-type: none"> <li>• User 's manual for statistical software for gene mapping</li> <li>• Guidelines for analysis of animal genomic data using SAS/GENETICS and macro program</li> </ul>
	Service	<ul style="list-style-type: none"> <li>• QTL data management and analysis system</li> <li>• BLAST DB and analysis system</li> </ul>

- Research on proteome expression related to growth and metabolism of livestock
  - Identification of genes by analyzes of protein groups related to adipocyte tissues and growth in swine
  
- Construction of managing systems for genomic information
  - Enhancement of research efficiency and enlargement of bioinformatics DB through harmonization between DB and analytical systems
  - Establishment of service system through continuous DB and DBMS control and preservation of originality through the DB update
  - Establishment of DNA chip and proteome data management systems for animal genomic researches

### Collaboration with Domestic and Foreign Institutes

	Name of Institution	Classification	Content	Results (or Products)
Domestic	National Institute of Agricultural Biotechnology(NIAB), RDA	Nat'l institute	Collaborative research	Collaborative research project
	Korea University	University		
	Korea Research Institute of Bioscience and Biotechnology(KRIBB)	Nat'l institute	International consortium	Swine genome sequencing project
	Gyeongsang Nat'l University	University		
Foreign	USDA-ARS (USA)	Nat'l Institute		
	Sanger Institute (UK)	Institute		
	Roslin Institute (UK)	Institute		
	French National Institute for Agricultural Research(INRA/ France)	Nat'l Institute		
	Illinois state university (USA)	University		
	Iowa state university (USA)	University		
	National Institute of Agrobiological Science (NIAS/ Japan)	Nat'l Institute		
	International Livestock Research Institute (ILRI)	International organization	Collaborative research	Collaborative research project
	University of New England (Australia)	University		

### Websites

Department	Content	URL
NLRI	National Livestock Research Institute	<a href="http://www.nlri.go.kr">http://www.nlri.go.kr</a>
Animal genomics and bioinformatics division	Biogreen21 animal genomic and resources research project	<a href="http://www.magic.go.kr">http://www.magic.go.kr</a>
Dairy cattle research division	Dairy Individual management service	<a href="http://dims.nlri.go.kr">http://dims.nlri.go.kr</a>
Animal genetic improvement division	Hanwoo individual identification system	<a href="http://hanwoo.nlri.go.kr">http://hanwoo.nlri.go.kr</a>

### Future Plans

Date	Type	Contents
The 1 <sup>st</sup> half, 2007	Project	Management project for NABC system
The 1 <sup>st</sup> half, 2007	Education	Techniques for statistical analysis of DNA chip data

## Korea Institute of Oriental Medicine

### Mission

- Research for formula principle of South Korean traditional medicine and Korean herbal formula
- Data base construction of expression change gene information in prescription and use of prescription
- Biomarker excavations for the efficacy of oriental medicine prescription
- Searching examination of action mechanism of the oriental medicine prescription which uses the bioinformatics
- The guidance of bioinformatics research of prescription and application for new herbal medicine development of disease in the future
- Information construction against the representative prescription of oriental medicine
- Standard guidance preparation for the composition, dosage, use, draught, storage of Oriental medicine prescription
- The standardization for the quality control of Oriental medicine prescription
- Bank constructions of Oriental medicine prescription
- Safety security of Oriental medicine prescription
- Prevention and remedy development of chronic disease
- Efficacy confirmation of herbal and herbal medicine
- Verification development of new efficacy

### Organization Chart and Members' Specialty

Total	Degree	subtotal	BT	IT	Chemistry	Physics	Math/Statistics	Etc
27 people	Ph.D	9	5	-	2	-	-	2
	M.S.	13	6	-	6	-	-	1
	B.S.	5	2	-	1	-	-	1

### Research Areas

- ▶ Research for the formula principle of South Korean traditional medicine and Korean herbal formula
  - Data base construction of expression change gene information in prescription and use of prescription
  - Analysis for principal of herbal formula by using bioinformatics
- ▶ Information construction against the representative prescription of Oriental medicine
  - Standard guidance preparation of herbal medicine prescription
  - The standardization for the quality control of Oriental medicine prescription
  - Safety security of oriental medicine prescription

- ▶ The evaluation of herbal medicine efficacy and new medicine subject excavation
  - Efficacy confirmation of herbal and herbal medicine
  - Verification development of new efficacy
  
- ▶ Development of standardization for Oriental medicine diagnosis
  
- ▶ Scientific and industrialization of herbal medicine
  
- ▶ Informatics of herbal medicine 🌐

*Contact Details:*

Contact Person: Dr Hyun-Kyu Shin

Address: Dept. of Herbal Pharmaceutical Development,  
Korea Institute of Oriental Medicine,  
461-24 Jeongmin-dong, Yuseong-gu,  
Daejeon 305-811, Korea

Tel: +82 42 868 9464

Fax: +82 42 868 9471

Email: [hkshin@kiom.re.kr](mailto:hkshin@kiom.re.kr)

URL: <http://www.kiom.re.kr>