

# INFOBIOMED

## NEWSLETTER

N.0 DECEMBER 2004



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**BIOMEDICAL INFORMATICS  
TO SUPPORT INDIVIDUALISED HEALTHCARE**

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# BIOMEDICAL INFORMATICS TO SUPPORT INDIVIDUALISED HEALTHCARE





<http://www.inmegen.org.mx/>

### IBM promotion toward personalized medicine

Since few months ago, IBM is being introduced into the biomedical informatics field. On March 2004, this prestigious IT Company announced a joint effort together with Affymetrix to supply clinical genomics capabilities to medical research facilities and drug makers. On September 2004, IBM has stepped forward with new initiatives and collaborations towards personalized medicine. In fact, IBM researchers are currently developing the Genomic Messaging System (GMS), a computer language that allows clinical information and management functions, such as security measures, to be embedded within streams of DNA sequences. Originally designed for building clinical genomic reports of patient data, GMS was then generalized so that clinical data could be more easily linked to bioinformatics and computational tools. In a recent demonstration, GMS helped to predict how the single nucleotide polymorphisms (SNPs) would affect the structure of a certain protein for a particular patient and how the structure would affect the interaction of drugs with that protein. This approach has allowed researches to speculate about the power of GSM to support personalized medicine.

Moreover, a recent agreement between IBM and The Cleveland Clinic aims to develop a translational medicine platform that will use information from electronic medical records to support basic and genetic research. **The goal is to deliver better, more personalized patient care by more easily incorporating research discoveries at the patient bedside.** The Cleveland Clinic has the largest vascular surgery electronic medical record database in the world, which will be used by IBM to build an information infrastructure that provides access to medical and genetic information involving patients with abdominal aortic aneurysms in a confidential, anonymous fashion.

By giving physicians and researchers access to

clinical research data, the platform will aid in identifying potential triggers and ultimately more effective treatment solutions for patients with abdominal aortic aneurysms. The objective is to expand this new practice of using electronic medical records to study disease and create new knowledge and better treatments for patients across all medical specialties.

## INFOBIOMED PARTNERS RESEARCH PROFILES

- a. IMIM
- b. ISCIII
- c. FIMIM

### IMIM

#### Municipal Institute of Health Care – Municipal Institute of Medical Research – Research Group on Biomedical Informatics (GRIB)

The Research Unit on Biomedical Informatics (GRIB) of IMIM (the research institute of the health-care organisation of the City Council of Barcelona, IMAS) brings together a team of over fifty scientists and other professionals with wide experience in the conception and execution of scientific projects.

The GRIB carries out research and development on the application of computational methods and new information technologies in health and life sciences. GRIB has a wide experience in the participation and coordination of research projects funded by the European Commission.

In the last years, the unit has participated in 14 European projects. The GRIB is also involved in a significant number of other research projects funded by research funding agencies.

GRIB has a long tradition of collaboration with the industry in the framework of R&D projects.

The IMIM is academically affiliated with the Pompeu-Fabra University, collaborating in the

Biomedical Research Park of Barcelona (PRBB) and in pre and postgraduate teaching on life sciences.

In particular, the GRIB is on charge of the teaching of the biocomputation disciplines.

The GRIB is currently organised in eight laboratories:

- ◆ Genome Bioinformatics
- ◆ Evolutionary Genomics
- ◆ Structural Bioinformatics
- ◆ Computational Biophysics and Biochemistry
- ◆ Chemogenomics
- ◆ Computer-Assisted Drug Design
- ◆ Complex Systems
- ◆ Integrative Biomedical Informatics

Some of the European projects in which IMIM participates or has participated are:

INFOBIOMED: Structuring European Biomedical Informatics to Support Individualised Healthcare,  
BIOSAPIENS: A European Network for Integrated Genome Annotation,  
LINK3D: Linking organisations through a secure environment for distributed drug discovery,  
SMARTIE: Smart medical applications repository of tools for informed expert decision and  
ASD: The alternative splicing database.

During the period 2003-2005, GRIB scientists have published over 60 papers in SCI indexed publications.



<http://www.imim.es/>

## ISCIII

The Institute of Health “Carlos III” is the scientific-technological support body of the Spanish Health System, with competences in public health, biomedical research coordination, health technology assessment, postgraduate education and new health technologies.

The Department of Medical Bioinformatics (<http://www.isciii.es/biomatic>) was created in 1998, and, at this point in time consists of a multidisciplinary team that includes biologists, pharmacists, chemists, informaticians, statisticians and veterinarians. Its main task relies on facilitating the knowledge of new technologies for the processing of genetic information and their application in biomedical research, public health and clinical practice.

There are two main lines of research clearly defined in the department: one is devoted to Bioinformatics and Microarrays and the other to Biomedical Informatics. In the former the laboratory designs and carries out experiments, their work ranging from the design and making of the microarrays to the hybridisation, scanning and data analysis with specialized software that has been developed by the unit. In the last two years the laboratory has updated and improved its technological means making it more efficient in its work.

With respect to the later, the Department has participated in several European Projects, including the BIOINFOMED study (IST-2001-35024) that produced a white paper that studied the synergy and interactive issues between Medical Informatics and Bioinformatics and its implications for future patient care and proposed an agenda for Biomedical Informatics in Europe. It has also participated in numerous genomic-related activities and is currently coordinating the Spanish Thematic Cooperative Research Network in Biomedical Informatics, with more than 100 researchers and 13 groups from 6 regions (INBIOMED). ISCIII provides the consortium the expertise in Biomedical informatics and clinical applications of genomics.

Currently, the Department carries out research in heterogeneous database integration, ontologies in biomedicine, biomedical scientific knowledge rep-

resentation and scientific information services on Internet. The department also devotes an important effort to education. It not only teaches ISCIII internal seminars and courses but it also imparts external training within the National School of Public Health and teaches courses and conferences in several public and private institutions and universities. The project BIB-GEN (<http://bvs.isciii.es/bib-gen/Home.html>) deserves a special mention in this area. It developed an online course mainly targeted to health librarians and documentalists that provides education and training for accessing genomic information sources and basic bioinformatic tools with a clinical interest.



<http://www.isciii.es>

## FIMIM

The Fundació IMIM is a private non-profit independent organisation which objective is to support research at the Institut Municipal d'Investigació Mèdica (IMIM).

Its Project Office is a professional structure made up of highly skilled experienced professionals (1 Director, 3 Project Managers, 2 Project Assistants, 2 Secretaries) with expertise on international collaboration and a solid technical background.

FIMIM has a wide experience in managing and administrating international projects, and particularly European projects, currently coordinating the INFOBIOMED NoE (eHealth, IST priority).

The role in the IP will be providing a management structure that both helps and monitors the project development and integration, thus becoming a crucial tool for its success.



IMAS

Institut Municipal  
d'Investigació Mèdica. IMIM

## RESOURCES

### Reactome explores biological processes

Reactome, a knowledgebase of biological processes, is a newly revamped site from Cold Spring Harbor Laboratory (CSHL), the European Bioinformatics Institute (EBI), and the Gene Ontology Consortium.

**Reactome is a curated database of biological processes in humans.**

It covers biological pathways ranging from the basic processes of metabolism to high-level processes such as hormonal signalling. While targeted at human pathways, Reactome also includes many individual biochemical reactions from different model organisms such as rat, mouse, fugu fish and zebra fish. All the information in Reactome is backed up by its provenance: either a literature citation or an electronic inference based on sequence similarity. The basic information is provided by bench biologists who are experts in that domain of biology. The information is then managed (cross-referenced with PubMed, GO, EnsEmbl and UniProt) edited and entered into a relational database and finally reviewed by other biological researchers for consistency and accuracy. Following peer-review, the information is published to the web. The ontology ensures that the various events are linked in an appropriate spatial and temporal context.

Designed for everyone, Reactome has two target audiences: researchers dealing with unfamiliar gene products and wants to get a quick overview of what the product is and what it does and bioinformaticists trying to draw conclusions from a large dataset like those derived from microarray experiments.

The curators--who glean the info from the literature or DNA similarities--plan to add a new batch of pathways about every 3 months.



<http://www.reactome.org>

## Bioinformatics Links Directory

The Bioinformatics Links Directory is an initiative of the University of British Columbia Bioinformatics Center that features curated links to molecular resources, tools and databases. All of the resources are free or available for a nominal fee. The directory is divided into six different categories each one containing many links related to other useful resources. The "Computer Related" section links to resources relating to programming languages often used in bioinformatics as well as web development and database resources. There are also three different categories for "DNA", which contains links to a huge number of resources for DNA sequence analyses, "RNA" and "Proteins".

The "Education" section is a complete compendium of information about techniques, materials, people, places and events of the greater bioinformatics community as well as literature sources, educational material and links to bioinformatics courses and workshops. Within the " Human Genome" category there are compiled those links to draft annotations of the human genome in addition to resources for sequence polymorphisms and genomics. Another relevant section is the one including "Model Organisms" that links to data-

bases and tools for genome scale analysis.

Finally, the "Expression" category contains many links to different tools, databases and methods for protein expression, SAGE and microarray data.



[http://bioinformatics.ubc.ca/resources/links\\_directory/](http://bioinformatics.ubc.ca/resources/links_directory/)

## Fundamental Genomics website

This website aims to take a proactive role by informing citizens and European scientists about most recent EU research activities in the field of Fundamental Genomics, with particular emphasis on collaborative fundamental research into genomics.

**Fundamental genomics research into health and disease is one of the main action lines in the Life Sciences programme.** The strategic objective of this line is to foster the basic understanding of genomic information, by developing the knowledge base, tools and resources needed to decipher the function of genes and gene products relevant to human health and to explore their interactions with each other and with their environment.

Specific research areas address:

- ◆ Gene Expression and proteomics
- ◆ Structural genomics
- ◆ Comparative & population
- ◆ Bioinformatics
- ◆ Basic biological processes



[http://europa.eu.int/comm/research/health/genomics/index\\_en.htm](http://europa.eu.int/comm/research/health/genomics/index_en.htm)

## EVENTS

**MIE 2005.** Geneva Switzerland.  
28 August - 1 September 2005.  
<http://www.mie2005.net>

**IMIA 2005.**  
<http://www.imia.org/>  
c. Abril 7-8, 2005. HealthGrid Conference.  
Oxford. Mayo 14-18, 2005. Annual International.  
<http://oxford2005.healthgrid.org>

**Conference on Research in Computational.**  
Molecular Biology (RECOMB 2005). San Diego.  
<http://www.broad.mit.edu/recomb2005/>

**June 2005.** 13th International Conference on  
Intelligent Systems for Molecular Biology (ISMB  
2005). Michigan.  
<http://www.iscb.org/ismb2005/>

**October 2005.** 4rd European Conference on  
Computational Biology (ECCB 2005). Madrid.  
<http://www.eccb05.org/home/home.htm>

## COMMENT

Biomedical Informatics (BMI) is the emerging discipline that aims to put the two worlds of Bioinformatics and Medical Informatics together so that the discovery and creation of novel diagnostic and therapeutic methods in the context of genomic and individualized medicine is fostered. On the basis of the results of the European Commission-funded BIOINFOMED Study, the INFOBIOMED Network of Excellence (NoE) has been constituted with the main objective of setting a durable structure for a collaborative approach in BMI at a European level. Formed by fifteen renowned European organizations, the main objective of the INFOBIOMED network is therefore to enable the reinforcement of European BMI as an integrative discipline. One key issue with regard to this purpose is the effort that has to be done in terms of explaining which are the main goals and achievements in the field. This e-bulletin is born with the aim of fulfilling one of the commitments of the INFOBIOMED NoE: to disseminate the more relevant advances in the field of Biomedical Informatics.

The initial objective is to deliver four issues a year. The INFOBIOMED Bulletin will feature several sections:

- ◆ News
- ◆ Resources of interest
- ◆ Group Profiles
- ◆ Events and an editorial comment.

This INFOBIOMED e-bulletin will be distributed to interested parties by e-mail in PDF format and it will be also available on the NoE web site: <http://www.infobiomed.net>, under the section "e-bulletin"

We hope that this initiative will be of interest for those interested in the development of Biomedical Informatics methods and tools, both at the academic and industrial settings.

We don't need to reinforce that these pages are open for those of you that would like to contribute with comments, relevant information or scientific events data. For this purpose, you can contact the editorial team at [biotic@isciii.es](mailto:biotic@isciii.es).

URL: <http://www.infobiomed.net> (Bulletin)

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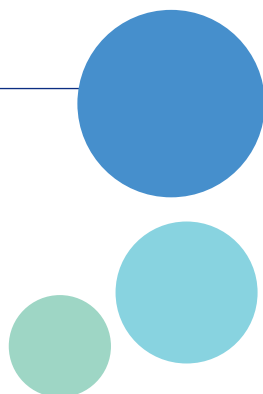
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BIOMEDICAL INFORMATICS TO SUPP

<http://www.infobiomed.org>

