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NEWS

SCIENTISTS FROM VALENCIA AND BARCELONA TAKE PART IN THE DECIPHERING OF THE COMPLETE GENOMA OF *ARABIDOPSIS THALIANA*

An international consortium of scientists, formed in 1996 and consisting of around 20 European laboratories, has published the first complete genome of a vegetable species, the plant *Arabidopsis thaliana*, in the journal Nature (2000; 408: 791). Among the research groups taking part, there were two from the Catalan language area: the team of Professor Manuel Pérez Alonso, Scientific Director of Sistemas Genómicos, S.L. (company located in the Technology Park of Valencia) which includes scientists from the Department of Genetics of the University of Valencia, and the team of Professor Pere Puigdomènech of the Institute of Molecular Biology of Barcelona, which belongs to the CSIC (Higher Council for Scientific Research). The sequencing of chromosomes 2 and 4 of this plant had already been reported during 1999.

The contribution of the Catalan laboratories was significant in terms of the nucleotides sequenced (practically all chromosome 3), which places them on a par with the major international genome-sequencing centres.

However, the real transcendence of the work undertaken in the Catalan laboratories lies in the technology employed (large-scale DNA sequencing), which can now be applied to the study of organisms which could be used by the agro-food industry, such as wheat, rice, maize, etc.. The laboratories of the Valencian company are already applying these techniques to the resolution of specific needs of this industrial sector, especially in the field of analysis of transgenic material in foods.

Arabidopsis is a crucifer, an annual plant of the mustard and cauliflower family. It is used a great deal in laboratories because its life cycle is very short, it matures quickly, it is small and it produces a large amount of seeds.

Also included in the publication is the bioinformatics analysis of the results and the identification of the genes contained in *Arabidopsis*' genetic material. Its total number of base pairs is 119 million, distributed in 5 chromosomes. There are 26,000 genes, but as much of the genome is doubled or tripled, it is thought that the genes which structure the plant number around 15,000. 8% of these genes coincide with genes that have been found in animals and, above all, are genes of primary metabolism (synthesising basic elements such as sugars or fats). A further 20% are genes which have considerable similarity with animal genes and correspond in particular to genes involved in the plant's structural development. Unlike the human genome, in *Arabidopsis* there is very little DNA which does not contain information for the synthesis of proteins.

The sequencing of the genome of this plant has been made available to the scientific community, and can be found at various Internet addresses, among which are:

http://www.mips.biochem.mpg.de/proj/thal
http://www.arabidopsis.org
http://www.nsf.gov/od/lpa/news/media/2000/agicontrib.htm

THE BIOCAMPUS RESEARCH COMPLEX OF THE AUTONOMOUS UNIVERSITY OF BARCELONA

Recent decades have seen the consolidation at the Autonomous University of Barcelona (UAB) of a network of outstanding research groups in the areas of Biomedicine and Biotechnology, for which the UAB has created and developed a number of scientific and technical support services. To maintain these groups' high standards and to promote technology transfer to companies in the sector and society as a whole, the Autonomous University of Barcelona has set up the Biocampus research complex.

The objectives of Biocampus are to improve and modernise research infrastructures, by reorganising both the study groups and the scientific and technical services in the biomedical field, and by introducing new management practices into research.

The Biocampus complex brings together, on our Science and Technology Campus, the centres and services of the Autonomous University of Barcelona and of companies and private and public institutions that share activity and research in the fields of biomedicine and biotechnology. Quality research spaces will be created for UAB groups to carry out projects, for the location of spin-off companies, which will make up the Nursery of biomedical and biotechnological Companies (VE3B), and for joint research structures between UAB groups and private enterprise, which will foment technology transfer to society.

The Biocampus research complex will consist of various centres and services:

- Nursery of biomedical and biotechnological Companies (VE3B)
- Institute of Biotechnology and Biomedicine (IBB)
- Institute of Neuroscience
- Centre of Animal Biotechnology and Gene Therapy (CEBATEG)
- Integrated Services of Genomics and Proteomics (SIGIP):
  - Nucleic Acid Sequencing Service
  - Proteomics and Bioinformatics Service
  - Molecular Genetics Veterinary Service
- Animal Housing Facility
- Cellular Cultures Service
- Antibody Production Service
- Radioimmunology Testing and Endocrinology Service

The project was presented to the General Meeting of the Association of Science and Technology Parks of Spain (APTE) on the occasion of the Autonomous University of Barcelona joining this association, and also to the International Association of Science Parks (IASP).

THE NOBEL PRIZE-WINNERS ROBERT HUBER AND PETER DOHERTY AND THE PATHOLOGIST ROBERT E. SCULLY INVESTED AS DOCTORS *HONORIS CAUSA* BY THE AUTONOMOUS UNIVERSITY OF BARCELONA

In October and November 2000 the Autonomous University of Barcelona invested three well-known scientists in different areas doctors *honoris causa*: Dr. Robert Huber, Nobel Prize for Chemistry in 1988, Dr. Peter C. Doherty, Nobel Prize in Physiology and Medicine in 1996, and Dr. Robert E. Scully, an internationally renowned pathologist.

Professor Peter C. Doherty, current Director of the Immunology Department at St. Jude's Children's Research Hospital in Memphis (Tennessee, USA), has had a long and distinguished scientific career in the field of Immunology, with over 200 articles in major scientific publications and 85 contributions to books and review articles. In 1996 he was awarded the Nobel Prize for Physiology and Medicine jointly with Dr. Rolf Zinkernagel for their research into the specificity of cells' immune response, concretely for the discovery of how the immune system recognises cells infected by viruses.

Dr. Doherty carried out the research that was to lead to the Nobel Prize from 1973 to 1975 when he was Professor at the John Curtin School of Medical Research in Canberra, Australia. Doherty saw that white corpuscles, in order to eliminate cells infected by viruses, had to recognise both the viruses and certain molecules in their own body. This discovery laid the basis for the understanding of the general mechanisms used by the cell immune system to recognise foreign micro-organisms and the molecules of the body. This discovery had widespread implications in the field of clinical medicine, since it concerned efforts to strengthen the immune response to invasive micro-organisms and certain forms of cancer and to reduce the effects of auto-immune reactions to inflammatory diseases such as Rheumatism, Multiple Sclerosis and Diabetes.

Since 1974 Doctor Scully has been editor of the «Case Record of the Massachusetts General Hospital,» which is published weekly by the New England Journal of Medicine, one of the most renowned medical journals in the world.

Scully has had close links to the Department of Morphological Sciences of the Autonomous University of Barcelona and the Pathology Service of the Santa Creu i Sant Pau Hospital. His scientific contribution has inspired a line of pathogenetic, clinical and pathological research into the main gynaecological cancers. The North-American scientist, born in Massachusetts in 1921, has received numerous awards and honours for his work on the pathology of cancer, among which are doctorates *honoris causa* from the University of Leyden in the Netherlands and from the College of the Holy Cross in Massachusetts, the establishment of the Robert E. Scully Fellowship in Gynaecological Pathology at the University of Harvard, the F.W. Stewart award from the Sloan-Kettering Memorial Cancer Center, the Honorary Fellowship of the Royal Society of Pathologists, the Maude Abbott Lectureship of the United States Academy of Pathology, and the Distinguished Pathologist prize, also awarded by this society.

Dr. Huber, founder of the biotechnology company Proteros and director since 1972 of the Department of Structural Research of the Max Planck Institute of Biochemistry at Munich, is a specialist in the determination of the three-dimensional structure of proteins. He has worked (and works) mainly on the proteins of the cell membrane, which have a very important function in the metabolism of organisms (between 20 and 30% of genes codify through this kind of protein). These molecules also have great biomedical importance, since they are one of the main points of union between drugs and cells. Despite this, the systematic explanation of their three-dimensional structure has still not been achieved by structural biology.

Robert Huber, who published last year three articles in the famous journal Nature, gave the lecture: «Genes, a puzzle without end?» For Huber the sequencing of the genome of pathogenic organisms is a priority over the sequencing of the human genome, although the human genome has a much higher public and political profile which helps finance the research.

After a concise description of the basis of genetic engineering, the researcher explained «how little knowledge we really have about our existence and which holes in this knowledge need to be filled urgently». Huber commented the importance of determining the three-dimensional structure of biological molecules in the post-genome era, al-

though «in this field we are in a tunnel without even being able to glimpse the light at the end». For the Nobel Prize-winner the synchrotron is a fundamental tool for pushing forward this kind of research, among many other uses.

During his visit to Barcelona, Huber confirmed his interest in taking part in the UAB's Biocampus research project, and was appointed President of the project's advisory council. Biocampus will bring together the research structures in Biomedicine and Biotechnology that already exist at the Autonomous University of Barcelona, research areas in which the UAB is a European leader, and will welcome other companies and private and public institutions which share activity and research into Biomedicine and Biotechnology.

The investiture ceremony took place on November 8 1999. In homage to Professor Robert E. Scully, the Autonomous University of Barcelona and the Santa Creu i Sant Pau Hospital organised the IV Course of Oncological Pathology between November 6 and 8, under the direction of Dr. Jaume Prat. The course included lectures and single-theme seminars on breast pathology, lesions of the cervix, endometrium and myometrium, and ovarian pathologies. The key-note lecture was given by Dr. Robert Scully on Gynaecological Pathology.

THE UNIVERSITY OF VALENCIA PRESENTS THE INSTITUTE OF MOLECULAR SCIENCE

The University of Valencia has set up the first Institute of Molecular Science in the Spanish state. The institute, directed by the Professor of Inorganic Chemistry Eugenio Coronado, is specifically designed for research into molecular science, a multidisciplinary field that turns on the design and study of molecules and possible interactions between them, with a view to obtaining supramolecular associations and materials with relevant physical or chemical properties. This field covers areas of great contemporary relevance such as molecular physics, supramolecular chemistry, photochemistry, molecular magnetism and molecular electronics, which can contribute benefits in such diverse areas as Biomedicine, Electronics or green Chemistry.

The Institute of Molecular Science is an ideal context for developing synergy between physicists and chemists, theoreticians and experimental researchers, the organic and the inorganic. Leading its work are research groups of renowned prestige and with complementary capacities that have already been working together for years on problems relating to molecular systems, both in the departmental sections of the University, the CSIC (Higher Council of Scientific Research) centres and institutes for the science of materials. All these groups maintain a fluid communication that has been captured in joint publications and research projects, rounded off by the creation of this new institute.

The latest fruit of this intense collaboration is based on the study of new compound transmitters. The study, carried out by Eugenio Coronado and his team, was published in the journal Nature. This study led to the discovery of the first molecular compound that has at the same time conducting and ferromagnetic compounds, giving a hybrid material that opens new doors in molecular electronics. Nowadays new materials for developing smaller and smaller transmitters need to be found. This compound will enable the technological materials to be reduced in the future to sizes a thousand times smaller that those known up to now. The process is possible because molecular electronics uses individual molecules to imitate bigger structures such as converters or semi-conductors, but for these materials to be effective total control over their composition, size and use is needed. By combining a magnetic complex and an organic conductor, Coronado and his team achieved this objective and introduced multi-functional compounds which will revolutionise the world of electronics.

The new institute's opening ceremony took place during a scientific conference in celebration of the event. Throughout the day lectures by different representatives of the sector were given. The key-note speech was delivered by the Italian Vicenzo Balzani, one of the world's leading specialists in molecular devices and machines, which will be the components of the molecular computers of the future.

JOAN MASSAGUÉ AND JUAN CARLOS IZPISÚA JOIN THE BARCELONA SCIENCE PARK

The Barcelona Science Park has been joined by two of the leading Spanish researchers living abroad: the Catalan researcher Joan Massagué as scientific adviser and Juan Carlos Izpisúa-Belmonte as future director of the Institute of Developmental Biology.

Massagué will contribute to the Barcelona Science Park scientific advice which will have an effect on its organisational structure, contribute substantially to the modelling of the main research lines and identify leading researchers in their fields who could be of use to the Park. For the Barcelona Science Park to become a modern research centre of international renown, Massagué proposes an operational strategy similar to that followed by a normal company, in which a director, with his/her board of shareholders and managers, decides on the basis of quality and opportunity which lines of research to back and which to eliminate, and how to achieve this. In Spain at present there is no research institute which fits this plan, but the Barcelona Science Park aspires to become a space with all the necessary conditions for the development of a great top-quality research centre.

Widely recognised for his research into regulatory elements of cell proliferation and their disorder in cancerous

processes, Massagué is the world's second most quoted author in the areas of cellular biology and genetics (1994-1998), according to data published by the Institute for Scientific Information (ISI). In honour of his brilliant scientific career –over 200 articles published in the top journals– last June he was elected member of the National Academy of Sciences, the main scientific institution in the United States.

Born in Barcelona in 1953, Massagué received his doctorate from the University of Barcelona under the direction of the biochemist Joan Guinovart, before moving on to Brown University (Rhode Island) where he would discover the structure of the insulin receptor. Since 1989 he has been Director of the Department of Cellular Biology at the Sloan-Kettering Memorial Institute of New York, one of the world's leading cancer research centres.

Massagué's first action at the Park has been to work with his executive Vice-President Màrius Rubiralta in acquiring the services of Juan Carlos Izpisúa-Belmonte. This researcher signed a preliminary agreement by which the Barcelona Science Park undertakes to install the necessary scientific infrastructures, with the support of the Spanish and Catalan Governments, so that in 2003 Izpisúa-Belmonte will become the first Director of a newly created Institute of Development Biology at the Park. This project would fall within the Institutes policy of the *Generalitat* of Catalonia.

Born in 1960 in Albacete, the biochemist and pharmacist Izpisúa-Belmonte at present leads one of the most active and internationally known research groups in Development Biology at the Salk Institute, San Diego, USA. Outstanding among its many achievements has been the discovery of the genetic cascade that determines the formation and positioning of the body's main organs, such as the heart and lungs.

THE UAB AND THE UPC ORGANISE THE FIRST MAJOR CONGRESS ON INTELLIGENT SYSTEMS AND ROBOTICS

Automatic driving of vehicles and planes, the guidance of robots, the introduction of intelligent clothes and furniture and the automated diagnosis of illnesses are some of the latest technological advances that were presented to the 15th International Conference on Pattern Recognition, ICPR2000. The conference, held in Barcelona between September 4 and 7, was organised jointly by the Autonomous University of Barcelona (UAB) and the Polytechnic University of Catalonia (UPC), coordinated by Juan José Villanueva, Professor at the UAB and Manager of the Computer Vision Centre (CVC), and Albert Sanfeliu, Professor at the UPC.

This scientific forum, organised every two years and sponsored jointly by the International Association of Pattern Recognition (IAPR) and the Spanish Association of Pattern Recognition and Image Analysis (AERFAI), brought together for the first time in Spain university and industrial researchers from around the world.

Over a thousand people attended the ICPR 2000, the biggest ever scientific meeting in this field. It was structured round four main themes: computer vision and image analysis, pattern recognition and neurone networks, processing of signals, speech and image, and robotics systems and architecture.

These disciplines have many uses. As well as movement of vehicles, medicine (blood component counts, study of heart function and cancer detection) and industry in general (in which intelligent robots can recognise and inspect objects and count and move goods), they can be used in computers (voice recognition systems and automatic writing in computers), agriculture (crop counting), fishing (detection of shoals), the Internet (contents searches), architecture (to manage buildings' energy saving), aerospace (guidance and automatic coupling of space-ships) astronomy (to observe types and conditions of galaxies) and the economy (to analyse economic studies), among other things.

Outstanding among the scientists invited to the Congress was Alex Pentland, expert in computer vision from the Media Laboratory of the Massachusetts Institute of Technology (MIT), USA. This well-known researcher has studied the design of intelligent clothes and furniture. Another major figure present was Theo Pavlidis of the State University of New York (SUNY), pioneer in pattern recognition and computer graphics.

Throughout the forum, various researchers from the Centre for Computer Vision and the Optics Group of the Department of Physics of the Autonomous University of Barcelona exhibited their research work in fields such as the recording of images on the retina, the improvement of biomedical imaging, the study of the information contained in colour, the analysis of images of faces, the reconstruction of three-dimensional images, and the location and monitoring of people.

http://www.cvc.uab.es/ICPR2000.

THE NARCÍS MONTURIOL MEDALS FOR SCIENTIFIC AND TECHNOLOGICAL MERIT

On November 30 last year, Jordi Pujol, President of the *Generalitat of Catalonia*, in an official ceremony at the Palace of the Generalitat presented the Narcís Monturiol medals and shields for scientific and technological merit. Andreu Mas-Collell, Councillor for Universities, Research and the Information Society, and David Serrat, Director-General of Research, were also present.

These prizes, awarded by the Department of Universities, Research and the Information Society, distinguish those persons and institutions who have contributed in an outstanding manner to the scientific and technological progress of Cat-

alonia. Since it was initiated in April 1982, 154 people and 24 institutions have received this distinction.

This year's award-winners were:

EDUARDO ALONSO i PÉREZ DE AGREDA
Professor of Land Engineering at the Polytechnic University of Catalonia.
He has contributed to the development of probabilist methods in Geotechnics and the Mechanics of unsaturated soils. In both cases the models and methods of analysis proposed are an international reference in the subject.

JAUME BAGUÑÀ i MONJO
Professor of Genetics at the University of Barcelona.
For promoting the teaching of development biology and genetics in Catalonia and for his research work in regeneration biology and genetics, and in molecular taxonomy and phylogeny.

MIQUEL BRUGUERA i CORTADA
Professor with tenure of Medicine at the University of Barcelona and doctor at the *Hospital Clínic* of Barcelona.
For his teaching and research in the field of liver diseases, particularly viral Hepatitis, which has helped define the epidemiological patterns of the disease in our country and design prevention programmes.

JORDI CAMÍ i MORELL
Professor of Pharmacology at the Pompeu Fabra University and Director of the Municipal Institute of Medical Research at Barcelona.
For his internationally important scientific contributions in the field of the pharmacology of dangerous drugs and therapy for drug users, and for his management and promotion of biomedical research in Catalonia.

EUDALD CARBONELL i ROURA
Professor of Prehistory at the Rovira i Virgili University.
The research work of Carbonell Roura and his team has contributed qualitatively to spreading the understanding of our oldest ancestors to society as a whole, with the objective of giving science and its techniques their rightful place as the motor-forces underlying human development.

RICARD GUERRERO i MORENO
Professor of Microbiology at the University of Barcelona. Member of the Institute for Catalan Studies.
For his pioneering research work in bacterial Ecology and Ecogenetics in our country, for disseminating various microbial ecosystems of Catalonia as models for international studies, for the multi-disciplinary focus of his research, and for his teaching career and training as a researcher.

MANUEL SOLÀ-MORALES i RUBIÓ
Professor of Urbanism at the Polytechnic University of Catalonia.
For his extraordinary teaching and research work. Since its foundation in 1968, the Urbanism Laboratory of Barcelona has trained a generation of teachers and professionals of urbanism. It has contributed greatly to the international renown of the School of Architecture of Barcelona and the urban transformation of the city.

JOSEP MARIA TERRICABRAS i NOGUERAS
Professor of Philosophy at the University of Girona, member of the Institute of Catalan Studies and Director of the Ferrater Mora Chair of Contemporary Thought at the same university.
For his contributions in some of the most dynamic areas of contemporary philosophy, particularly philosophy of language, theory of knowledge, logic and ethics, and for the preparation of reference texts for research and teaching.

CARME TORRAS i GENÍS
Professor of Research at the Institute of Robotics and Industrial Computer Science (CSIC-UPC).
For her research work into neuronal models of learning and techniques of geometrical reasoning, which has found industrial application in kinematics and planning of movements; also for her devotion to training researchers in these fields.

ENRIC TRILLAS i RUIZ
Professor of the Department of Artificial Intelligence of the Polytechnic University of Madrid.
For his contributions to the study of models of connectives, conditionals and indistinctives in the field of theoretical fuzzy logic, and for being the initiator, when he was Professor at the Polytechnic University of Catalonia, of what is widely known as the Spanish School of Fuzzy Logic.

INSTITUTE OF HIGH-ENERGY PHYSICS (IFAE)
For its strong support for High-Energy Physics research in Catalonia and particularly for the introduction of its experimental side through participation in the ALEPH experiment, which was able to determine, among other questions, the number of families of neutrinos existing in Nature.

CENTRE FOR MATHEMATICAL RESEARCH
Since its creation in 1984 by the Institute for Catalan Studies, this Research Institute has stimulated the considerable growth of mathematical research in Catalonia, as a centre for visiting professors and post-doctoral researchers at the service of all mathematicians in Catalan universities. It has also given international projection to our country's scientific activity.

THE INSTITUTE OF HIGH-ENERGY PHYSICS OF THE UAB PARTICIPATES IN CONSTRUCTING THE GREAT TELESCOPE, MAGIC

The Institute of High-Energy Physics of the UAB will construct the detection chamber of the giant telescope MAGIC (Major

Atmospheric Gamma-ray Imaging Cherenkov). The telescope, which will be located at the Observatory of Roque de los Muchachos at the Institute of Astrophysics in the Canary Islands, will have the biggest active mirror in the world, measuring 17 metres in diameter, and will enable cosmic gamma rays to be detected in a range of energies never before explored.

MAGIC is a Cherenkov-light telescope that will be equipped with the most up-to-date technology, among which is the detection chamber, work on which has already begun at the Institute of High-Energy Physics of the UAB. The chamber will be based on new kinds of photosensors called hybrid solid-state phototubes. These have great quantum efficiency and will be built entirely at the IFAE.

The main objective of the telescope is to detect cosmic gamma rays in the energy range from 10 to 300 gigaelectronvolts (GeV). This the sole unexplored zone among all the types of radiation that can reach us from space.

In this energy range, the scientists hope to find numerous galactic and extra-galactic sources, such as remains of supernovae, gamma-ray explosions, diffused radiation and pulsars, among others. The study of these sources will help understand better the origin of gamma-ray explosions and also the mechanisms of particle acceleration near objects with very strong gravitational fields, such as neutron stars and ultra-massive black holes in nuclei of galaxies. It will also help research into supersymmetrical particles, one of the greatest challenges of particle physics. The telescope is due to start operating on June 21 2000.

About 50 scientists and engineers from 12 research institutes in various countries, mainly Germany, Italy and Spain, have collaborated on the construction of MAGIC.

The telescope was formally approved at a function held in the Fraunhoffer Room of the Deutsche Museum of Munich on June 5 last year. The agreement for the construction of the telescope was signed by representatives of the Institute of Astrophysics of the Canary Islands and representatives of MAGIC international project, among whom were Professor Enrique Fernández, Director of the Institute of High-energy Physics, and Dr. Manel Martínez, IFAE researcher and scientific co-director of the MAGIC project.

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