MEETINGS

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The 24th Congress of the Spanish Society for Microbiology (L'Hospitalet de Llobregat, Barcelona, 10–13 July 2013)

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The 24th Congress of the Spanish Society for Microbiology (SEM) took place on 10–13 July, 2013 at the Bellvitge Campus of the University of Barcelona (UB), in L'Hospitalet de Llobregat, Barcelona [http://congresosem2013.semicrobiologia.org] (Fig. 1). This meeting brought together 618 microbiologists from several prestigious universities and research centers throughout Spain, as well as experts from 24 countries including the United States, the United Kingdom, Germany, Australia, Canada, France, Italy, Belgium, Mexico, Austria, Chile, China, Denmark, Slovenia, the Netherlands, Peru, Sweden, Scotland, Turkey, Uruguay, and Venezuela. In addition to the 17 symposia, there were around 300 free communications, in the form of oral and poster presentations, with contributions from 1008 authors. This scientific summit meeting was the effort of an organizing committee led by one of us (MV), and other members of the Department of

Fig. 1. Barcelona's skyline, with the Bellvitge Campus of the University of Barcelona, at the left. © M.Berlanga

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Fig. 2. Ceremonial Main Hall (*Paranimph*) of the University of Barcelona (left), and upper-floor cloister of the Institute for Catalan Studies (right), where the opening and closing ceremonies, respectively, of the conference were held.

Pathology and Experimental Therapeutics, University of Barcelona-IDIBELL, and by a scientific committee headed by Albert Bosch, President of the Spanish Society for Virology.

One of the main goals of the meeting was to stimulate the participation of young microbiologists. The topics covered by the program included new frontiers in research on the molecular basis of pathogenicity and bacterial resistance, fungal virulence, antimicrobial agents in biodegradation and bioremediation in polluted environments, "-omics" techniques in food microbiology, and bacteriophages in industrial microbiology.

The opening ceremony was presided over by Enric Canela, Vice-Rector of the University of Barcelona; Ricardo Guerrero, current President of the SEM; Miguel Viñas, President of the Congress; and Antonio Ventosa, President-elect of the SEM. This event was held at the Ceremonial Main Hall (*Paranimph*), at the historical site of the University of Barcelona. Andrés Moya, Professor at the University of Valencia, delivered the opening lecture, "From minimal cells to microbiome." David Rodríguez Lázaro, from the University of Burgos, gave the closing address, "Molecular approaches to food security," at the Institute for Catalan Studies (IEC) (Fig. 2).

The different sessions of the conference were held at the modern premises of the Faculty of Medicine, Campus of Bellvitge, of the University of Barcelona (Fig. 3).

Microbial biotechnology

A series of talks examined the key role of microbes in the deterioration of buildings and monuments around the world (S. Betts, M. Urizal, Thor Especialidades, S.A.; J.M. Vaquero, BASF; A. de los Ríos, National Museum of Natural Science, CSIC, Madrid). To combat the effects of fouling microorganisms, mainly fungi and algae, biocides are typically used. These include encapsulated biocides to control cement biodeterioration, antimicrobial paints to avoid the dissemination of pathogenic bacteria, and wide-spectrum biocides to protect stone monuments and minimize environmental damage.

Microbial diseases and antimicrobial resistance

Our knowledge on recent as well as more well-established infectious diseases and antimicrobial resistance was brought up to date in a series of lectures. Among them, the pathogenesis of diseases caused by *Candida* species, the genetic variability of this fungus, and its strong resistance to antifungal agents were discussed (G. Larriba, University of Extremadura; G. Quindós, University of the Basque Country).

Brucellosis, one of the most common bacterial zoonoses worldwide, was a health problem until a few years ago in Spain but currently of great importance in other countries of the Mediterranean basin, such as those in northern Africa (I. López, University of Navarra, Pamplona). It was pointed out that although there are several vaccines to control this disease in animals, none of them is still completely effective. Improved efforts to reduce the incidence of human brucellosis will require an understanding of the coordinated role of virulence factors.

The most common antimicrobial resistance mechanisms of pathogens such as *Streptococcus pneumonia* and *Haemophilus influenzae*, frequently isolated from patients with chronic obstructive pulmonary disease (COPD), were also reviewed (J.A. Martínez, University of Barcelona; A. Domènech, Bellvitge University Hospital). Other lectures discussed the relevance of new sequencing platforms in determining the phylogeny of *Clostridium* species (S. Valdezate, National Center of Microbiology, CNM, Madrid), a new method of fast genotyping for *Coxiella burnetii,* the microorganism that causes Q fever (I. Jado, CNM), and the increasing interest in Europe in hepatitis E, a complex infectious disease currently considered as both zoonotic and imported (J.M. Echevarría, CNM).

The importance of plasmid-encoded proteins associated with chromatin, i.e., H-NS proteins, in the regulation of conjugation and the selection of some genes was highlighted. In that same talk, integrons, the genetic elements responsible for the capture and spread of antibiotic resistance determinants among gram-negative bacteria, were shown to be linked to the SOS response (D. Mazel, Institut Pasteur, Paris). This coupling enhances the potential for cassette swapping and capture in cells undergoing stress, while preserving the cassette arrangement in stable environments.

Finally, recent results were presented on a new family of mobile genomic islands (MGIs) identified in *Vibrio* species and other marine Gammaproteobacteria and on the contribution of these MGIs to virulence (V. Burrus, University of Sherbrooke, Canada).

Industrial and food microbiology

The conference included talks on the state of the art of industrial microbiology, including the differentiation and development of *Streptomyces* in bioreactors and the involvement of these bacteria in the production of secondary metabolites (A. Manteca, University of Oviedo), the response to oxidative stress in *Actinobacteria* (L.M. Mateos, University of Leon), and the relevance of genomic analysis in the search for peroxidases of industrial interest (A. Martínez, Biological Research Centre, CIB, CSIC, Madrid).

The symposium on food microbiology was devoted to the "-omics" techniques (proteomics, genomics, and metagenomics) commonly used in this field (E. Jiménez, Complutense

Fig. 3. Artistic interpretation of the main buildings, hospital and Faculty of Medicine of the Campus of Bellvitge, University of Barcelona, L'Hospitalet, where the different sessions of the conference were held.

University of Madrid; B. Sánchez and S. Delgado, Dairy Institute of Asturias, Villaviciosa, CSIC), including their advantages and disadvantages compared with conventional techniques. Also discussed were the software tools used in data analysis and the relevance of the integration of different "-omics" techniques to study microorganism of interest in food microbiology (E. Smid, Wageningen University, the Netherlands).

Symposium *in memoriam* of Prof. Lynn Margulis (1938–2011)

The conference included the Symposium "Microbes, symbiosis and evolution", chaired by R. Guerrero (University of Barcelona), as a tribute to the world-renowned American biologist Lynn Margulis (1938–2011), Distinguished Professor of the University of Massachusetts-Amherst, who in 1967 proposed the endosymbiotic theory to explain the origin of the eukaryotic cell.

All animals and plants carry in their bodies very diverse microbial communities. The development of molecular techniques has allowed the identification of these microorganisms, whose fidelity has continued, generation after generation, throughout the evolutionary history of their hosts. The same tools have been used to elucidate the chemical signals that mediate host-microbe communication. The symposium took note of the new trends in biology, and in microbiology in particular, focusing on the continuous cooperation and interdependence between microbes and "macrobes." Margulis saw evolution as a race in which progress is achieved not by those organisms that seek to dominate but by those that cooperate for a common purpose. She showed the friendly face of evolution, that of a world that has thrived through cooperation and altruism.

Symbiosis, a term coined by Heinrich Anton de Bary (1831–1888), refers to the co-habitation of "differently named organisms." Symbiotic relationships are long-term physical associations that occur under specific environmental conditions. In endosymbiosis, which can be viewed as a topological state, one of the symbiotic partners lives inside the other. The process by which long-term stable symbiosis leads to evolutionary changes is called "symbiogenesis," a term coined by the Russian botanist K.S. Merezhkovsky and rescued by Lynn Margulis. It refers to the appearance of new behaviors, morphologies, tissues, metabolic pathways, and taxa (including species), or other recognizable evolutionary novelties.

Examples of symbiogenesis in the animal kingdom, in which animals have adapted to specialized ecological niches, were provided in the talks by I. Uriz (Centre for Advanced Studies of Blanes, CEAB, CSIC) and M. Berlanga (University of Barcelona) on sponges and xylophagous insects, respectively. The symposium ended with the contributions of N. Skinner (Institute for Catalan Studies, IEC, Barcelona) and A. Omedes (Natural History Museum of Barcelona) talking about communication and diffusion of science, other field in which Lynn Margulis was both outstanding and world-wide known. In her talk N. Skinner (Institute for Catalan Studies) addressed the role of the Internet, and examined the impact of social networks on scientific research and the dissemination of science. Finally, A. Omedes (Natural History Museum of Barcelona) presented an example of public outreach, in the form of the new permanent exhibition of the *Museu Blau* in Barcelona. Microbes, symbiotic relationships among organisms, and environmental interactions are the driving organizational forces in the newly renovated museum's fascinating exhibits.

Symposium *in memoriam* of Prof. Miquel Regué (1953–2012)

The conference also included a plenary session *in memoriam* to Miquel Regué (1953–2012), Professor of Microbiology at the Faculty of Pharmacy of the University of Barcelona, who passed away last year. M. Viñas, A. Juárez, and J. Tomás (University of Barcelona) reflected on Miquel Regué's personal and professional life. R. Benz, Wisdom Professor of Biophysics and Microbiology at Jacobs University (Bremen, Germany) and *Doctor Honoris Causa* recipient from the University of Barcelona, Spain, and University of Umeå, Sweden, reviewed the structure and role of porins in gram-positive bacteria. Many gram-positive bacteria have an unusual cell envelope. Besides the thick peptidoglycan layer, they contain large amounts of lipids in the form of mycolic acids and free lipids in their cell walls. The mycolic acids are linked through ester bonds to the arabinogalactan attached to the murein of the cell wall. The chain length of these 2-branched, 3-hydroxylated fatty acids varies considerably within the mycolic-acid-containing taxa. Thus, especially long mycolic acids have been found in *Mycobacterium* spp. and *Tsukamurella* spp. they are medium-sized in *Gordonia* spp. and *Nocardia* spp., and small in the genus *Corynebacterium*.

The mycolic acid layer is considered to be functionally similar to the outer membrane of gram-negative bacteria. Small hydrophilic solutes can permeate through the outer membrane of gram-negative bacteria, either via channel forming proteins or by receptor mediated uptake mechanisms. Similarly, the cell wall of gram-positive bacteria from the

order Corynebacteriales was recognized as a permeable barrier containing pores for the permeation of hydrophilic solutes. These channel-forming proteins represent the natural main passage of hydrophilic solutes across the cell wall of these bacteria.

Microbiology and the media

How can the information emerging from microbiological research—and from scientific research in general—be disseminated to society? Is communicating science to lay audiences as difficult as often portrayed? Are journalists primarily interested in the more sensationalist aspects of science, as a means to attract the attention of their audiences? Is it true, as scientists tend to say, that most journalists are poor science communicators because they lack a scientific background? Is it true, as journalists tend to say, that scientists are not usually good science communicators because they have not developed the communication skills needed to make their work understandable by the general public?

Answers to these questions were sought in a symposium on microbiology and journalism, chaired by M. Sánchez (University Miguel Hernandez, Alicante) and I. López (University of Navarra, Pamplona), with contributions from C. Ribas (President of the Catalan Association for Science Communication, ACCC), M. Piqueras (ACCC past-President), and A. López (Autonomous University of Madrid). The participants agreed that when the message exists, it is crucial to find a messenger capable of appropriately communicating it.

Access to high-quality microorganisms

The aim of the Microbial Resource Research Infrastructure (MIRRI) project is to establish a Pan-European research infrastructure that provides access to high-quality micro-organisms, their derivatives, and the associated data for purposes of research, development, and applications. The MIRRI connects resource holders with researchers and policy makers to more effectively deliver resources and services and to efficiently meet the needs of innovation in biotechnology.

Microbiology and cosmetics

Applied microbiology also had its place in the conference. A symposium on microbiology and cosmetics, organized by S. Leranoz (Reckitt Benckiser España, SL, Barcelona) and P. Orús (Colomer BPP, SL, Barcelona), discussed the policies related to the microbiological control of cosmetics. The interest in this topic was readily apparent from the large number of attendees.

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In summary, the Spanish Society for Microbiology had a very successful and productive meeting, complemented by activities such as concerts and a closing dinner held at the premises of the Institute for Catalan Studies, a Baroque building from mid-17th Century, in the heart of Barcelona. Looking at the future, in the SEM General Assembly it was approved that the next SEM Congress (with the significant number of being the 25th) will be held in Logroño in 2015, under the presidency and organization of Elena González Fandos, from the University of La Rioja.