

Microbiology in Latin America and the ALAM

Carmen Chica

Catalan Foundation for Research and Innovation, Barcelona, Spain

Quito, the capital of Ecuador, will host the 19th Latin American Congress of Microbiology [<http://www.microbiologiaecuador.com>] on October 15–18, 2008. The meeting has been organized by the Ecuadorian Society for Microbiology on behalf of the Latin American Association for Microbiology (Asociación Latinoamericana de Microbiología, ALAM). Ecuador succeeds Chile, which in October 2006 held the ALAM Congress, chaired by Prof. Michael Seeger, president of the Chilean Society for Microbiology [5]. The meeting was held in the city of Pucón and attracted over 600 researchers from Latin America, Europe, Japan, USA, and Canada. Prof. María Fernanda Espinoza, current president of the Ecuadorian Society for Microbiology, will chair the 2008 edition. More than 20 prestigious researchers from Canada, USA, Cuba, Venezuela, Colombia, Peru, Chile, Uruguay, Paraguay, Argentina, Spain, UK, and Belgium have been invited to actively participate in this event.

They will discuss the latest advances in clinical, veterinary, food, industrial, and water treatment as they relate to microbiology. The program includes a pre-congress course, keynote speeches, round-table discussions, plenary sessions, exhibitions covering various topics, and symposia hosted by each of the ALAM member countries.

The history of science and microbiology in Latin America follows a path that has been strengthened throughout time by three main elements: scientific societies, scientific journals,

and cooperation and interaction between colleagues from around the world. These three elements constitute a mechanism for promoting science in general; however, political and economic “circumstances,” which usually coincide, have had deleterious effects on progress in Latin American science and on its results.

In the first of a series of editorials that the journals of the Spanish Society for Microbiology, *Microbiología SEM* (1985–1998) and *International Microbiology* (1998–present), devoted to science in Latin America between 1996 and 1998 (Table 1), M. Schaechter y C. Orrego [7] observed that Latin American progress in the microbiological sciences and in technology had reached important peaks throughout time, yet on a background of little consistency. There is a long tradition of research involving good scientists who achieved remarkable results, despite a nearly constant lack of resources. This is no

doubt the reason why, at the same time, the general trend has been discouraging. Fortunately, this trend is slowly but progressively changing; while there is still a long way to go, promises made in the past are gradually becoming reality [4].

A country's scientific coordination needs institutional recognition and promotion, which in many countries has entailed a long process. In Latin America, the progressive introduction of the National Councils of Science, Development and Technology [8] along the 1960s was a measure that favored the increasing of investment in science and the development of research institutes and centers, some of



Table 1. Articles on Latin American microbiology or scientific research published in the SEM journals from 1996 to 2000**Articles in *Microbiologia SEM***

- Schaechter M, Orrego C (1996) *Microbiol SEM* 12(1):7-8
Una perspectiva sobre la investigación microbiológica
- Ayala FJ (1996) *Microbiol SEM* 12(2):163-166
La ciencia en América Latina
- Halvorson HO (1996) *Microbiol SEM* 12(3):343-346
Instituciones de apoyo a la microbiología en Cuba
- Colwell RR (1996) *Microbiol SEM* 12(4):519-522
Reto a la microbiología en América Latina. Una epidemia de colera a finales del siglo xx
- Cetto AM (1996) *Microbiol SEM* 12(4):647-650
Revistas latinoamericanas: un grano de arena a la ciencia universal
- Lazcano A (1997) *Microbiol SEM* 13(1):7-10
Los retos de la ciencia en América Latina
- Allende JE (1997) *Microbiol SEM* 13(2):127-130
La ciencia en América Latina desde una perspectiva chilena
- González Cappa SM (1997) *Microbiol SEM* 13(3):267-270
Trayectoria y situación actual de la investigación biomédica en Argentina
- Toranzos GA (1997) *Microbiol SEM* 13(4):399-402
La microbiología ambiental en América Latina
- Allende JE (1997) *Microbiol SEM* 13(4):529-532
La red latinoamericana de ciencias biológicas (RELAB)

Articles in *International Microbiology*

- San-Blas G (1998) *Int Microbiol* 1(1):7-9
Un poco de historia y actualidad en la ciencia y la microbiología venezolanas
- Patarroyo MF (1998) *Int Microbiol* 1(2):89-91
Ciencia en Colombia: de la utopía a la realidad
- Cetto AM (1998) *Int Microbiol* 1(3):181-182
Ciencia y producción científica en América Latina. El proyecto Latíndex

which eventually became of high quality. Nevertheless, this promising expansion, which benefited from economic gains and increased prosperity, was slowed down by political and economic changes that, mainly due to foreign debt, paralyzed its development. During times of crisis, funds devoted to science are among the first to be cut. The consequences are worse than decision-makers may think, because in a very short time the gap between those countries and more politically stable ones—in terms of research and scientific progress—may increase dramatically, and it takes a very long time to recover what has been lost. The problem is compounded by the discouragement of researchers and the brain drain to countries where their work is recognized, and where they can develop their abilities and aptitudes without the background of instability. It seems, however, that the lesson has finally been learnt and, although much remains to be accomplished, Latin American politicians have recently shown renewed interest in promoting research.

The proportion of projects involving foreign scientists is approximately the same in Latin America as in Europe or the USA. Most of these projects can take advantage of local conditions, such as the existence of special habitats (rain forest, extra-dry deserts), or benefit from the observation of diseases

that are limited to a geographical environment, the study of which broadens our understanding of more general phenomena and thus contributes to the advancement of science and medicine. The most successful of these international interactions are those based on true cooperation, in which the position of principal investigator is shared, or the responsibilities made comparable, between the Latin American scientists and those of the other countries.

Ever since their inception, scientific associations have been essential elements through which researchers have communicated their observations and established relationships with other researchers, thereby benefiting from the knowledge and opinions of their colleagues. The case of the “amateur” scientist Antonie van Leeuwenhoek (1632–1723) is well-known. In his letters to the journal of the Royal Society of London, *Philosophical Transactions of the Royal Society*, van Leeuwenhoek published the detailed descriptions of the “animacules” he observed in the water of Delft’s canals.

Latin America has been on par with other regions in the creation of groups that have, over time, developed into scientific associations and societies. In microbiology and in its diverse branches of specialization, there are associations in virtually all of the Latin American countries, such as the



Fig. 1. Latin American microbiologists honored on the back covers of *International Microbiology* since 2004.

Ecuadorian Society for Microbiology, in charge of organizing the ALAM congress in 2008, within which it is also holding its own congress (6th Ecuadorian Congress of Microbiology).

The Latin American Association for Microbiology is made up of the national associations of this branch of science. ALAM's purpose, explicitly declared in its statutes, is "to bring together microbiologists in everything which is of interest for the practice and the progress of their discipline and of scientific research." The measures undertaken by ALAM to achieve that goal are: (a) the organization and continuity of Latin American microbiology congresses and meetings, (b) the maintenance of relations with microbiology associations from other countries, (c) the creation of microbiology associations in every Latin American country, (d) the promotion of scientific exchange on an international scale, and (e) the diffusion of scientific knowledge in the field of microbiology through national congresses and scientific pub-

lications. Over the last decade, thanks to initiatives such as Latíndex and its ability to channel institutional resources and personal and group efforts, the number of Latin American scientific publications has increased [3].

Currently, ALAM congresses are held every 2 years in a previously chosen country. This periodicity has been kept since the mid-1990s, after an initially irregular phase typical for the start of any initiative that entails a great deal of complex organization. ALAM congresses are a meeting point for Latin American microbiologists and provide the opportunity to exchange information, discuss research strategies, and plan courses of action, cooperation, and development for projects of common interest. They are also an open forum to meet colleagues from other countries who, on their own initiative or invited by the organization, attend the event. The result is a lively, inspiring scientific exchange that especially benefits young researchers, who can increase their knowledge, learn new techniques, and contribute with their training

Table 2. Classical Latin American and Spanish microbiologists honored on the back covers of *International Microbiology* since 2004

Scientist's name/journal issue	Country	Field/Main contributions
Jaime Ferrán (1849–1929) Int Microb 7(1,2) 2004	Spain	Recognized for his work on active immunization against cholera in humans. Between 1881 and 1885, he immunized 50,000 people and later advocated similar preventive measures for other infections.
Oswaldo G. Cruz (1872–1917) Int Microb 7(3,4) 2004	Brazil	Father of Brazilian sanitation. Fighter against yellow fever, which he eradicated from Rio de Janeiro and Belem do Pará. He introduced preventive disease measures in Brazil.
Juan Noé Crevani (1877–1947) Int Microb 8(1,2) 2005	Chile	He worked on several infectious diseases, including malaria, a disease that was eradicated later in Chile by his collaborators.
Eugenio Espejo (1747–1795) Int Microb 8 (3,4) 2005	Ecuador	Precursor of bacteriology. He realized the role of air as a vector of living beings causing diseases and advanced the idea that specific agents are involved in the process of fermentation.
Alfonso L. Herrera (1868–1942) Int Microb 9(1,2) 2006	Mexico	He developed the hypothesis of plasmogeny, which led to a better understanding of both the uniformity of nature and the origin of life. His books were considered the best Darwinian works of that time in Mexico.
Clodomiro Picado (1887–1944) Int Microb 9(3,4) 2006	Costa Rica	Pioneer in toxicology. He developed anti-venom antisera and his book on this topic brought him international recognition. His experiments in 1915 and 1927 demonstrated the inhibitory action of <i>Penicillium</i> .
Francisco X. Balmis (1753–1819) Int Microb 10(1,2) 2007	Spain	He led the first global vaccination campaign against smallpox in 1830 as a physician on the <i>Real Expedición Filantrópica de la Vacuna</i> in the ship <i>María Pita</i> . The mission was to spread the vaccine into all overseas Spanish territories.
Louis D. Beauperthuy (1807–1871) Int Microb 10(3,4) 2007	Venezuela	Venezuela He carried out detailed observations on the spread and treatment of many diseases and was the first to describe scabies as a parasitic infection.
Carlos J. Finlay (1833–1915) Int Microb 11(1,2) 2008	Cuba	He discovered the vector of yellow fever and, among other advances, contributed to the decrease in newborn mortality by implementing a new sterile process.
José de Arechavaleta (1838–1912) Int Microb 11(3,4) 2008	Uruguay	He founded the Laboratory of Bacteriology, from which the Public Health Institute originated. In 1886, he and his colleague Pedro Hormaeche wrote a leaflet describing the <i>virgula bacillum</i> and giving instructions to prevent cholera.

to personal and social progress. This is equally valid for Latin American researchers who do training internships in Europe, USA, Japan, etc., as for young researchers from those countries, who have the opportunity to discover the enormous possibilities of Latin America's diverse natural environments.

International Microbiology has been closely and actively involved in the recognition of microbiological sciences from Latin America. The journal has honored several classical Latin American microbiologists on its back cover since 2004 (Fig. 1, Table 2) and has published a significant number of research works from different laboratories based in Latin American countries (Table 3).

Latin American scientists have worked hard to meet the challenges posed by new and re-emerging infectious diseases, clearly a global problem that transcends borders and in

which cooperation is crucial. For instance, in the control of human and bovine tuberculosis, Latin American scientists have made significant contributions, many of which are the result of cooperative projects with European colleagues and institutions. The fight against infectious diseases [6], endemic or unexpected outbreaks affecting human [4], and livestock health [2] lies in such cooperative research—as is the case for many other agricultural and environmental issues affecting the daily lives of millions of people and the conservation of Earth [1]. The ALAM congresses play a significant role in the searching for appropriate ways to overcome those problems by developing sustainable research strategies.

In Quito, the most recent advances in all fields of microbiology, including human and veterinary health, food, soil, industrial, water and environmental microbiology, among others, will be displayed and discussed, along with the con-

Table 3. Articles from Latin America^a published in *International Microbiology* from 1998 to 2008

Year	Spain	Rest of Europe	Latin America	USA&Canada	Other countries
1998	30	7	6	8	1
1999	24	12	1	7	3
2000	25	7	3	6	–
2001	18	6	2	5	3
2002	21	3	2	6	3
2003	19	6	9	5	3
2004	24	7	5	2	2
2005	27	4	5	2	1
2006	22	7	4	6	1
2007	28	1	4	4	1
2008 ^b	18	4	4	–	–

^aBased on the affiliation of the corresponding author.

^bUntil the present issue, September 2008.

tributions of Latin American microbiologists in those fields. Challenges concerning research, teaching, and the applications of microbiology will be debated by microbiologists whose current and future responsibilities include those issues.

Importantly, the Quito congress coincides with the start of the commemoration of both the 200th anniversary of Charles Darwin's birth (12 February 1809) and the 150th anniversary of the publication of his revolutionary book, *On the Origin of Species* (22-24 November 1859). Both anniversaries will be celebrated with numerous activities in many countries and academic centers. But how many of them will take note of the essential role that the geography, fauna, and flora of Latin America played in Darwin's revolutionary idea? The theory of evolution owes a great deal to the observations Darwin made during his voyage on the HMS Beagle (1832–1835) throughout South America, especially in Brazil, Patagonia, and the Galapagos Archipelago. These places, especially the Ecuadorian jewel of recent evolution, the Galapagos, can boast of having contributed the essential elements for the discovery and comprehension of the natural laws which, once elaborated by Darwin, would not only give rise to a completely new concept of life on Earth, but would also influence many aspects of human thought and activity.

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References

1. Barragán VA, Aveiga I, Trueba G (2008) Microbial community composition in petroleum-contaminated and uncontaminated soil from Francisco de Orellana, in the northern Ecuadorian Amazon. *Int Microb* 11:75-150
2. Blanco M, Lazo L, Blanco JE, Dahbi G, Mora A, López C, González EA, Blanco J (2006) Serotypes, virulence genes, and PFGE patterns of enteropathogenic *Escherichia coli* isolated from Cuban pigs with diarrhea. *Int Microb* 9:53-60
3. Cetto AM (1998) Ciencia y producción científica en América Latina: el proyecto Latindex. *Int Microb* 1:181-182
4. Colwell RR (1996) Reto a la microbiología en América Latina: una epidemia de cólera a finales del siglo xx. *Microbiol SEM* 12:519-522
5. Holmes DS, Mora G (2006) Taking the pulse of Latin American microbiology: the 18th ALAM congress (Pucón, 23-26 October 2006). *Int Microbiol* 9:306-308
6. Rocha CD, Caetano BC, Machado AV, Bruña-Romero O (2004) Recombinant viruses as tools to induce protective cellular immunity against infectious diseases. *Int Microbiol* 7:83-94
7. Schaechter M, Orrego C (1996) Una perspectiva sobre la investigación microbiológica. *Microbiol SEM* 12:7-8
8. Sebastián J (ed) (2007) Claves del desarrollo científico y tecnológico de América Latina. Fundación Carolina, Madrid, 457 pp