Every two years, the Congress of Paraguay promotes scientific research by bestowing the National Science Award and five honorary mentions in the field of science. This year, Graciela Russomando from the Department of Biology and Molecular Genetics of the Instituto de Investigaciones en Ciencias de la Salud of the National University of Asunción, Paraguay, received the award for the results of her research on pneumonia in Paraguay presented in the article:

“Diagnosis of severe acute respiratory infections in hospitalized children under 5 years reveals high incidence of viral co-infections, genetic diversity, and high carriage of Streptococcus pneumoniae serotypes not covered by the PCV-10 vaccine”, with the following authors: Graciela Russomando, Emilio Espínola, Rosa M. Guillén, Wilma Basualdo, Viviana Pavlicich, Carolina Aquino, Gláucia Paranhos-Baccala, Jean-Noël Telles, Melina Messaoudi, Florence Komurian-Pradel, and Valentina Sanchez Picot.

The President of the Congress and the members of the jury of the National Science Award for 2014 granted this project an Honorable Mention, which is considered to be highly prestigious in Paraguay.

Graciela Russomando, Instituto de Investigaciones en Ciencias de la Salud of the National University of Asunción (Paraguay)
Cryptococcus neoformans complex in HIV-infected patients in Madagascar

Little is known on the epidemiology of Cryptococcus neoformans in Madagascar. The Department of Infectious Diseases of the University Hospital Befelatanana, Antananarivo, in partnership with the Charles Mérieux Infectiology Centre, has secured funding from EDCTP (European and Developing Countries Clinical Trials Partnership) in Epidemiology and Medical Statistics to drive a research project on the study of the prevalence and risk factors associated with C. neoformans complex in HIV-infected patients. EDCTP promotes research training and career development in sub-Saharan Africa and North-South partnerships. The one-year study, launched in October 2014, is conducted in collaboration with two French institutions.

The project forms part of a Master 1 programme in Public Health to be followed by a Master 2 in Epidemiology and Risk Management. The recipient of the Master’s and the principal investigator of the study is Dr. Rivo Rakotoarivelo, an infectiologist.

In summary, HIV-infected patients are selected according to their immunologic CD4 status. Samples are tested for cryptococcal antigen by a new technique, LFA (Lateral Flow Assay). Other diagnostic investigations will be conducted. This project has been submitted to the National Ethics Committee.

Ultimately, this study is expected to (a) make a laboratory-based diagnostic for early detection of cryptococcosis available to the HIV/AIDS National Control Programme; (b) support the implementation of an effective treatment for cryptococcosis; (c) provide a better understanding of the epidemiology of the C. neoformans complex in Madagascar; and (d) serve as a model for launching similar studies to enhance the understanding of other opportunistic infections in HIV-infected patients. In addition, the study will lead to virological monitoring of HIV-infected patients, such as viral load measurement.

Rivonirina Rakotoarivelo, University Hospital Befelatanana, Antananarivo (Madagascar), Mala Rakoto-Andrianarivelo, Mandranto Rasamoelina, Njary Randriamampionona, Bénédicte Contamin, Centre d’Infectiologie Charles Mérieux, Antananarivo (Madagascar), Philippe Vanhems and Thomas Bénet, Lyon 1 University (France), Muriel Cornet, Grenoble University (France)
Detection of the enterovirus C117 in China and Mongolia

Enteroviruses (EVs) are small, non-enveloped viruses in the family Picornaviridae. EVs are classified into 12 species according to the molecular and antigenic properties of their viral capsid protein (VP1). To date, 7 species are known to infect humans, including EV-A to EV-D, and rhinoviruses A, B, and C (www.picornastudygroup.com/taxa/species/species.htm).

EV-C117 is a newly-discovered EV-C genotype. It was identified in Lithuania in 2012 in a nasopharyngeal sample from a hospitalized child (3 years and 9 months old) with community-acquired pneumonia. Until now, this was the sole report of EV-C117. However, through collaboration between the Christophe Mérieux Laboratory and the Mongolian Academy of Medical Sciences, EV-C117 has now been detected in Chinese and Mongolian children with respiratory tract infections (RTIs). Through BLAST* and phylogenetic analyses, researchers at the Christophe Mérieux Laboratory also found EV-C117 present in children with RTIs in Nepal, Switzerland, and South Korea. This research indicates that EV-C117 is widely distributed geographically and exhibits respiratory tropism. (For further details, see: http://wwwnc.cdc.gov/eid/article/20/6/pdfs/13-1596.pdf)

Jianwei Wang, Christophe Mérieux Laboratory, Beijing (China) and Pagbajabyn Nymadawa, Mongolian Academy of Medical Sciences, Ulaanbaatar (Mongolia)

*Basic Local Alignment Search Theorem

Antibiotic resistance surveillance at the Charles Mérieux Infectiology Centre of Mali

The advent of antibiotics has led to tremendous progress in the fight against infectious diseases in the world, particularly in Africa. However, this progress is compromised by the emergence and spread of pathogens resistant to antimicrobials. Surveillance of antibiotic resistance is unconditionally required to attain the Millennium Development Goals, especially in terms of reducing maternal and infant mortality. This resistance has been well characterized and is being monitored in developed countries, but this is not the case in developing countries. The control of bacterial resistance requires reliable country data on the incidence and characteristics of resistance, provided on a regular basis.

The Charles Mérieux Infectiology Centre has implemented the surveillance of bacterial resistance to antibiotics in patients hospitalized at Gabriel Touré and Point G in Bamako, Mali. Studies were conducted in 2013 and 2014 on 351 patients with sexually-transmitted infections, 212 patients with urinary tract infections, 68 cases of septicemia, 68 cases of tuberculosis caused by the Mycobacterium tuberculosis complex, and 58 cases of diabetes. The microorganisms the most frequently associated with sexually-transmitted infections were Candida albicans (31%), Ureaplasma urealyticum (25.8%), beta-hemolytic Streptococcus group B (16%), Gardnerella vaginalis (9.4%), Candida non-albicans (8.8%), Mycoplasma hominis...
(6.4%), *Trichomonas vaginalis* (1.2%), *Escherichia coli* (0.6%) and *Streptococcus* beta-hemolytic group A (0.2%). Resistance to antibiotics (ciprofloxacin, erythromycin, tetracycline, azithromycin, clarithromycin) was observed and a multidrug-resistant (MDR) strain of *E. coli* was identified in a patient with a genital infection. In the 212 positive urine cultures, 20 different bacterial species were isolated, predominantly represented (80%) by *E. coli*, *K. pneumoniae* and *P. aeruginosa*. Overall, 8.4% of isolated bacteria were MDR. These were *E. coli*, *K. pneumoniae*, and *P. aeruginosa* in 58%, 34%, and 7.5% of cases respectively.

Overall, 44 species of bacteria were isolated from blood cultures of patients with septicemia. The predominant bacterial species were *Acinetobacter baumanii* complex (22.7%), *Staphylococcus aureus* (20.5%), *Klebsiella pneumoniae* (20.5%), and *Escherichia coli* (18.2%). Approximately 9% of these bacteria were multidrug-resistant, including *K. pneumoniae* (29%), *Acinetobacter baumanii* (29%), *E. coli* (16%) and *S. aureus* (12%).

In the diagnosis of tuberculosis, 68% of mycobacteria were isolated from sputum, 19% from aspirates, 8% from pus, and 4% from urine. *Mycobacterium tuberculosis* complex was found in 80% of cases. *M. fortuitum* was the most common atypical mycobacterium. A strain resistant to rifampicin and 3 strains resistant to isoniazid were detected and were isolated from an aspirate and sputum respectively. A MDR strain was isolated from a sputum sample. The bacteria isolated from the diabetic feet of patients were mainly *Staphylococcus aureus*, *Escherichia coli*, *Proteus mirabilis*, *Proteus vulgaris*, *Klebsiella pneumoniae*, *Streptococcus agalactiae*, and *Enterobacter cloacae*. Many antibiotic-resistant strains were identified, of which 34% were multi-resistant (29% of *E. coli* and 37.5% of *S. aureus*).

These results indicate that strains of resistant bacteria to antibiotics are circulating in Bamako and warrant the establishment of greater surveillance in Mali.

*Bourema Kouriba, Bréhima Traoré, and Souleymane Diallo, Charles Mérieux Infectiology Centre in Bamako (Mali)*

**Bioinformatics and Genomic Data Analysis Workshop in Bangladesh**

A workshop on bioinformatics and analysis of genomic data was co-organized, September 22 - 26, 2014, with the Institute for Developing Science and Health Initiatives (ideSHi, Bangladesh) and the International Centre for Diarrheal Disease Research, Bangladesh (icddr, b). The workshop was conducted by Ana Tereza R. Vasconcelos from the Laboratório Nacional
de Computação Científica of Brazil, a new member of GABRIEL since 2014.

Fifteen participants from a variety of institutes (icddr,b, Bangladesh Institute of Tropical Infectious Disease (BITID), Dhaka University, BRAC University, Institute for Developing Science and Health Initiatives (ideSHi), Institute of Epidemiology, Disease Control and Research (IEDCR), Dhaka and the National Forensic DNA Profiling Laboratory, Dhaka Medical College) attended the course.

The following topics were presented:

- Principle of PCR and primers design (Primer3)
- Multiple sequence alignment and search for regions of similarity (BLAST)
- Concept of motifs and encoding
- Genome annotation (SABIA) and metagenomics
- Gene-finding strategies (Markov model)
- Methods of analyzing polymorphisms

During the workshop, participants had the opportunity to carry out practical exercises, and present specialized scientific articles on these subjects.

Florence Komurian-Pradel, Fondation Mérieux (France)

3rd National Hepatitis Workshop in Vientiane, 3-5 November 2014 - Christophe Mérieux Infectiology Centre of Laos

The 3rd edition of the National Workshop on Hepatitis entitled, “Toward more extensive access to diagnosis and treatment of viral hepatitis in Lao PDR”, was held for three days, with the support of Fondation Mérieux, at the Christophe Mérieux Infectiology Centre of Laos.

Worldwide, chronic hepatitis C affects around 170 million people, and chronic hepatitis B, 400 million. A large proportion of those infected are from South-East Asia, which is, in fact, one of the regions where chronic hepatitis B and C are the most prevalent. It has been shown that hepatocarcinoma (liver cancer), one of the major types of cancer in this region, is a consequence of the aggravation of those forms of chronic hepatitis. Mongolia and Laos are the two countries that are most affected by this form of cancer in the world (data from Globocan 2012).

Opened by his Excellency Prof. Som Ock Kingsada, Vice-Minister of Health of the Lao
PDR, the conference gathered 60 clinicians from all parts of the country, who arrived to attend courses on viral hepatitis B and C, characterized as major health concerns for the Lao PDR.

During the 3-day conference, experts from France (Prof. Christian Trépo from Lyon 1 University and Prof. Paul Dény from Paris 13 University), Thailand (Dr. Gonzague Jourdain and Dr. Nicole Ngo-Giang-Huong from IRD-PHPT in Chiang Mai), and the WHO in Manilla (Dr. Nick Walsh) provided an insight on the natural history of the disease, as well as the diagnosis, treatment, and follow-up of infected patients.

The first day focused on hepatitis C. Newly-released recommendations from the WHO on the follow-up of patients were announced. There are grounds for hope that the arrival of new drugs will successfully treat this disease.

The second day was dedicated to hepatitis B. Questions on the prevalence, diagnosis, immunization, and access to treatment in Laos were addressed. The final day covered the examination of clinical cases and was devoted to the review of studies comparing the efficacy of rapid diagnostic tests versus ELISA, the gold standard.

The three days were very enriching and provided an opportunity for extensive discussions and debates. As highlighted by his Excellency, Prof. Dr. Som Ock Kingsada, this event was very important for the clinicians of the country, especially the junior staff who will benefit from the experience of the renowned experts present at this Third National Workshop.

Laurent Malato, Christophe Mérieux Infectiology Centre of Laos (Laos)

Bioinformatics training at the Christophe Mérieux Laboratory, Beijing, China

DNA/RNA sequencing has been widely used in the genotyping of bacteria and viruses to characterize the evolution of pathogens and trace the origin of emerging pathogens. However, sequence analysis is still a challenge for most biologists and clinicians. To improve the implementation of such technologies in GABRIEL sister labs, the Christophe Mérieux Laboratory (CML) offered a training course on sequence analysis, October 13-19, 2014, in Beijing. Two participants, Maria de Lourdes Aguiar Oliveira from Brazil, and Ganchimeg Sampil from Mongolia, took part in the one-week course. Four sections were covered following requests from participants, i.e.

1. basic knowledge of sequence analysis;
2. phylodynamics and the evolution of viral genes;
3. identification and characterization of new emerging viruses (with Enterovirus as an example);
4. next-generation sequencing and
metagenomics. The basic principles and the use of standard software applications (e.g., MEGA, BEAST, Simplot, BWA, MEGAN) was introduced.

Additionally, hands-on practice provided in each of the four sections enabled the participants to analyse, step by step, actual data generated with guidance from the instructor. A supervisor was assigned to help each participant solve the analytical problems they encounter in their own labs. Feedback from both participants indicates that this customized course was very beneficial for their work. They will continue to work on data analysis in close collaboration with the Christophe Mérieux Laboratory. Prof. Jianwei Wang, the Director of the CML, said that the laboratory will try to provide more training courses in the future, as well as support for the investigation of respiratory viruses. This should reinforce the connection between GABRIEL sister labs, in accordance with Fondation Mérieux’s vision and schedule.

Mingkun Li, Christophe Mérieux Laboratory, Beijing (China)

GABRIEL Member Publications since June 2014


http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3944851


Haas DW, Severe P, Jean Juste MA, Pape JW, Fitzgerald DW. Functional CYP2B6 variants and virologic response to an efavirenz-containing regimen

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