

Sixteenth Annual Boston University Symposium on Bioinformatics



Professor Placide Mbala, Head of the Epidemiology and Global Health Department at the Institut National de Recherche Biomédicale, took part in the activities of Boston University's Annual Symposium 2023. (Read the article on Page 12)

Training workshop on viral genome sequencing and bioinformatics analysis



The workshop was organized from May 29 to June 9, 2023, by the Africa Centers for Disease Control and Prevention (Africa CDC) in conjunction with the African Society for Laboratory Medicine (ASLM) and the Institut National de Recherche Biomédicale. (Read the article on Page 11)

Capacity building for the Laboratoire de Biosûreté et des Epidémies in N'Djamena, Chad



A team from the Pathogen Genomics Laboratory of the Institut National de Recherche Biomédicale (INRB) carried out a support mission from N'Djamena in Chad from June 1 to 30... (Lire l'article à la Page 8-9)

French President Emmanuel Macron visits INRB

On March 4, 2023, the President of the French Republic, Emmanuel Macron, visited the Institut National de Recherche Biomédicale, the flagship of Franco-Zairean cooperation at the time, which was inaugurated in 1984 by President François Mitterrand and Kengo Wa Dondo.



The President of the French Republic, Emmanuel Macron, is welcomed at INRB's Pathogen Genomics Laboratory by Professor Placide Mbala, Head of INRB's Epidemiology and Global Health Department, accompanied by Professor Jean-Jacques Muyembe, INRB's Director General.

The government of the Democratic Republic of Congo (DRC) has joined the PREZODE «Preventing Zoonotic Disease Emergence» initiative, launched in 2021 by the President of the French Republic, Emmanuel Macron to combat emerging and re-emerging zoonotic diseases.

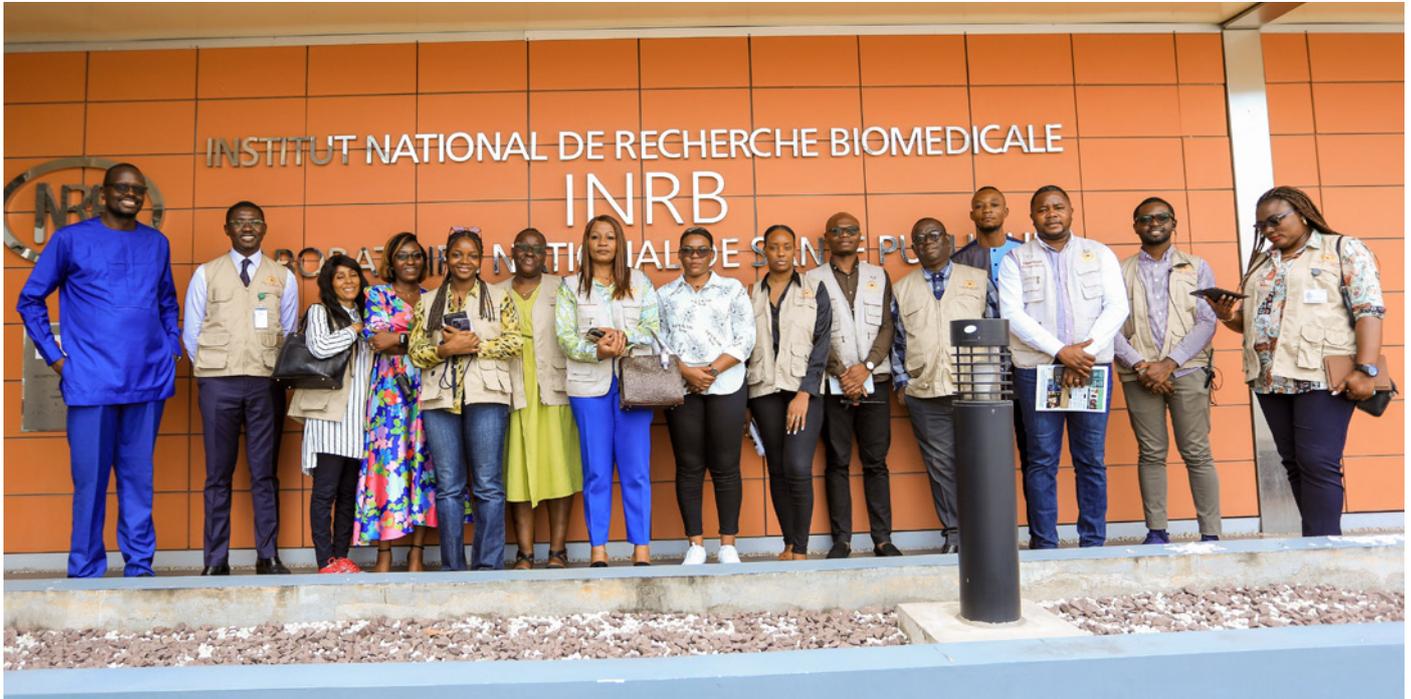
Thanks to the Franco-Congolese health roadmap signed in 2019, the DRC has benefited from French support through the Institut National de Recherche Biomédicale in financing the sequencing laboratory and in the fight against Covid-19.

During the same visit, the PRISME «Plate-forme de Recherche Internationale sur la Santé Mondiale» agreement was signed. This

agreement marks the return of a new scientific partnership between France and the DRC, through a network between the Institut National de Recherche Biomédicale (DRC), the University of Kinshasa (DRC), the Institut de Recherche pour le Développement (France), the University of Montpellier (France), the Agence Nationale de Recherches sur le SIDA et les Hépatites Virales (France), the Institut National de la Santé et de la Recherche Médicale (France), and the French Embassy in the Democratic Republic of Congo. As part of this new scientific partnership between France and the DRC, the President of the French Republic visited INRB, and in particular the Pathogen Genomics Laboratory, to get an idea of its sequencing capacity.

Denise Nyakeru Tshisekedi Foundation visits the Institut National de Recherche Biomédicale

On March 15, 2023, a team from the Denise Nyakeru Tshisekedi Foundation visited the Institut National de Recherche Biomédicale (INRB) to get a first-hand feel of the work being carried out by young researchers at this reference institution.



Family photo of the Fondation Denise Nyakeru Tshisekedi (FDNT) team and the Institut National de Recherche Biomédicale (INRB) team in front of the new INRB building.

Despite the challenges it faces, the Institut National de Recherche Biomédicale (INRB) has made training young researchers one of its priority missions, to enable it to perpetuate its activities in diagnosing common diseases, monitoring priority diseases and conducting research.

This mission of mentoring young researchers meets that of the Fondation Denise Nyakeru Tshisekedi (FDNT) as part of its «Excellentia» program. Indeed, INRB, through its Pathogen Genomics Laboratory, intends to work in collaboration with FDNT, with the aim of supporting these elite researchers in continuing their training in the field of biomedical research.

To this end, a guided tour with the FDNT team was organized on March 15, 2023 at INRB, during which a

session of presentations was made by Professor Jean-Jacques Muyembe, Director General of INRB and Madame Adrienne Amuri, Head of the Pathogen Genomics Laboratory. In their words,

they shared with the invited team the capabilities of this laboratory in terms of the pathogens sequenced, the techniques used and the various materials employed.



Visit by the Fondation Denise Nyakeru Tshisekedi (FDNT) team to the Pathogen Genomics Laboratory, guided by Mrs. Adrienne Amuri, Laboratory Manager.

US Ambassador to DRC visits Pathogen Genomics Laboratory

On May 8, 2023, the Pathogen Genomics Laboratory team welcomed the Ambassador of the United States of America to the Democratic Republic of Congo (DRC) on a working visit.



Presentation of the Pathogen Genomics Laboratory's Staff by Professor Jean-Jacques Muyembe to the Ambassador of the United States of America to the Democratic Republic of Congo

Accompanied by her delegation, the US Ambassador to the Democratic Republic of Congo, Lucy Tamlyn, visited the Institut National de Recherche Biomédicale on May 8, 2023.

During her visit, she exchanged views with the Director General, Professor Jean-Jacques Muyembe, on the research activities carried out on site and the advances made by this institution in terms of infectious disease management, prevention and surveillance, research and response in the DRC.

The working visit ended at the premises of the Pathogen Genomics Laboratory, which is managed by

Professor Placide Mbala, Head of INRB's Epidemiology and Global Health Department. Led by Professor Jean-Jacques Muyembe, the US

Ambassador to the DRC received an overview of the laboratory's activities and sequencing capabilities.



Presentation by Professor Placide Mbala, Head of the Epidemiology and Global Health Department at INRB, on the sequencing capacity of the Pathogen Genomics Laboratory.

Kick-off meeting: IMReC_001, on the Epidemiological Analysis of Monkeypox Contamination and Severity

From March 27 to 28, 2023, the Institut National de Recherche Biomédicale organized a two-day launch of a study aimed at linking clinical and basic sciences to develop guidelines for the prevention of Monkeypox.



Family photo with the team from the Institut National de Recherche Biomédicale (INRB), the International Development Research Centre, the the National Program for the Control of Monkeypox and Viral Hemorrhagic Fevers in the DRC, the University of California, Los Angeles (UCLA) and the University of Manitoba.

The kick-off meeting of the IMREC001 study on the epidemiological analysis of the contamination and severity of Monkeypox (mpox) was held on March 27 and 28, 2023 in the amphitheater of the Institut National de Recherche Biomédicale in Kinshasa, Democratic Republic of Congo.

The University of Manitoba and the Canadian Institutes of Health Research (CIHR), in collaboration with the Institut National de Recherche Biomédicale (INRB), have set up an international consortium to conduct a prospective, multi-center study of mpox.

This project aims to improve mpox surveillance and detection across Africa by leveraging existing networks, partnerships and study cohorts, samples and data. Through this, coordinated retrospective and prospective analyses will be conducted to identify other possible

risk factors, including biological and social determinants, contributing to mpox transmission or various clinical presentations of the disease.

Through coordinated efforts in Canada and Africa, the aim of this project is to rapidly collect, analyze and deliver knowledge to public

health officials, policy-makers and priority communities regarding mpox infection and transmission, policy-makers and priority communities regarding smallpox infection and transmission risks, clinical characteristics and the relative efficacy of vaccine and therapy.



Presentation on the epidemiological situation of Mpox in the DRC by Dr Robert Shongo, Director of the National Program for the Control of Monkeypox and Viral Hemorrhagic Fevers in the DRC.

African region's first training session on Poliovirus NGS sequencing

From April 24 to 28, 2023, the Institut National de Recherche Biomédicale welcomed 8 participants from Cameroon, Kenya, the Democratic Republic of Congo and Senegal for training on Poliovirus sequencing with the Nanopore platform.



Family photo of the Institut National de Recherche Biomédicale (INRB) team, the WHO team, the Imperial College London team, the National Institute for Biological Standards and Control (NIBSC) team, the Bio Surviv International team, training participants and the Global Polio Laboratory Network (GPLN) regional coordinators for Africa and the world, in front of the new INRB building.

Direct Detection of Poliovirus in stools using Next-Generation Sequencing (NGS) on the Oxford Nanopore Technology (DDNS) platform offers a real opportunity to improve turnaround times for results, and thus outbreak detection and response.

On this day, the World Health Organization (WHO), in partnership with the Global Polio Laboratory Network (GPLN), is supporting countries in the African region in building their laboratory capacity in new Poliovirus sequencing techniques.

As part of this support, the WHO, in collaboration with the Polio Sequencing Consortium and the Institut National de Recherche Biomédicale (INRB), organized the first training session in the African region on Poliovirus sequencing using the Oxford Nanopore Technology platform.

Held from April 24 to 28, 2023 in one of the training rooms at INRB -

Kinshasa in the Democratic Republic of Congo (DRC), this regional training course welcomed 8 participants from Polio laboratories in Kenya, Senegal, Cameroon and the DRC, facilitated by teams from Imperial College London, National Institute for Biological Standards and Control (NIBSC), Bio Surviv International and INRB.

This first session was supervised by the Global Polio Laboratory Network (GPLN) regional coordinators for Africa and the world, and is part of the process of expanding poliovirus sequencing laboratories in the African region. This will further reduce the time needed to confirm and respond to outbreaks.



Dr Alex Shaw in a hands-on session with participants at the Training Laboratory.

Training at the Biosafety Level 4 laboratory in the NIH Integrated Research Facility, USA

Professor Placide Mbala, virologist at the Institut National de Recherche, took part in a training course from June 12 to 16, 2023 on the principles of level 4 biosafety facilities at the National Institute of Health in the USA.



Participants in the Introduction to Biological Safety Level 4 training course

Organized by the Occupational Health and Safety Division of the National Institute of Health of the United States of America, from June 12 to 16, 2023, this training focused on the principles and Skill building of level 4 biosafety installations.

The Institut National de Recherche Biomédicale was represented at the course by Professor Placide Mbala, a virologist with extensive experience in the detection of Ebola and Monkeypox viruses. Participants attended theoretical and practical sessions on the requirements for level 3 and 4 facilities (laboratories), principles of biocontainment, introduction to the external checklist, introduction to positive pressure suits, waste management and sample removal in level 4 biosafety facilities,

Biosafety Cabinet Review and Set Up, sharps Management, Emergency Response, Dynamic Risk Assessment,

Cell Culture Inoculation, Spill clean-up procedures in a positive pressure suit.



Practical session on handling infectious materials

Support for staff from 5 Cameroonian institutions by the INRB team for the implementation of SARS-Cov-2 sequencing activities

From April 24 to May 19, 2023, a biologist and a bioinformatician from the Institut National de Recherche Biomédicale were invited by WHO to Cameroon to support the implementation of sequencing activities and build capacity in sequencing and bioinformatics analysis of SARS-CoV-2.



Family photo of the Institut National de Recherche Biomédicale (INRB) team, the Centre Hospitalier Régional de Garoua team and training participants in the meeting room.

As of February 2021, the Institut National de Recherche Biomédicale (INRB) has been designated by the World Health Organization (WHO) and Africa CDC as the Regional Reference Laboratory for the sequencing of SARS-Cov-2 samples in the Central African region, as part of the PGI initiative.

With the efforts of Cameroon's Ministry of Public Health and its partners, sequencing activities have been implemented in the country.

To date, Cameroon has 5 laboratories capable of sequencing SARS-CoV-2.

Over the past two years, WHO has organized a number of training courses and visits, during which

INRB teams have welcomed biologists and bioinformaticians to INRB for introductions to SARS-CoV-2 sequencing, and have made visits to Cameroon to support the implementation of sequencing activities.

From February 20 to March 03, 2023, two members of the Garoua's Centre Hospitalier Régional (CHR) team, comprising a biologist and a bioinformatician, received training in genomic sequencing and bioinformatics at Institut National de Recherche Biomédicale.

With the aim of operationalizing the sequencing platform, evaluating the genomic surveillance system and finalizing the training of biologists

and bioinformaticians from the CHR, the LANAVETTE veterinary laboratory and the Garoua Pasteur Center, the Centre de Recherche sur les Maladies Émergentes et Re-émergentes (CREMER), Centre International de Recherche Chantal Biya (CIRCB), two members of the INRB team were invited by WHO to a joint Ministry of Public Health - WHO workshop, from April 24 to May 12, 2023. The objectives of this workshop were to ensure the proper implementation of sequencing techniques, to report to health authorities on the detection of variants of public health concern, to summarize the bioinformatics concepts acquired at INRB and take stock of the situation, to assist teams in bioinformatics analyses, and to ensure the smooth continuation of activities.

Capacity building for the Laboratoire de Biosûreté et des Épidémies of N'Djamena - Chad

A team from the Pathogen Genomics Laboratory of the Institut National de Recherche Biomédicale (INRB) was in N'Djamena (Chad) from 1st to 30 June 2023 to install new equipment acquired by the Laboratoire de Biosûreté et des Épidémies (LabiEp), and build the capacity of laboratory technicians and bioinformaticians.



The team from the Institut National de Recherche Biomédicale (INRB) and the Laboratoire de Biosûreté et des Épidémies (LABIEP), preparing the library for sequencing.

Since its emergence in late 2019, the Covid-19 pandemic has required several means and tools to control the infection. One of these tools is genomic surveillance. This has increased during the epidemic on all continents except Africa.

With the efforts of the Chadian Ministry of Public Health and Prevention, through its Laboratory Directorate, the Laboratoire de Biosûreté et des Épidémies has been set up for on-site pathogen diagnostics and sequencing activities in Ndjamen.

This initiative was encouraged and supported by the World Health Organization (WHO) through its country office in Chad, in terms of equipment, consumables and the development of local sequencing capacities to improve genomic surveillance of SARS-CoV-2 in the country. Several training sessions were

held for the Chad team, including a visit by 2 members of the Laboratoire de Biosûreté et des Épidémies to the Institut National de Recherche Biomédicale (INRB) in Kinshasa, and an initial supervisory mission of INRB team in Chad. Following these

contacts, which set the milestone for the sequencing of SARS-CoV-2, another 1-month support mission was carried out from June 1 to 30, 2023, with the aim of installing the new sequencers acquired by WHO for the Chad Ministry of Public Health and Prevention, and building the capacity of the local team of technicians, biologists and bioinformaticians in SARS-CoV-2 sequencing and bioinformatics analysis.

During the period of support for the Laboratoire de Biosûreté et des Épidémies team by the INRB supervisory team, activities focused on setting up the new laboratory, inventorying materials and consumables, sorting SARS-CoV-2 samples and sequencing the sorted samples. Bioinformatics analyses were used to generate the sequences and determine the variants and sub-variants for these samples.

The Laboratoire de Biosûreté et des Épidémies in N'Djamena currently has the infrastructure and staff to carry out its sequencing activities.



Debriefing of the mission to the Country Representative of the WHO Office - Chad

Bioinformatics and quality assurance training for SARS-CoV-2 sequencing

Two members of the Bioinformatics team from the Pathogen Genomics Laboratory attended a training course on Bioinformatics, External Quality Assurance and Reporting for SARS-CoV-2 sequencing, from May 15 to 19, 2023 at Noguchi Memorial Institute for Medical Research, in Accra - Ghana



Training launch and program presentation

The Pathogen Genomics Laboratory at the Institut National de Recherche Biomédicale (INRB) participates in the quality control exercises of several institutions. These include UK Health Security Agency, an English institution that sends samples for proficiency testing using SARS-CoV-2 samples for sequencing.

As part of its efforts to build the capacity of African countries to ensure the quality of sequencing data, Africa CDC, in collaboration with Cambridge University, UK Health Security Agency, African Society for Laboratory Medicine and Noguchi Memorial Institute for Medical Research, organized a training course on bioinformatics analysis and quality control of SARS-CoV-2 sequencing data from May 15 to 19, 2023.

The course welcomed 22 participants from 11 African countries, including Cameroon, Ethiopia, Ghana, Morocco, Namibia, Uganda, the Democratic Republic of Congo, Senegal, the Seychelles Islands, Togo and Zambia.

INRB's Pathogen Genomics Laboratory took part in this training course, through its two members involved in bioinformatics analyses of sequencing data, in order to improve the quality of the data that is shared.

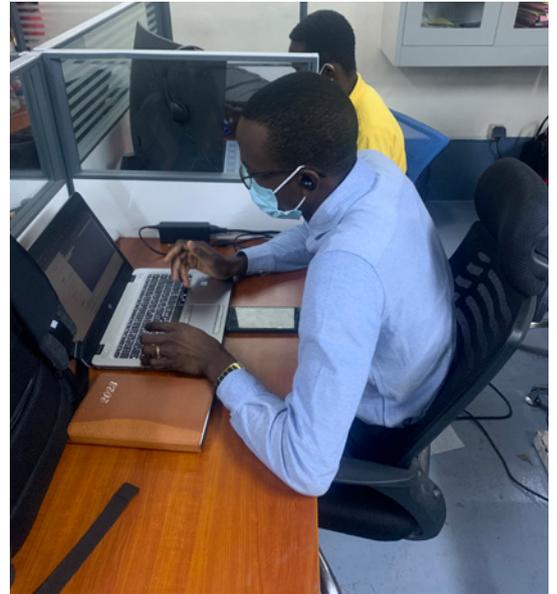


Family photo with participants, facilitators from Cambridge University and UK Health Security Agency, staff from Africa CDC, and Noguchi Memorial Institute for Medical Research.

Training in SARS-CoV-2 sequencing and bioinformatics analysis

Teams from 5 countries (Central African Republic, Cameroon, Burundi, Equatorial Guinea and Madagascar) were trained in sequencing and bioinformatics analysis of SARS-CoV-2 during the period January 13 to 31, 2023 and February 14 to March 02, 2023 at the Institut National de Recherche Biomédicale by teams from the Pathogen Genomics Laboratory.

These sessions were funded by WHO Africa - EPR Dakar Hub.



The first team in this training series came from the Central African Republic's Laboratoire National de Biologie Clinique et Santé Publique. Comprising a medical biologist and a computer scientist, this Central African team was received from January 13 to 31, 2023 for training in SARS-CoV-2 sequencing with the Midnight protocol, using the Oxford Nanopore Technology platform. They were also introduced to bioinformatics analysis using the artic platform.



Three teams of 2 people each, from the Institut National de Santé Publique (Burundi), the Centre Hospitalier Régional (CHR) de Garoua (Cameroon) and the Laboratoire d'Investigation Baney (Equatorial Guinea), were welcomed from February 14 to March 2, 2023, for the second training session on sequencing and bioinformatics analysis of SARS-CoV-2.



This last series of training courses was completed with 4 staff from Madagascar's Laboratoire d'Analyses Médicales Malagasy who were received from March 27 to April 07, 2023, for sequencing and bioinformatics analyses of SARS-CoV-2.

Training workshop on viral genome sequencing and bioinformatics analysis

This workshop was organized from May 29 to June 9, 2023 by Africa CDC in collaboration with the African Society for Laboratory Medicine (ASLM) and the Institut National de Recherche Biomédicale (INRB) through the Pathogen Genomics Laboratory in the Democratic Republic of Congo. The introduction to bioinformatics was facilitated by an expert from IRD Montpellier.



With the aim of continuing to build National and Regional genomic surveillance capacity on the continent, Africa Centers for Disease Control & Prevention (Africa CDC) in conjunction with African Society for Laboratory Medicine (ASLM) and Institut National de Recherche Biomédicale (INRB) welcomed 20 participants from 9 African countries (Burundi, Chad, Cameroon, CAR, DRC, Equatorial Guinea, Gabon, Republic of Congo and São Tomé and Príncipe) for a training workshop from May 29 to June 9, 2023 on Viral Genome Sequencing and Bioinformatics

Analyses. This activity took place at INRB through its Pathogen Genomics Laboratory. The Illumina and Oxford Nanopore Technology platforms were used to sequence SARS-CoV-2 and Ebola Virus Disease samples using the Gunit and Midnight protocols. In addition, an introduction to command lines, tools and bioinformatics analyses was provided by facilitators from INRB and the TransVIHMI unit, as part of the AFROSCREEN project run by the Agence Nationale de Recherches sur le SIDA et les hépatites virales.

Sixteenth Annual Boston University Symposium on Bioinformatics

Professor Placide Mbala, Head of the Epidemiology and Global Health Department at the Institut National de Recherche Biomédicale, took part in the Boston University 2023 Annual Symposium.



Turcinovic Jacquelyn (Membre du comité du symposium) et Placide Mbala (Chef de la Direction d'Epidémiologie et Santé Globale à l'IINRB)

The sixteenth annual Boston University Bioinformatics Symposium was held on June 7, 2023. Organized by the graduate students of this University, this symposium recorded several activities among others: lectures and poster presentations on current student research. With an exciting list of invited speakers, the session was enriched by hands-on interventions on activities and studies carried out, with particular emphasis on the contribution of bioinformatics.

The IINRB's Pathogen Genomics Laboratory and its young bioinformatics unit, have since 2018 enabled the confirmation of several outbreaks that have plagued the DRC. The Pathogen Genomics Laboratory was in fact represented by Professor Placide Mbala, who, with the support of partners, has implemented the laboratory's sequencing activities. During his speech, he spoke about genomic surveillance of infectious diseases in the Democratic Republic of Congo.

Publications

1. Use of Mpox Multiplex Serology in the Identification of Cases and Outbreak Investigations in the Democratic Republic of the Congo (DRC) - <https://www.mdpi.com/2076-0817/12/7/916>
2. Sensitive poliovirus detection using nested PCR and nanopore sequencing: a prospective validation study - <https://www.nature.com/articles/s41564-023-01453-4>

Degree and study



Francisca Muyembe

Specialization diploma in medical biology from the University of Kinshasa (DRC)



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The activities of the first half of 2023 have been made possible thanks to your invaluable collaboration and support.



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