DIAGNOSTICS IS POWER
The power to fight infectious diseases
Summary

• OUR HISTORY
• SERVING PUBLIC HEALTH
• A GLOBAL PLAYER IN THE FIELD OF IN VITRO DIAGNOSTICS
• ADDRESSING MAJOR PUBLIC HEALTH CHALLENGES
• A NEW APPROACH TO INFECTIOUS DISEASE DIAGNOSTICS
• INNOVATION WITHOUT BORDERS
• DRAWING STRENGTH FROM OUR ROOTS
bioMérieux is first and foremost a human and scientific adventure that began more than 55 years ago. Its expertise and its commitment to expand the frontiers of knowledge in biology are grounded in an entrepreneurial adventure that has been ongoing for more than one century.

In 1897, Marcel Mérieux, who had studied with Louis Pasteur, founded a laboratory in Lyon where he developed the first anti-tetanus sera. He called it Institut Mérieux, and from the outset began to lay the groundwork for a bio-industrial edifice that would leave its mark on vaccinology and the diagnosis of infectious diseases worldwide.

bioMérieux, created in 1963 by Alain Mérieux, with headquarters located in Marcy l’Étoile, France, employs over 11,000 people. The Company is present in 43 countries and serves more than 160 countries through a large network of distributors, earning 90% of sales outside of France.

Since 2014, Alexandre Mérieux, the great grandson of Marcel, has taken over the management of this family-owned company as its CEO. In December 2017 he was appointed Chairman and CEO by resolution of the Board of Directors.

Our history

The entrepreneurial adventure of bioMérieux is rooted in a strong family commitment to serve public health. Faithful to our pioneering spirit, our ambition is to remain a major player in infectious disease diagnostics. Thanks to our scientific approach, with no barriers between the disciplines and no geographic barriers, and bolstered by the commitment of our teams across the globe, we remain focused on this goal as part of our long-term vision.”

Alexandre Mérieux
Chairman and CEO
THE IMPORTANCE OF DIAGNOSTICS

Serving public health

bioMérieux develops and produces in vitro diagnostic solutions (instruments, reagents, software and services) for private and hospital laboratories, mainly for the diagnosis of infectious diseases. The results obtained from a patient sample (blood, urine, stool, cerebrospinal fluid, saliva, etc.) provide doctors with information to support their decisions.

For more than 25 years, bioMérieux has also applied the expertise acquired in the clinical sector to meeting industrial microbiology needs, making it possible to manage contamination risks in agri-food, pharmaceutical and cosmetic products, at each step of the production chain.

Molecular biology

Molecular biology is based on the detection of the DNA or RNA genetic sequences that characterize a disease agent in order to target several bacteria, viruses, yeast and parasites.

Microbiology

Microbiology is based on culturing biological samples, identifying microorganisms and measuring their resistance to antibiotics.

Immunoassays

Immunoassays use an immunological reaction to identify and quantify the presence of antigens and/or antibodies in a sample.

THE THREE KEY TECHNOLOGIES OF IN VITRO DIAGNOSTICS:

* The Lewin Group, "The Value of Diagnostics Innovation, Adoption and Diffusion into Health Care," 2005. This figure concerns all diagnostic tools: in vitro diagnostic tests and medical imaging exams.
Diagnostic tests have a decisive impact on quality at each step of the healthcare chain:
- For screening to help prevent certain diseases when the symptoms have not appeared yet.
- For early diagnosis at the onset of a disease, when symptoms are still very mild.
- For diagnosis and prognosis, in particular of infectious diseases, to identify the disease-causing agent and determine its antibiotic resistance profile.
- For therapeutic decisions and treatment monitoring.

How diagnostics benefit healthcare systems

For improved patient care

Diagnostics is also a valuable instrument of healthcare policy, in particular for epidemiological monitoring and control.

Microbiology applications in industrial production

Microbiological control tests make it possible to meet the quality demands of the agri-food, pharmaceutical and cosmetic industries. Performed along the entire production chain and for the environmental control of production zones, such tests ensure product sterility, the absence of disease-causing bacteria and the enumeration of bacterial flora that indicate the quality of food products.

Veterinary applications: the continuum between human and animal health

The "One Health" concept, an integrated approach advocated by international organizations, is based on the principle of the continuum between animals and humans when it comes to the transmission of infectious agents and antimicrobial resistance. Since 2011, bioMérieux has provided its microbiology expertise to professionals of animal health, in particular to make progress in the fight against antimicrobial resistance, animal diseases and emerging zoonoses.

Spending on medical biology represents only between 2% and 3% of healthcare expenditures*. This cost is limited when weighed against the medical value of diagnostics and the savings it can generate – both by reducing over-prescription of treatments and by shortening the onset of care and the length of hospital stays. Diagnostics is also a valuable instrument of healthcare policy, in particular for epidemiological monitoring and control.

* French Directorate for Research, Studies, Evaluation and Statistics (DREES) and Court of Auditors, 2011.
In a world where viruses and bacteria know no borders, our international outreach is an integral part of bioMérieux’s history. We draw our strength from our organization based on geographic regions and from investing in R&D and production as close as possible to our markets.

**bioMérieux** is present in more than

- **160 countries** through
- **43 sites**
- and a large distribution network
- **19 bio-industrial sites**
- **20 R&D centers** worldwide

**A global player in the field of *in vitro* diagnostics**
Addressing major public health challenges

SOLUTIONS TO SERVE HEALTHCARE PROFESSIONALS AND INDUSTRY

Across the globe, bioMérieux’s research teams are working to develop high medical value diagnostic applications that address public health challenges and laboratories’ needs.

- Antimicrobial resistance
- Sepsis
- Respiratory infections
- Emergency situations
- Protecting consumers’ health
- Efficiency of microbiology labs
Every 45 seconds, a person dies from an infection caused by bacteria which have become resistant to antibiotics.*

Diagnostic tests contribute to reducing the improper use of antibiotics and help ensure they remain effective for the treatment of bacterial infections in humans and in animals.

bioMérieux’s mission is to contribute to protecting the health of patients and consumers, as well as the health of animals.

Taking a global health approach, the Company develops innovative solutions for clinical diagnostics and industrial microbiological control – particularly in the agri-food sector, environmental monitoring and veterinary diagnostics.

This holistic approach represents an essential asset when it comes to meeting public health needs such as antimicrobial resistance. It also allows bioMérieux to provide the most complete offering on the market.

*Sourced from the 700,000 deaths caused annually by antimicrobial resistance according to “Antimicrobial Resistance: Tackling a crisis for the health and wealth of nations”, Jim O’Neill, December 2014.

Antimicrobial resistance
A GLOBAL HEALTH EMERGENCY

Diagnostic tests
ESSENTIAL COMPONENTS OF ANTIMICROBIAL STEWARDSHIP PROGRAMS

ROLE OF DIAGNOSTIC TESTS

Does the patient need antibiotics?

Confirm bacterial infection and identify the causative pathogen to ensure optimal patient outcomes and avoid unnecessary antibiotic use.

Can the antibiotic prescription be optimized?

Determine a pathogen’s resistance profile to select the most appropriate treatment, limit use of broad-spectrum antibiotics and prevent adverse side effects.

When can the antibiotic treatment be safely discontinued?

Monitor patient response to personalized treatment duration and discontinue antibiotics as early as possible.

Sepsis affects around 27 million people each year. Reaching a diagnosis as rapidly as possible is critical for patient outcomes.

The survival rate is 60% when the right treatment is administered within 2 hours after the onset of care and it falls to 30% if treatment is given within 4 hours**.

bioMérieux provides the broadest product offering on the market for the diagnosis of sepsis, based on:

- The host response with the VIDAS® B·R·A·H·M·S PCT™ test;
- The detection, identification and characterization of disease agents, in particular with the BACT/ALERT®, VITEK®, ETEST® and BIOFIRE®;
- Microbiology data monitoring with MYLA®.

**Kumar et al., Crit Care Med 2006, vol. 34, p. 1589-1596.
Emergency situations

In emergency rooms, healthcare professionals need to initiate patient care as quickly and efficiently as possible. High medical value tests, such as VIDAS® B·R·A·H·M·S PCT™ for the diagnosis of bacterial infection and severe sepsis, the VIDAS® HIGH SENSITIVE TROPONIN I test for myocardial infarction, and the VIDAS® D-DIMER EXCLUSION™ test for pulmonary embolism provide rapid results to clinicians and contribute to optimized patient care.

The BIOFIRE® FILMARRAY® Meningitis/Encephalitis Panel addresses a critical need for the rapid, accurate identification of central nervous system infections. With response time of around one hour, this full panel tests cerebrospinal fluid for the 14 most common pathogens responsible for community-acquired meningitis and encephalitis (6 bacteria, 7 viruses and 1 yeast).

The NEPHROCHECK® test enables early identification of acute kidney insufficiency risk.

**Respiratory infections**

Upper respiratory tract infections are the leading cause of new cases of diseases, all diseases combined, both infectious and non-infectious*. Lower respiratory tract infections, including pneumonia, cause nearly three million deaths annually. It is the leading cause of death due to infectious diseases worldwide** and one of the primary reasons for hospitalization in Europe and the United States***.

To fight against these severe infections, bioMérieux proposes an extended offer with:

- PCR molecular biology solutions: the Respiratory Panel, Respiratory 2 (RP2), Respiratory 2 plus (RP2 plus), Respiratory EZ (RP EZ, sold in the United States), Pneumonia Panel and the Pneumonia Panel plus;
- The VIDAS® test for the host response;
- CHROMID® chromogenic culture media for the detection of Pseudomonas aeruginosa, Staphylococcus aureus and methicillin-resistant Staphylococcus aureus (MRSA);
- The VITEK® range for the identification and automated antimicrobial susceptibility testing of bacteria and yeasts;
- The ARGENE® range in molecular biology.


The efficiency of microbiology labs

Automation is extremely important for microbiology laboratories to standardize analyses, ensure traceability and speed up time to results. The “Lab Efficiency” offer is the result of a strategic partnership between COPAN’s unique know-how in automation and pre-analytic solutions and bioMérieux’s leadership in clinical microbiology diagnostics. “Lab Efficiency” makes it possible to automate and standardize each step of microbiology analysis thanks to:

- The WASP® (Walk-Away Specimen Processor) system for the automated plate streaking of Petri dishes;
- The WAPSLab™ system for incubation, imaging and digital analysis.

These instruments make it possible to reduce the time required to identify bacterial growth. They complete the Company’s range of automated systems, which include in particular BACT/ALERT® and BACT/ALERT® VIRTUO® for blood culture and VITEK® 2 and VITEK® MS for the automated identification of bacteria and antibiotic susceptibility testing.

In addition to these instruments, our “Lab Informatics” service solution, in particular with MYLA®, supervise the flow of information from instruments while providing full traceability of exchanges with the IT system and delivering relevant indicators of laboratory efficiency.

MICROBIOLOGICAL CONTROL SOLUTIONS FOR CUSTOMERS IN INDUSTRY

Applying its expertise in clinical microbiology to serve customers in industrial production, bioMérieux offers a broad choice of solutions in industrial microbiological control, ranging from sample preparation to pathogen identification thanks to the BLUE LINE™, VITEK®, VIDAS® and other product lines.

GENE-UP® is a molecular diagnostics system designed for customers in the agro-food sector. The VERIFLOW® platform now completes this offer for wine and beer producers.

Protecting consumers’ health
For most patients with an infectious disease, the first symptoms are not specific to the cause of the infection: fever, diarrhea, coughing, headache, etc.

The syndromic approach, based on using the BIOFIRE® FILMARRAY® multiplex molecular biology system, is especially valuable for this reason.

The BIOFIRE® FILMARRAY® technology delivers results within about 45 to 65 minutes. With a single test, it simultaneously detects, from a single sample, bacteria, viruses, yeast and parasites that may be causing an infectious disease. These tests provide accurate, rapid answers for clinicians, which speeds up the decision-making process and improves patient care. As a pioneer in the syndromic molecular diagnosis of infectious diseases, bioMérieux plans to further expand the BIOFIRE® FILMARRAY® menu.

THE BIOFIRE® FILMARRAY® PANELS COM普ISCE THE LARGEST INFECTIOUS DISEASE PATHOGEN MENU ON THE MARKET:

- **The Respiratory Panel**, a full panel that simultaneously detects 20 respiratory viral and bacterial pathogens, is further advanced by the Respiratory Panel 2 and Respiratory Panel 2 plus, which can simultaneously test for 21 and 22 pathogens.
- **The Pneumonia panel** identifies 33 targets including 18 bacteria, 8 virus and 7 anti-microbial resistant genes. The Pneumonia panel plus identifies the same targets as well as the emerging virus MERS-CoV. These innovative tests give semi-quantitative results.
- **The Respiratory Panel (RP) EZ**, which detects 11 viral and 3 bacterial pathogens associated with respiratory infections, has been CLIA waived by the FDA for use outside traditional clinical laboratories only in the United States.
- **The Blood Culture Identification Panel**, which makes it possible to identify directly from a positive blood culture the 24 pathogens most often associated with bloodstream infections as well as 3 antibiotic resistance genes.
- **The Gastrointestinal Panel**, to identify the 22 most common causes of infectious diarrhea.
- **The Meningitis/Encephalitis Panel**, based on a sample of cerebrospinal fluid, tests for a comprehensive set of 14 bacteria, viruses and yeasts that cause meningitis and encephalitis.

THE SYNDROMIC DIAGNOSIS

MULTIPLE TARGETS WITH A SINGLE TEST

A new approach to infectious disease diagnostics
Innovation without borders

A combination of daring and an open mind that has been handed down from generation to generation, ambitious R&D programs, and top-notch scientists: innovation is an essential part of bioMérieux’s DNA.

To create the diagnostic solutions of tomorrow, the Company has developed an open, multidisciplinary innovation model.

TWO PRIORITIES:
• To enhance the medical value of diagnostics with high clinical value tests that identify and characterize disease agents with growing precision, and deliver faster and increasingly reliable results to support treatment decisions and better patient care.
• To improve lab efficiency and more generally contribute to optimizing laboratories’ operational performance.

FIVE DRIVERS:
• In-house innovation programs.
• International collaborations with academic and private research, the medical and scientific community and cutting-edge biotech companies.
• Joint research laboratories with hospitals, in close proximity to patients.
• Structuring, strategic acquisitions to access new technologies.
• Active scientific and technological watch at the international level.

A PIONEERING AND VISIONARY SPIRIT

1,700 employees involved in R&D

20 R&D centers worldwide

AND 3 JOINT RESEARCH PUBLIC/PRIVATE LABORATORIES

Around 30 patents filed annually

543 patent families in the portfolio
The commitment to improve global public health by fighting against infectious diseases brings with it a unique responsibility, upheld by all the Institut Mérieux companies. As an extension of its public health mission, bioMérieux has always been mindful of the importance of its social responsibility.

A HUMANISTIC CORPORATE OUTLOOK

The Company owes its success first and foremost to its employees. bioMérieux places great importance on ensuring that the working environment fosters the career development of each employee, while also encouraging employees to keep pace with the changing business context.

As a company that believes in its human capital, bioMérieux encourages each employee to behave ethically and with integrity within the Company and in relations with external partners. The Company's employees are passionate about its mission and dedicated to fighting against infectious diseases.

The Company is committed to improving global public health by fighting against infectious diseases. This commitment brings with it a unique responsibility, upheld by all the Institut Mérieux companies. As an extension of its public health mission, bioMérieux has always been mindful of the importance of its social responsibility.

A HUMANISTIC CORPORATE OUTLOOK

The Company owes its success first and foremost to its employees. bioMérieux places great importance on ensuring that the working environment fosters the career development of each employee, while also encouraging employees to keep pace with the changing business context.

As a company that believes in its human capital, bioMérieux encourages each employee to behave ethically and with integrity within the Company and in relations with external partners. The Company's employees are passionate about its mission and dedicated to fighting against infectious diseases.

The commitment to improve global public health by fighting against infectious diseases brings with it a unique responsibility, upheld by all the Institut Mérieux companies. As an extension of its public health mission, bioMérieux has always been mindful of the importance of its social responsibility.

A HUMANISTIC CORPORATE OUTLOOK

The Company owes its success first and foremost to its employees. bioMérieux places great importance on ensuring that the working environment fosters the career development of each employee, while also encouraging employees to keep pace with the changing business context.

As a company that believes in its human capital, bioMérieux encourages each employee to behave ethically and with integrity within the Company and in relations with external partners. The Company's employees are passionate about its mission and dedicated to fighting against infectious diseases.

The commitment to improve global public health by fighting against infectious diseases brings with it a unique responsibility, upheld by all the Institut Mérieux companies. As an extension of its public health mission, bioMérieux has always been mindful of the importance of its social responsibility.
Within the framework of its sponsorship activity, bioMérieux supports the work of the Fondation Mérieux and the Fondation Christophe et Rodolphe Mérieux. Thanks to the support of bioMérieux and other partners, these two independent family foundations focus on the fight against infectious diseases that affect developing countries, in particular by helping them improve their clinical diagnostic capabilities.

- They are active today in close to 30 countries, including: Haiti, Guinea, Mali, Madagascar, Lebanon, Iraq, China, Laos, Cambodia and Bangladesh.
- 13 laboratories built and 32 renovated since 2005. The Rodolphe Mérieux Laboratories of excellence are dedicated to training biologists, diagnosing diseases specific to developing countries and conducting applied research.
- Through the Christophe Mérieux Prize, worth €500,000, the Fondation Christophe et Rodolphe Mérieux encourages research in developing countries. Since it was created in 2007, this prize has been awarded each year to scientists who work in the field to combat diseases devastating their countries.
- In 2017, the Fondation Mérieux, a non-profit foundation, celebrated its 50th anniversary. With its network of laboratories, the foundation’s work is focused on diagnosis, an essential aspect of patient care and an indispensable tool for disease surveillance and control. The Mérieux Foundation works closely with Fondation Christophe et Rodolphe Mérieux, an independent family foundation under the aegis of the Institut de France, sharing the same public health goals.