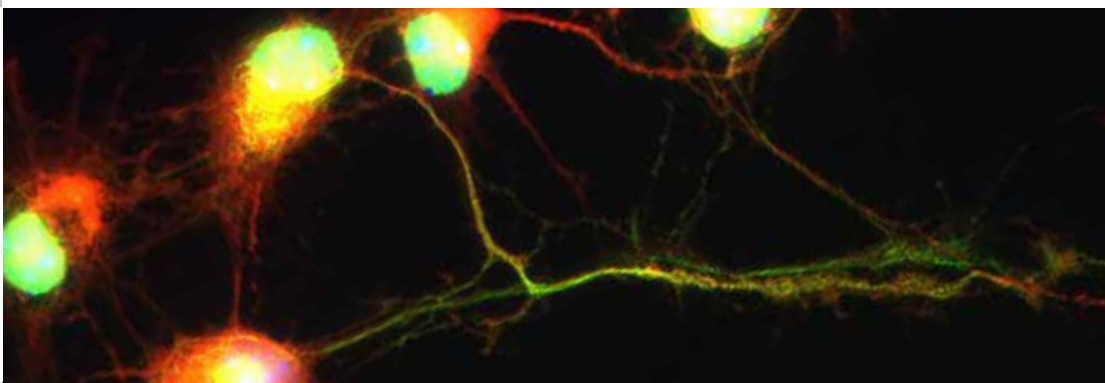




2019/2023



# Strategic Plan



Institut Pasteur



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INSTITUT PASTEUR - 2019-2023 Strategic Plan

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# Contents

---

## INTRODUCTION

**Address the major scientific and health issues facing the world today**

PAGE 1

---

## OUR AMBITION

**Give new impetus to basic research and increase its impact on health challenges**

PAGE 4

---



### THREE PRIORITY SCIENTIFIC AREAS



- Objective 1 / Respond to public health challenges by supporting cross-cutting research topics
- Objective 2 / Provide a favorable technological environment
- Objective 3 / Introduce an organizational structure for scientific activities that reflects our priority areas
- Objective 4 / Develop research applications
- Objective 5 / Increase the impact of research on health
- Objective 6 / Develop teaching programs in line with scientific priorities
- Objective 7 / Strengthen national partnerships to boost the Institut Pasteur's scientific excellence
- Objective 8 / Pursue the ongoing improvements to the Institut Pasteur campus

---

## 4 CROSS-CUTTING PRIORITIES TO SUPPORT OUR AMBITION

---

### PRIORITY 1

## Strengthen the Institut Pasteur International Network and implement a proactive policy of international partnerships

PAGE 26

---

- Objective 1 / Structure and strengthen relationships with the International Network on the basis of shared scientific ambitions
- Objective 2 / Build the Network's influence by working towards a more structured governance framework and business model
- Objective 3 / Increase the Institut Pasteur's attractiveness at international level

### PRIORITY 2

## Promote creativity and openness to society

PAGE 36

---

- Objective 1 / Improve monitoring of scientific and technical developments so as to anticipate emerging issues
- Objective 2 / Identify working methods that encourage creativity
- Objective 3 / Facilitate the emergence of new talent
- Objective 4 / Continue to strengthen the Institut Pasteur's visibility and reputation by fostering a contemporary image
- Objective 5 / Promote open access to publications and research data
- Objective 6 / Develop interactions between the Institut Pasteur and civil society

### PRIORITY 3

## Work more effectively together and empower each individual so as to create an attractive, collaborative working environment

PAGE 46

---

- Objective 1 / Look to the future, adapt to our environment and work together to make any changes needed
- Objective 2 / Improve the quality of working life
- Objective 3 / Promote gender equality and especially improve the representation of women in senior scientific positions
- Objective 4 / Cultivate a reflective attitude and guarantee compliance with principles in the areas of ethics, scientific integrity and professional conduct

### PRIORITY 4

## Develop financial resources to strengthen the Institut Pasteur and ensure its long-term sustainability

PAGE 56

---

- Objective 1 / Boost industry partnerships
- Objective 2 / Capitalize on the Institut Pasteur's institutional brand to foster public generosity
- Objective 3 / Encourage the success of Institut Pasteur scientists in calls for proposals
- Objective 4 / Optimize expenses
- Objective 5 / Guarantee good resource management and effective governance
- Objective 6 / Use advocacy initiatives to boost research funding



## INTRODUCTION

**Address the major scientific  
and health issues facing  
the world today**

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**T**he Institut Pasteur is ideally placed to successfully pursue its primary missions of research, public health, education and the identification of research applications. Its many strengths include the outstanding quality of its staff, the excellence of its research and infrastructures, and the enormous potential of the Institut Pasteur International Network.

The 2014-2018 strategic plan was an ambitious program designed to boost the Institut Pasteur's research through a wide-ranging policy of investment and recruitment. It led to the creation of new research groups and a bioinformatics center with global reach, extensive investment in technology (genomics, nuclear magnetic resonance, nanoimaging, etc.) and continued improvements to the Institut Pasteur campus. The plan represented a key milestone in the Institut Pasteur's ongoing transformation. But the growth in resources required to fund these developments was not achieved, and a first vital step will therefore be to restore financial balance.

As it looks to the future, the Institut Pasteur continues to face major challenges. These include:

- the development of scientific competition from countries that are emerging as new research forces;
- a shift in age distribution as a result of the upcoming retirement of some scientists in leadership positions;
- the need to continue the campus improvement program;
- the cost of unavoidable technological investment.

Rising to these challenges and positioning the Institut Pasteur as one of the 21st century's leading international institutions for biomedical research, on a par with The Rockefeller University and the Weizmann Institute, means implementing a strategic plan that is both ambitious and realistic, that builds on our strengths and specific characteristics while acknowledging the development of international competition and our changing environment.

Our ambition is to give new impetus to basic research and to increase the impact of this research on health challenges. We will draw on four cross-cutting priorities that will be broken down into specific objectives and joint projects involving the entire campus:

1. To strengthen the Institut Pasteur International Network and implement a proactive policy of international partnerships.
2. To promote creativity and openness to society.
3. To work more effectively together and empower each individual so as to create an attractive, collaborative working environment.
4. To develop financial resources to strengthen the Institut Pasteur and ensure its long-term sustainability.

This plan combines a research policy and organizational framework that will enable the Institut Pasteur to address the major scientific and health issues facing the world today, as well as a strategy to consolidate its financial structure, balance its accounts and provide it with the resources it needs to fund ongoing developments and investments in the future. This will require a rigorous and effective approach to management, a concerted policy to encourage public donations, appropriate use of borrowing and proactive efforts to secure industry partnerships and research contracts.

Within the French landscape, the Institut Pasteur is a central player in the national research and innovation strategy, in partnership with the country's major research organizations (primarily the CNRS and Inserm) and universities. Identifying joint research priorities with these institutions is vital in order to strengthen these partnerships. Similarly, at international level, the Institut Pasteur has collaborative research partnerships which it is keen to develop by working with the institutions concerned.

At a time of rapid and dramatic changes in scientific knowledge and methods that is also characterized by the emergence of new health threats, it is vital for the Institut Pasteur to clarify and reaffirm its priorities

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and strategic focus for the short, medium and long term. Biomedical research is facing major challenges in the 21st century, including the emergence of new epidemics, the development of resistance to anti-infective agents, health conditions associated with increased life expectancy, the constant rise in cancer incidence, global warming, and globalization with all its implications.

The Institut Pasteur is determined to maintain its scientific excellence and develop technologies to improve understanding of the complexity of biological systems. Technological progress is opening up innovative research fields that will pave the way for new treatment possibilities tailored to the environment and needs of local populations, as part of a broader approach to healthcare. The aim of our research is to improve human health both directly, through medical intervention, and indirectly, by strengthening our knowledge and expertise.

The Institut Pasteur's scientific strategy involves three priorities:

- tackling emerging infectious diseases;
- identifying innovative approaches to combat antimicrobial resistance;
- elucidating and tackling conditions that affect brain connectivity and neurodegenerative diseases.

This limited number of scientific priorities will enable the Institut Pasteur to devote significant resources to them, while maintaining its commitment in the other research areas in which it excels. In organizational terms, our philosophy will remain focused on promoting multidisciplinary and interdisciplinarity, encouraging the development of young scientific leaders and strengthening links between the research teams at the Institut Pasteur and in the Institut Pasteur International Network.

Given the significant increase in the number of research teams over the past four years and the revitalization of certain research areas, the Institut Pasteur now needs to set objectives for the development

of its Paris campus. This is crucial to guarantee that all teams have the facilities they need to achieve excellence.

By encouraging mobility both internally and among partner research institutes in connection with ambitious projects, the Institut Pasteur will strengthen its links with the French higher education and research ecosystem. As one of the key components of a human resources policy designed to meet research needs, this focus on mobility will also help improve the quality of working life. An active policy to promote women's access to positions of scientific responsibility will be pursued.

When it comes to the organization of scientific research at the Institut Pasteur, the sphere of activity of the scientific departments will be adjusted to better reflect current scientific realities and priorities. The Institut Pasteur will encourage its research units to keep to an average size of twelve employees, working on a small number of well-defined scientific questions, to foster a dynamic atmosphere and optimize efficacy and flexibility. The Institut Pasteur intends to shift the organization of its scientific structures to a more decentralized approach, giving departments more room for maneuver in terms of financial and human resources management.

To maintain its position at the forefront of science, the Institut Pasteur also needs to strengthen investment in its technological platforms, thereby boosting the attractiveness of scientific positions. This investment plan will involve pooling the facilities available at the Institut Pasteur and potentially also with partner establishments.

Scientific priorities will also be set within the Institut Pasteur International Network, with the aim of boosting its impact. The Institut Pasteur will strengthen its links with the other institutes in the Network, especially by promoting staff mobility and setting up joint international units and four-year groups (G4s) designed to launch the careers of promising junior scientists.



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In terms of education, the Institut Pasteur will develop its activities in cooperation with higher education and research establishments in the Greater Paris region, focusing particularly on innovative, recognized teaching programs, without trying to take the place of schools and universities. Training in and through research needs to be reaffirmed as the central priority. The Institut Pasteur's educational programs should attract outstanding PhD students by offering an appealing framework to train future scientists.

Human health is central to the Institut Pasteur's work. We will therefore pursue our public health missions and our activities in the area of vaccinology, remaining faithful to our original vocation. The aim is to foster the cross-fertilization of research and public health activities. Developing research projects in the field of human health means strengthening the Institut Pasteur's links with the clinical community.

The development of research applications is a key component of our scientific strategy. As Louis Pasteur once said: "There are science and the applications of science, bound together as the fruit of the tree which bears it." Basic research leads to the identification of new mechanisms and new approaches in terms of prevention and treatment. We will actively encourage the engagement of the entire campus through a policy linking basic research and research applications.

It is vital to maintain an ongoing dialog with industry to fund innovative research and boost our understanding of the industrial environment. The Institut Pasteur is therefore committed to fostering further collaboration in biotechnology and creating industrial research chairs and joint incentive programs with industry partners. Earmarking further resources for the transfer of technologies developed at the Institut Pasteur and for industrial partnerships is crucial in order to speed up the commercialization of the most promising inventions and ultimately yield a return on investment.

The Institut Pasteur will pursue its missions to improve human health, continuing to apply the

"Pasteurian" model of open, interdisciplinary research that involves a broad approach to health issues. Our values of humanitarianism, universalism, perseverance and the transmission of knowledge, handed down by Louis Pasteur and his students, have underpinned our development for the past 130 years and will continue to drive us for the next five.



OUR **AMBITION**

**Give new impetus to  
basic research and increase  
its impact on health challenges**

## OBJECTIVES

1

Respond to public health challenges by supporting cross-cutting research topics

2

Provide a favorable technological environment

3

Introduce an organizational structure for scientific activities that reflects our priority areas

4

Develop research applications

5

Increase the impact of research on health

6

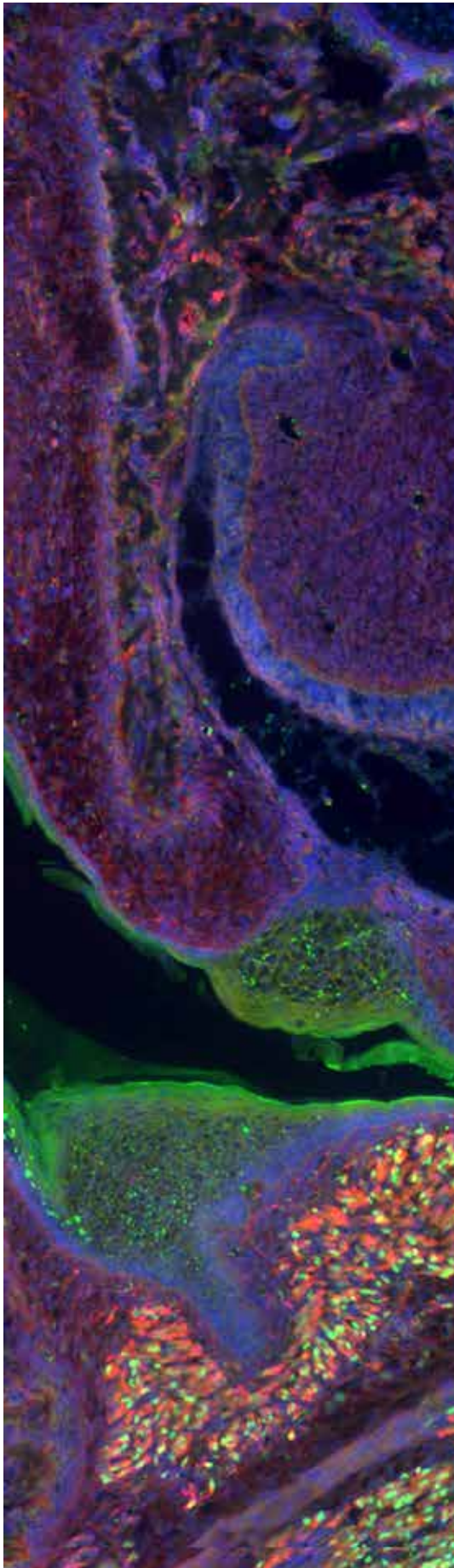
Develop teaching programs in line with scientific priorities

7

Strengthen national partnerships to boost the Institut Pasteur's scientific excellence

8

Pursue the ongoing improvements to the Institut Pasteur campus



The generation of new knowledge is central to our activities and results in progress in many areas with a potential impact on human health. To detect, prevent and cure diseases, it is vital to understand the incredibly complex dynamics of living systems.

Today's integrative biology is based on technological and conceptual advances requiring an interdisciplinary approach that analyzes living systems at every level. The increasing complexity of analytical and imaging data relies on the vital input of computational science. Alongside the traditional scientific approach, which involves conducting experiments to answer specific questions, the study of big data, as produced by sophisticated equipment and large-scale cohorts, is paving the way for new techniques to observe and analyze complex phenomena with the aim of testing and applying novel hypotheses – while taking care to avoid introducing bias by the choices made in terms of measurements and data.

The Institut Pasteur is constantly updating its technological infrastructure, as demonstrated by the recent installation of equipment for high-throughput sequencing, single-cell analysis and high-resolution cryo-electron microscopy. We have also strengthened our expertise by recruiting many bioinformatics engineers, computer scientists and statisticians and significantly boosting our data processing and storage capabilities.

The Institut Pasteur plays a key role within the French scientific landscape, where it works closely with various institutions, including the CNRS, Inserm, Inra, a number of hospitals in the Paris Public Hospital Network (AP-HP), universities (including Paris Descartes and Paris Diderot), Cnam, Inria, the Ecole Polytechnique, the Military Health Department (SSA), the ENS, the Institut Curie, the CEA and the ESCPI. The Institut Pasteur also enjoys a strong international presence through the Institut Pasteur International Network and partnerships with various research institutes abroad.

The research activities carried out by the Institut Pasteur's 136 units stem from a wide range of interconnected fields including microbiology, immunology, genomics, structural and cell biology, developmental and stem cell biology, neuroscience, chemistry and clinical research. These research fields cover a variety of complementary topics.



### **From molecules to cells and living organisms**

We analyze the molecular and cellular basis underpinning the workings of living organisms, in both physiological and adverse conditions. Interdisciplinary teams investigate how the information encoded in the genome determines cell function. We examine the organization of nanomachines and other cell structures, the mechanisms of cell division, differentiation, migration and communication, the function of stem cells, organogenesis, and the workings of the immune system and the brain. Our research programs, which range from single molecules to entire organisms, reveal the disease mechanisms underlying infection, cancer, inflammation, aging and developmental defects. This field involves several novel experimental systems including the use of organoids and “organs-on-chips”, induced pluripotent cells, new animal models and analysis of samples from healthy individuals and patients.

### **Microbes and hosts**

We investigate the mechanisms that govern interactions between pathogenic or commensal microbes and their hosts. Viruses, bacteria, fungi, parasites and archaea are studied either in isolation or in their natural environment. The main focus is on the proliferation and spread of microbes, regulatory mechanisms, metabolism, microbial components and forms, toxins, virulence determinants, evasion strategies and synthetic biology. The interface between microbes and their hosts extends from molecular structures at atomic level to whole-body analysis. We examine microbial communities (microbiota, biofilms, mycobiota, etc.) in various tissues and ecosystems. We draw on multiple-species molecular microbiology techniques to elucidate the links between commensal organisms, pathogens and their hosts. We are stepping up our research on the role of the microbiome in human health, aging, cancer and neurodegenerative diseases. Understanding the interactions between microbes and host immunity provides the basis for developing innovative therapeutic and prophylactic strategies.

### **Cancer**

Research on cancer at the Institut Pasteur covers a wide range of basic and applied research questions. Our basic research includes the genetic, epigenetic, molecular and cellular mechanisms involved in tumorigenesis, the relations between the immune system and cancer cells, bacteria and oncogenic viruses, the microenvironment involved in tumor development, and tumor stem cells. We are also interested in how aging, inflammation, infections and the microbiome influence cancer development. In terms of applied research, we are developing diagnostic tools and original preventive and therapeutic approaches.

### **An integrative vision of health and disease: individuals and populations**

To shed light on infectious and chronic diseases, it is important to take into account the immense variability observed at the individual level between microbes, cells, humans and populations. We analyze how susceptibility to diseases and immune responses vary in populations, and dissect the causes and consequences of this variability. We model biological systems and host responses to pathological processes. We use techniques for gathering and storing big data and effective analysis methods, including artificial intelligence. By combining the expertise of researchers in biology and medicine with the know-how of mathematicians, chemists and physicists, we can develop a quantitative understanding of human diseases. This enables us to predict the emergence of diseases, anticipate their treatment and lay the foundations for precision medicine.

Over the next five years, we will pursue our multidisciplinary basic research in life sciences based around these fields, which form the foundation of our scientific activities. We have also identified three research priorities that reflect some of the most alarming public health challenges we are currently facing. We will focus our efforts on emerging infectious diseases, antimicrobial resistance, and brain connectivity and neurodegenerative diseases. Our aim is to turn the knowledge acquired into health applications.



## OBJECTIVE 1

# Respond to public health challenges by supporting cross-cutting research topics

It is imperative that the Institut Pasteur leverages its extensive basic research portfolio to address the most pressing global health challenges. We have set specific goals that represent a coherent yet flexible approach. We have identified the following three areas.

### **Emerging infectious diseases.**

Emerging infectious diseases are increasing at an alarming rate at a global level, claiming 10 million lives every year. In the developing world, they account for 90% of avoidable mortality, are responsible for significant morbidity (expressed as disability-adjusted life years, or DALYs) and generate significant financial losses owing to patients' inability to work. In our increasingly globalized world, emerging infectious diseases respect no borders, causing economic disruption and immeasurable suffering. The impact of human activities on the environment and climate change will continue to drive the emergence of new pandemic threats.

### **Antimicrobial resistance.**

The global rise in antimicrobial resistance means that we are at risk of heading towards a post-antibiotic era, where common infections once again become life threatening. This dire prediction has raised awareness at the highest levels, including the United Nations and the G20. Therapy escape and the need

for more effective treatments are not restricted to bacteria; they concern all microorganisms (viruses, fungi and parasites) and their vectors. Challenges include the emergence of resistance of the malaria parasite *Plasmodium falciparum* to artemisinin, the most effective treatment, and mosquitoes' ability to change their behavior to counter insecticides.

### **Brain connectivity and neurodegenerative diseases.**

Mental and neurological disorders represent a significant health burden in high-income countries (25% of DALYs). Neurodevelopmental disorders can first be observed in late pregnancy or early childhood, and can last throughout the individual's lifetime. In France, the economic burden of autism is €1.4 billion each year. Higher life expectancy has also increased the prevalence of age-related disorders. For example, 100 million people worldwide will suffer from Alzheimer's disease by 2050. The spread of Alzheimer's, Parkinson's and other neurodegenerative and brain diseases requires novel research efforts.

## > Area 1

### Emerging infectious diseases

Ever since its very early days, the Institut Pasteur has been committed to tackling emerging infections, and its work has left an extraordinary legacy. Many emerging infectious diseases are zoonoses, in which a zoonotic (animal) pathogen has crossed the species barrier to cause disease in humans. We focus on the disease mechanisms of pandemic and (re)emerging viruses (HIV, HCV, influenza, chikungunya, dengue, Zika and hemorrhagic fever viruses, etc.), bacteria (*Neisseria meningitidis*, *Salmonella* spp., *Vibrio cholerae*, *Leptospira* and, more recently, *Yersinia pestis*, etc.) and parasites (*Plasmodium falciparum*, *P. vivax*, *Leishmania*, *Trypanosoma*, etc.). Research on insects and other vectors is a priority area for investigation. Novel approaches such as modeling and artificial intelligence will be applied to study and predict pathogen structure and function, establish diagnoses, identify therapeutic and immunological targets, and anticipate infection outcomes. Our aims are:

1. To analyze the diversity/complexity of hosts when they come into contact with microbes in order to improve understanding of host susceptibility, especially depending on age, and the role of the microbiota.
2. To understand host-microbe interactions, shed light on growth, structure, metabolism, species barriers and transmission of infectious agents, and identify novel targets for diagnosis, vaccination and treatment.
3. To study the biology of vectors and their roles in the emergence of infection. Basic and applied vector research will particularly investigate host-vector-pathogen interactions, the development of environmentally friendly, safe control strategies, and the impact of the microbiota on arthropod vector capacity.
4. To explore the microbial diversity/complexity of emerging diseases in terms of early detection and diagnosis, as well as clinical and societal impacts.

## > Area 2

### Antimicrobial resistance

We will step up our research on antimicrobial resistance by incorporating clinical and field data within molecular, genetic and physiological approaches. We will implement antimicrobial discovery programs in conjunction with interested partner institutes. Our aims are:

1. To improve understanding of resistance by combining approaches involving epidemiology, genomics, statistics and modeling to identify factors

## MEASURES

1. Recruit at least two five-year research groups (G5s)/research units.
2. Propose research funding that encourages novel synergistic approaches for the development of responsible strategies to detect and tackle disease outbreaks.
3. Build a state-of-the-art insectarium for vector research.
4. Strengthen the capabilities of the Institut Pasteur International Network by improving interactions between centers for human and veterinary medicine, epidemiologists and microbiologists, and by exchanging data.
5. Coordinate training on emerging infectious diseases between the Institut Pasteur and the International Network.
6. Strengthen our impact in vaccinology by pooling the wide-ranging expertise at the Institut Pasteur.
7. Set up an infrastructure for the identification and development of human monoclonal antibodies for research and therapeutic purposes.
8. Devise a genomic taxonomy of microbial strains.
9. Overhaul the microorganism collection.
10. Engage the legal and administrative departments to create “ready-to-use” processes to accelerate research, treatment and prevention.

contributing to the spread of resistant strains.

2. To analyze the physiology, ecology and evolution of microorganisms. We will investigate the molecular mechanisms governing microbial growth, metabolism and acquisition of resistance. The complex interactions between the host and communities of microorganisms need to be taken into account to understand resistance. We will further analyze the formation of complex structures (e.g. biofilms) and the processes of quiescence, bacterial dormancy, viral latency,

persistence and tolerance, which represent additional means of antimicrobial escape.

**3.** To identify new drugs and therapeutic strategies in response to antimicrobial resistance. We will step up our screening of chemical libraries to identify selective inhibitors, our work on phage therapy and our exploration of diverse environments to find new natural products. These inhibitors will be used in single-cell analysis. We will develop novel vaccines and immunotherapies to target microbes and resistant strains.

## MEASURES

1. Recruit two five-year research groups (G5s)/ research units.
2. Propose research funding that encourages novel synergistic approaches for the development of new treatments and alternative strategies to tackle infections.
3. Adopt metabolomics analysis techniques to examine microbes and their hosts.
4. Build a collaborative network of clinicians and public health experts.
5. Involve research units in the International Network in research on resistance.
6. Foster public-private partnerships for diagnostics and antimicrobial development.

### > Area 3

#### Brain connectivity and neurodegenerative diseases

We leverage the wide-ranging basic research expertise at the Institut Pasteur in the fields of neuroscience, genetics, cell and developmental biology, immunology, microbiology and infection biology to improve our understanding of the complexity of brain function. Our projects focus on sensory deficits (deafness), neurodevelopmental disorders (autism) and psychiatric disorders (mood disorders and addiction), neurodegenerative diseases (Alzheimer's and Parkinson's diseases) and other neurological conditions (sepsis and neurovascular disorders). Our cell biology research looks at the interneuronal transmission of misfolded proteins and the molecular mechanisms underpinning neurodegeneration. These conditions associated with brain connectivity are the result of damage to the brain's neural network and to links between the brain and other organs.

We will boost cooperation between the various teams on campus working on these topics to optimize and improve the visibility of our multidisciplinary approach. We will intensify research programs on neuroinflammation and the impact of microbes and the microbiota on brain function and neurodegeneration. We will combine genome and cell analysis, innovative microscopy techniques, approaches involving intact neural and artificial networks, integrative data analysis and stem cell analysis with behavioral research and intravital physiology in animal models and

humans. We will promote the translation of discoveries into (hardware- and software-based) diagnostic and therapeutic strategies.

## MEASURES

1. Recruit two five-year research groups (G5s)/ research units.
2. Propose research funding that encourages novel synergistic approaches involving neuroscience and other disciplines, with a view to developing diagnostic and therapeutic strategies.
3. Support the creation of the Hearing Institute (Institut de l'Audition).
4. Foster a partnership with the Brain and Spinal Cord Institute (Institut du Cerveau et de la Moelle Epinière).
5. Step up support for the infrastructure of the European Autism Innovative Medicine Studies-2-Trials (AIMS-2-TRIALS) consortium, in connection with the Innovative Medicines Initiative (IMI).
6. Strengthen and enhance imaging, behavioral research and prototyping facilities.





## OBJECTIVE 2

# Provide a favorable technological environment

The Institut Pasteur has set up a Center for Technological Resources and Research (C2RT) for its main technological facilities, with the aim of promoting the sharing of equipment and techniques and encouraging new technological and methodological developments. Scientists have access to state-of-the-art equipment. Technological research is supported by a dedicated TechLab. In parallel, the Center for Animal Resources and Research (C2RA) offers an infrastructure for *in vivo* analysis of biological processes and validation of preventive and therapeutic approaches using animal testing, in strict compliance with applicable procedures.

Processing multi-omics data and incorporating these data into predictive models requires the wide-ranging skills and vital input of the Information Systems Department (DSI) and the Center for Bioinformatics, Biostatistics and Integrative Biology (C3BI). We will strengthen our expertise in artificial intelligence so that we can analyze and interpret the vast quantities of data generated by our teams and our external partners. Our six priorities for state-of-the-art technological development will enable us to:

- perform imaging of living systems, from molecules to organisms;
- explore the metabolome, a new frontier in understanding biological systems;
- expand our capacities for single-cell analysis;

- provide an environment for the comprehensive study of vector-borne diseases;
- identify novel diagnostic and therapeutic approaches;
- enhance data management and collaboration at global level.

The investment plan needs to go hand in hand with a new approach to human resources management that involves boosting the attractiveness of scientific positions in technological platforms.

## MEASURES

1. Expand our nanoimaging initiative by acquiring additional electron microscopes to optimize our use of the Titan Krios™ for atomic resolution *in vitro* or *in cellulo* protein imaging.
2. Develop optical imaging methods for the multi-scale study of host-pathogen interactions: light sheet fluorescence microscopy, planar/cross-sectional imaging





microscopy, magnetic resonance imaging, super-resolution microscopy, etc.

- 3.** Optimize our crystallography, nuclear magnetic resonance (NMR), hydrogen exchange mass spectrometry and biophysics facilities to strengthen our expertise in structural biology.
- 4.** Enhance our data analysis and artificial intelligence capabilities by developing an effective strategy, recruiting research teams and fostering cooperation with external partners.
- 5.** Set up a metabolomics platform and/or research unit to provide a shared infrastructure and pool our expertise in sample preparation and analysis using mass spectrometry and NMR.
- 6.** Develop new single-cell analysis pipelines for transcriptomes, proteomes, metabolomes and other components of the host and microbes.
- 7.** Develop image analysis capabilities for complex samples so as to provide network maps at single-cell resolution.

- 8.** Establish a new infrastructure for simultaneous analysis of the host, the vector and the pathogen under biosafety level 3 containment conditions (animal facility, insectarium, imaging capabilities).
- 9.** Boost our ability to identify novel diagnostic and therapeutic solutions: high-content imaging, organ-on-a-chip, microfluidics, miniaturization, point-of-care testing, etc.
- 10.** Develop high-throughput approaches for antibody identification and production.
- 11.** Implement shared electronic data collection and analysis methods (Electronic Lab Notebooks (ELNs) and Laboratory Information Management Systems (LIMS)).
- 12.** Boost internal resources for computing, storage and networking, and develop partnerships with cloud solution providers.





## OBJECTIVE 3

# Introduce an organizational structure for scientific activities that reflects our priority areas

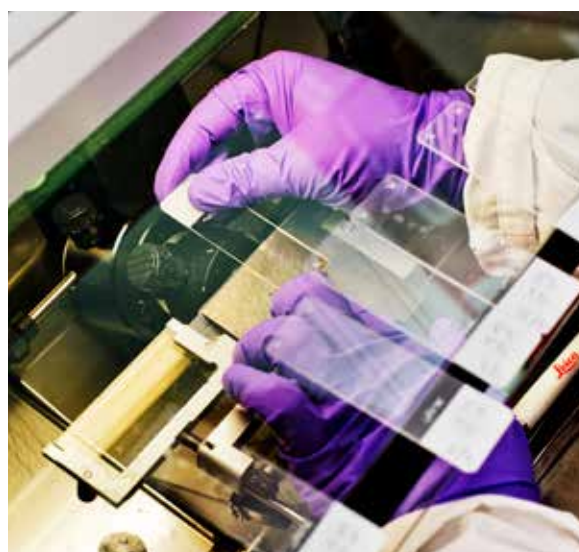
Our aim is to create a dozen new G5s/ research units as part of a process of campus development.<sup>1</sup> Half of the new staff will be recruited by open calls for applications to attract younger biomedical researchers and the other half in response to our three scientific priorities. We will also give new responsibilities to some of our current scientists by setting up a number of U5s (medium-sized, 5-year units).

These new units/G5s will continue the process to revitalize research that the Institut Pasteur embarked on with its 2014-2018 strategic plan. They will reflect a new approach to the organization of the Institut Pasteur's scientific activities that is inspired by the best international practices.

We will adjust the sphere of activity of the Institut Pasteur's departments and centers so that they are more closely in line with current scientific realities and can enable us to achieve our strategic priorities.

The Institut Pasteur will encourage its units to keep to an average size of twelve employees, working on a small number of well-defined scientific questions, to optimize efficacy and organizational flexibility.

The Institut Pasteur intends to shift the organization of its scientific structures to a more decentralized approach, giving departments more room for maneuver in terms of financial and human resources management.



<sup>1</sup> / Over the next five years, about 20 units will close because of the retirement of their PIs. The 23 G5s on campus will come to the end of their term and most of them will apply to become units.



## OBJECTIVE 4

# Develop research applications

**B**asic research and its applications are two links in the same innovation chain that enable us to respond to the challenges facing public health. Research applications have been a cornerstone of the Institut Pasteur's reputation and success since its early days, and they have also been instrumental in providing funding and supporting research.

### **Make developing research applications a key focus of scientific policy.**

Building on the momentum generated by the 2014-2018 strategic plan, it is important to make the development of research applications a central focus of the Institut Pasteur's scientific policy. Drawing on its basic research, which alone can provide new knowledge about the living world and new methods for tackling disease, the Institut Pasteur intends to make developing research applications a key component of its scientific policy once again.

The three scientific priorities set out above will be particularly affected by this new focus, and specific resources will be allocated for this purpose. Dialog will be initiated with assessment bodies to ensure that more emphasis is placed on scientists' activities in this area in individual and unit assessments.

A Consultative Innovation Committee (CCI) composed of scientists from the Institut Pasteur and the departments concerned was set up in late 2018. The CCI will be involved in the various stages of

the development process for research applications: identifying and protecting innovations, assessing financial requirements, discussing the potential of transferring applications to industry, and business development.

Business development correspondents will be appointed in the departments and centers to liaise with the Department of Scientific Affairs and the Research Applications and Industrial Relations Department (DARRI).

### **Early identification and support for innovation acceleration.**

By maintaining a detailed knowledge of all its research projects, the Institut Pasteur will be well positioned to identify any potential applications at an early stage.

Any projects identified in this area will be given individual support to speed up the innovation chain, either by transferring technology to an industry partner or by spinning off a start-up company.

### **Contribute to funding innovation.**

The Institut Pasteur will identify funding opportunities that will enable the development of financial incentives over the various development phases of a project.

### **Boost the creation of start-up companies.**

After a strong development phase in the early 2000s, the creation of Institut Pasteur spin-offs has slowed down, especially following the closure of the incubator on campus.

A number of measures have been taken this year to boost the creation of start-ups. They will be stepped up throughout the implementation period of the strategic plan.

- Adopting clear rules governing the participation of Institut Pasteur scientists in company start-up or consultancy activity (in line with the revised Allègre Act).
- Partnering with existing incubators to support scientists from the upstream phase (lab work) right through to company creation (incubation).
- Raising awareness among scientists, students and post-doctoral fellows, engineers and technicians about company start-up.
- Working in partnership to develop training programs for company start-up.

## MEASURES

- 1.** Foster closer cross-disciplinary involvement in the development of research applications among scientists on campus and all relevant stakeholders.
- 2.** Set up a Consultative Innovation Committee and appoint business development correspondents in the departments and centers.
- 3.** Pursue a more proactive policy to detect and support innovative projects.
- 4.** Identify innovative solutions to get external stakeholders (investment funds, industry partners, Bpifrance investment bank, etc.) involved in all stages of the innovation process, especially the upstream phase (proof of concept).
- 5.** Support start-up projects before they get off the ground.
- 6.** Develop partnerships with incubators so that they can take over as soon as start-ups reach setup phase.





## OBJECTIVE 5

# Increase the impact of research on health

Public health is one of the Institut Pasteur's primary missions. Basic and biomedical scientific research are closely linked and mutually enriching. Biomedical activities include monitoring and epidemiological research, as well as translational and clinical research, for example the development of new diagnostic tests, vaccines and innovative therapies. Tackling current health challenges requires a comprehensive, innovative, cross-cutting and collaborative scientific approach. The Institut Pasteur draws on the National Reference Centers (CNRs) and WHO Collaborating Centers (WHOCCs), the Center for Translational Science, the collections and PIBnet, the Medical Center and the Institut Pasteur International Network. It also offers relevant training in public health, in particular with the Institut Pasteur/ Conservatoire National des Arts et Métiers (Cnam) School of Public Health.

### **Translational and clinical research**

The Institut Pasteur has always had a biomedical vocation – and nowadays the traditional separation between basic and medical research is no longer relevant, since biology and medicine have become so closely intertwined in terms of the scientific and medical issues they raise and attempt to address. Any major scientific discovery now has a medical impact, and any medical breakthrough has a scientific dimension.

So it is vital for the Institut Pasteur that the excellence which characterizes its work should apply not only to the “basic” research it carries out, but also to the vital biomedical dimension of its activities. The Institut Pasteur will only be in a position to ask the right scientific questions based on medical observations, to reap the full scientific and medical benefits of its research, to take part in major collaborative projects with a biomedical dimension at national, European and international level, to foster fruitful relations with major global pharmaceutical laboratories, and finally to benefit from ad hoc funding in this area if the biomedical research carried out at the Institut Pasteur and in the International Network is seen as a spearhead of its activities.

The 2014-2018 strategic plan led to the creation of the Center for Translational Science (CRT), which reflects this ambition. The Center provides integrated support to scientists at the Institut Pasteur and to clinicians at hospitals in Paris and abroad who are looking to undertake a project. The CRT offers methodological, ethical, regulatory, operational and technological support for translational research projects carried out by the Institut Pasteur's scientists. Cooperation with patient associations and healthy volunteers has also been stepped up.

However, the Institut Pasteur has neither the vocation (since it does not have a hospital structure of its own)

nor the critical mass of clinical projects to maintain an infrastructure identical to those in teaching hospitals. So it is crucial to strengthen existing partnerships with teaching hospitals, since this represents their core activity. It is also important for the Institut Pasteur to develop close links with Inserm and to synergize with this institution. Fostering solid contacts with Santé publique France is equally vital. At a global level, it is essential for the Institut Pasteur and the International Network to benefit fully from potential synergies with international institutions and NGOs involved in public health (WHO, corporate and philanthropic foundations, and funding bodies).



## MEASURES

1. Facilitate access to samples and clinical data for the Institut Pasteur's scientists by offering an effective, rapid support service.
2. Strengthen ties with hospitals, especially Necker-Enfants Malades Hospital, and with the Institut Imagine and the Brain and Spinal Cord Institute.
3. Enhance dialog between scientific and medical stakeholders by pursuing the following activities:
  - scientific events;
  - discussions between institutions such as the Paris Public Hospital Network (AP-HP), Inserm, the ANRS and the IRD to determine shared priorities and tools to be developed and to establish a framework for access to patient cohorts and technological platforms and links with the International Network;
  - hosting doctors who carry out biomedical research (dedicated positions, partnership contracts, joint units, etc.).
4. Develop translational projects in line with scientific priorities (infectious, neurological and chronic diseases), in association with LabEx laboratories, especially "Milieu Intérieur".
5. Bring together and pool strengths in the area of vaccinology by involving immunologists, microbiologists, epidemiologists and vaccine specialists, the Cochin-Pasteur Vaccinology Clinical Investigation Center (CIC) and the International Vaccination Center (CVI) at the Institut Pasteur Medical Center.
6. Promote research in immunotherapy and the development of new monoclonal antibodies.
7. Review the current organizational structure (CRT and Medical Affairs Department) and bring it into line with the ambitions laid down in the strategic plan.

### National Reference Centers and WHO Collaborating Centers

The Institut Pasteur houses 14 of the 39 National Reference Centers (CNRs)<sup>2</sup> set up under the aegis of the French Ministry of Health and managed by Santé publique France (SpF), as well as 6 WHO Collaborating Centers (WHOCCs). Four CNR-associated laboratories are based at the Institut Pasteur in French Guiana. The Institut Pasteur also houses the Laboratory for Urgent Response to Biological Threats (CIBU), which is on constant standby to deal with any microbiological safety emergencies (any pathogens, whether or not they have been identified). The CIBU carries out its tasks in association with the French General Directorate of Health (DGS).

The CNRs' missions, laid down by the government, mainly involve:

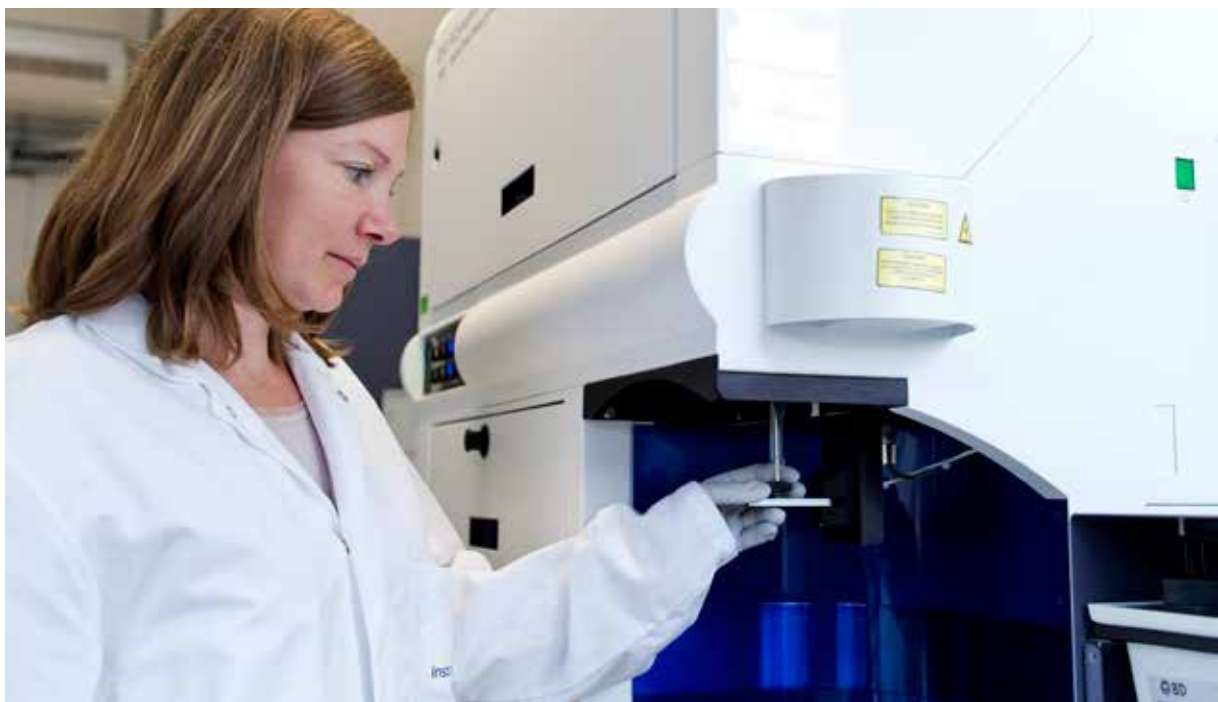
- Diagnosis and microbiological expertise;
- Advising healthcare professionals and authorities;
- Contributing to epidemiological surveillance;
- Contributing to the alert system.

The CNRs' activities, highly visible to the general public during major health crises, rely on the expertise of the Institut Pasteur's scientists and its ability to transfer its innovative scientific and technological research to the field of public health.

<sup>2</sup> / List of the 14 CNRs hosted at the Institut Pasteur: Anaerobic bacteria and botulism; Corynebacteria of the diphtheriae complex; *Escherichia coli*, *Shigella*, *Salmonella*; Hantaviruses; Invasive mycoses and antifungals; Leptospirosis; *Listeria*; Meningococci and *Haemophilus influenzae*; Plague and other *Yersinia* infections; Rabies; Respiratory viruses (including influenza); Vibrios and cholera; Viral hemorrhagic fevers (Lyon); Whooping cough and other *Bordetella* infections.

## MEASURES

1. Step up links between the diagnostics activities of National Reference Centers and the basic research carried out in the research units.
2. Continue raising awareness of these activities among the general public.
3. Reflect on how the organizational setup and business model of CNRs should develop in line with the development of the Institut Pasteur's service platforms.
4. Share the experience of the Institut Pasteur's sequencing platform dedicated to public health (P2M) with health authorities so as to consolidate this model and make it a pilot for similar structures at national and international level.
5. Boost research potential by applying to host CNRs for the next term (from 2022) in areas related to the Institut Pasteur's strategic priorities.





## PIBnet

The aim of PIBnet (the Pasteur International Bioresources Network) is to organize and promote the Institut Pasteur's biological collections (biological strains and samples), both in France in conjunction with the CNRs, and in the institutes in the International Network.

In France, with more than 18,000 sequences performed in 2017, the shared microbiology platform (P2M) is now a vital tool for the effective operation of our reference laboratories. P2M operates on a virtually industrial level and offers significant added value in terms of public health – as confirmed by the authorities, which have incorporated its activities into the CNR funding model.

Several institutes in the International Network are already making use of the P2M platform to sequence some of their samples of interest in the field of public health. The joint efforts invested in recent years to optimize the use of these collections will be supplemented by a dedicated e-learning course. At the same time, IT tools to manage samples will be made available to enable participating institutes to begin displaying selected collections of interest.

## MEASURES

1. Finalize the tools under development (FLEX-LIMS software and catalog regularly updated by institutes in the International Network), with the aim of developing a strategy to optimize the use of biological resources.
2. Seek new funding to replace the funding from MSD Avenir enjoyed over the past four years so that the initiative can be continued and extended to other interested institutes.
3. Continue the process of reflection with all CNRs with the aim of finding public health applications for new technological advances developed in the Institut Pasteur's laboratories.
4. Improve coordination between research activities and the use of collections of biological samples.
5. Promote the use of collections that represent a major strategic asset.
6. Further the process of reflection on the genomic taxonomy of microbial strains.

## Institut Pasteur Medical Center

The Institut Pasteur Medical Center (CMIP) mainly focuses on infectious and tropical diseases, international vaccinations and travel medicine. It also offers consultations for allergies and dermatology consultations for hidradenitis suppurativa. The Medical Center only offers outpatient services. In 2017, the CMIP received 53,000 visitors, carrying out 17,000 consultations and performing 71,000 vaccinations. The Center plays an important role as a showcase for the Institut Pasteur to the general public. Its web pages, which include disease fact sheets, are consulted every year by millions of people.<sup>3</sup>

3 / More than 4.9 million users consulted nearly 10 million CMIP web pages over the period from January to October 2018.

## MEASURES

1. Draw on the expertise of the International Vaccination Center as part of efforts to pool strengths in the field of vaccinology, involving immunologists, microbiologists, epidemiologists and vaccine specialists and the Cochin-Pasteur Vaccinology Clinical Investigation Center (CIC).
2. Prioritize the activities of the CMIP. Discussions on its medical activities will be held in partnership with the Paris Public Hospital Network (AP-HP), especially in conjunction with Necker-Enfants Malades Hospital.





## OBJECTIVE 6

# Develop teaching programs in line with scientific priorities

Since the first microbiology course taught by Émile Roux in 1889, the Institut Pasteur has played a key role in teaching life sciences at international level.

In recent years, the Institut Pasteur expanded the range of courses it offers. It will continue these efforts, in line with the scientific priorities identified in its strategy.

In partnership with the main universities in the Greater Paris region in life sciences and public health, the Institut Pasteur will continue to develop opportunities for training through research. These programs offer considerable added value, incorporating top quality practical work, increasing international visibility and boosting the Institut Pasteur's ability to attract the best students for internships or PhDs. The programs already offered by the Institut Pasteur at other institutions or universities in the Greater Paris region, especially at first-year Master's level, will gradually be stopped.

The Institut Pasteur will continue to develop online training, especially by producing and delivering MOOCs. Any new MOOCs will reflect strategic scientific priorities. The Institut Pasteur will seek accreditation for all its MOOCs at university level. It will also endeavor to identify partners to contribute to the funding and distribution of these courses. This strategy, already employed for a MOOC on tuberculosis, has boosted circulation of the course and increased the number of participants.

### Predocctoral programs

The Institut Pasteur has developed several predocctoral programs in partnership with the company Amgen, the Pasteur Foundation, the Massachusetts Institute of Technology (MIT) and Stanford University.

The Institut Pasteur also takes part in the International Genetically Engineered Machine (iGEM) competition organized by MIT, and offers training for around twenty students from a variety of backgrounds (engineering, design, biology, law, etc.). The Institut Pasteur will focus on programs to recruit outstanding students for its research units.

### Doctoral programs

The Institut Pasteur hosts around 280 PhD students, most affiliated with the doctoral schools at Paris Descartes University, Sorbonne University, Paris Diderot University and Paris Saclay University. PhD students are given access to the Institut Pasteur's tutoring program and the many activities and training courses offered by the Doct-Office. These initiatives will be continued.

The Institut Pasteur runs an international PhD program – Pasteur-Paris University – for foreign students with a Master's degree selected by means of an evaluation procedure. This highly attractive program, which has considerable international visibility, will be continued. The aim is to guarantee funding for the program from various external sources (LabEx laboratories and calls for proposals at national, European and international level).

The Institut Pasteur is a member of the “Médecine-Sciences” program, coordinated by the ENS in partnership with the Institut Curie. This program, which offers joint scientific and medical training, promotes interactions between the Institut Pasteur and the hospital community. It recruits 10 students each year and is co-funded by partner institutions. The program will be continued.

#### **Course sponsorship and professional training**

The Institut Pasteur will step up external funding for its teaching activities. The fees for several courses may be increased, especially for industrial or professional participants. This will be the case for advanced microscopy training, for example. The Institut Pasteur will continue to develop professional courses and compulsory regulatory training in its recognized areas of expertise (microscopy, bioinformatics, etc.).

#### **Scientific entrepreneurship training**

In recent years, the Institut Pasteur has been active in providing entrepreneurship training for its scientists, engineers, post-doctoral fellows and PhD students by organizing dedicated events. We intend to pursue this initiative by offering workshops for staff interested in company start-up, with training on subjects such as how to draw up a business plan or carry out market research. The Institut Pasteur will also be involved in the organization of “start-up weekends”, offering students the opportunity to work on a specific business start-up plan for two days. It is hoped that these initiatives will result in the creation of several spin-offs.

### **MEASURES**

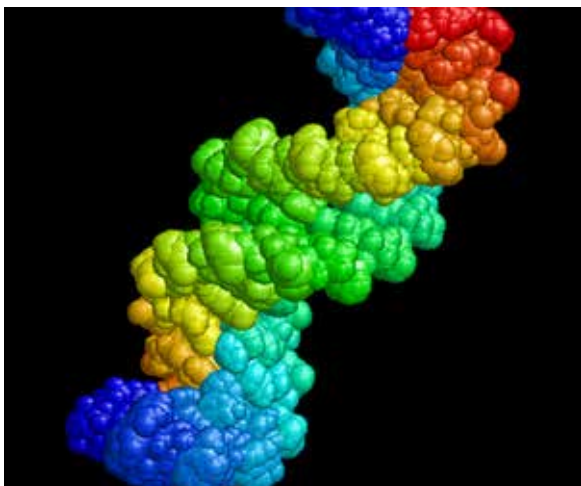
- 1.** Set up courses that reflect the Institut Pasteur’s scientific priorities.
- 2.** Produce three MOOCs per year.
- 3.** Secure university accreditation for some MOOCs.
- 4.** Increase external funding for courses.
- 5.** Increase the revenue of the Institut Pasteur International Doctoral Program (foundations, EU funds, sponsorship, LabEx).
- 6.** Host two students from the “Médecine-Sciences” program each year as interns or as part of their PhD.
- 7.** Create spin-offs.





## Strengthen national partnerships to boost the Institut Pasteur's scientific excellence

France is one of the world's leading scientific powers. Its wide-ranging higher education and research ecosystem makes it highly competitive. The partnerships developed by the Institut Pasteur, particularly through its joint research units involving the country's major research institutions, bolster its research projects and contribute to its scientific excellence. But the changing landscape of higher education and research is forcing the Institut Pasteur to adapt its collaborative approach so as to consolidate these partnerships.



Financial support from the government and the Greater Paris Regional Council has enabled the Institut Pasteur to launch ambitious scientific projects. The INCEPTION project<sup>4</sup> (Convergence Institute for the emergence of pathologies through individuals and populations), for example, aims to address the public health challenges associated with infectious diseases by drawing on complementary scientific expertise in the fields of biology, medicine, computer science, mathematics, statistics, physics and social sciences. This project also provides an opportunity to increase scientific dialog between several prestigious research institutes including Inserm, the CNRS and the CEA. The Institut Pasteur will make more extensive use of the technological research capabilities offered by Bioaster to facilitate the transfer of its scientific advances to industry.

But it is vital for the Institut Pasteur to target partnerships that reflect its needs. This approach will enable it to assign clear objectives and specific action to each partnership. The strategic plan will determine future partnerships. Scientific multidisciplinary, with a particular focus on the key role of social sciences and humanities, will encourage the Institut Pasteur to work more closely with the laboratories in the CNRS Institute for Humanities and Social Sciences (INSHS). Synergies will also be developed in terms of the use of technological platforms. The CEA infrastructures,

for example, are a vital resource for conducting ambitious scientific projects. Competitiveness clusters, such as Medicen, also represent potential strategic partners. By creating thematic sectors for research and development, competitiveness clusters can serve as drivers, especially for the application of the Institut Pasteur's research.

University partnerships also play a role in the achievement of one of the Institut Pasteur's primary missions: education. Structured partnerships with universities and their doctoral schools are needed if we are to offer courses and predoctoral/PhD programs to students each year. Hosting these students in the Institut Pasteur's laboratories and overseeing their personal and professional development are a core part of our strategy. The 2013 French Higher Education and Research Act significantly altered the scientific and university landscape. It led to developments that have resulted in the emergence of new players created by university mergers and alliances between several institutions. The Institut Pasteur needs to adapt to these changes and foster new partnerships with these institutions.

Since 2009, the French National Alliance for Life Sciences and Health (Aviesan) has grouped together the country's main stakeholders in life and health sciences. The Institut Pasteur will remain within Aviesan, and contribute more to its activities. Aviesan provides the Institut Pasteur with a multilateral platform, thereby playing an important part in boosting its scientific visibility at both national and international level.

## MEASURES

1. Draw up an inventory of existing scientific and institutional partnerships.
2. Identify the Institut Pasteur's scientific needs so that it can target privileged partnerships more effectively.
3. Play a more active role in Aviesan and other academic coordination bodies.
4. Develop a mutually beneficial partnership arrangement that involves sharing a pool of scientists keen to pursue a highly international career with other French research institutions.

4 / The INCEPTION Convergence Institute involves academic partners that contribute directly to the project: the Institut Pasteur and its CNRS/Inserm-associated joint research units, the CEA with its National Genotyping Center (CNG), Paris Diderot University with its SPHERE laboratory, PSL Research University, and the "Frontières du Vivant (FdV)" Doctoral School. Two additional public organizations, AP-HP and Inra, also contribute through collaboration between research units and joint structures.





## OBJECTIVE 8

# Pursue the ongoing improvements to the Institut Pasteur campus

The Institut Pasteur has a five-hectare campus in the center of Paris with 42 buildings, 48,000 m<sup>2</sup> of laboratories and a hectare of green spaces. This campus, a major factor in the Institut Pasteur's attractiveness, is architecturally diverse, with historical buildings (some listed historical monuments) standing alongside highly modern buildings housing state-of-the-art infrastructures.

The operation and maintenance of this site are complex tasks, especially given the ever stricter regulations in the areas of security, health, safety and the environment, the increasing sensitivity of high end equipment, and the need to reduce any disturbance for local residents. By coordinating our real estate plans with the requirements of sustainable development, we will be able to take account of environmental regulatory requirements from the design phase of any building or renovation projects. The Institut Pasteur is keenly aware of the importance of sustainable development and the challenge it represents in the development of a real estate master plan. In accordance with the 2019-2023 strategic plan, the Institut Pasteur will focus on the following:

- densifying and modernizing its campus;
- bringing National Reference Centers (CNRs) closer together;
- grouping together entities working on select agents in a small number of buildings;

while maintaining attractive and safe working conditions for the Institut Pasteur's staff.

After completing major modernization and building work on the area of campus located at 28 rue du Docteur Roux, the Institut Pasteur now needs to turn its attention to modernizing the buildings at 25 rue du Docteur Roux. We intend to carry out three major real estate projects, including demolition and reconstruction of the Darré and Borrel buildings. By grouping together state-of-the-art infrastructures, the new building will strengthen the Institut Pasteur's scientific excellence for the study of vector-borne diseases. We will also carry out two other ambitious projects: the Nanomaging project and a major refurbishment of the Institut Pasteur's historical building, the Roux building. These buildings represent a showcase for the Institut Pasteur's commitment to scientific excellence and the environment. By completing these projects, the Institut Pasteur will be in a position to provide all its staff with optimal working conditions and the cutting-edge equipment required to pursue its main missions. The ambitious real estate project is firmly focused on improving laboratories and creating modern infrastructures that can house sophisticated facilities.





PRIORITY 1

**Strengthen the Institut Pasteur  
International Network and  
implement a proactive policy  
of international partnerships**



## OBJECTIVES

**1**

Structure and strengthen relationships with the International Network on the basis of shared scientific ambitions

**2**

Build the Network's influence by working towards a more structured governance framework and business model

**3**

Increase the Institut Pasteur's attractiveness at international level



A hundred and thirty years after it was founded, the Institut Pasteur remains a major player whose added value lies in both the quality of its research and the international reputation of its network of institutes around the world. The Institut Pasteur is firmly committed to carrying out its work to improve human health worldwide as part of an ambitious international strategy centered on the Institut Pasteur International Network.

It is in the Institut Pasteur's interest to develop scientific synergies with renowned research institutions at global level. The arrival of new stakeholders with ambitious strategies and resources makes this global environment increasingly competitive. In this context, the Institut Pasteur International Network (hereafter referred to as the Network) represents a major asset for the Institut Pasteur and a factor that sets it apart and enables it to respond to the major issues involved in health research. This Network, composed of 32 partner institutes spread across the five continents, is unique and represents an outstanding base from which to develop international scientific cooperation.

Collaborative research is a means of guaranteeing scientific excellence by comparing and exchanging ideas. The Institut Pasteur has access to a wide variety of scientific ecosystems through its Network, placing it in a privileged position in this respect.



## OBJECTIVE 1

# Structure and strengthen relationships with the International Network on the basis of shared scientific ambitions

The Network enables the Institut Pasteur to respond at the international level to major challenges facing global health in a more diverse context – in terms of the populations it serves, and the pathogens to which they are exposed. It is within this Network that the Institut Pasteur can see the best return on its investment in the “health of populations” alongside its basic research.

With institutes in 25 countries, the Network also confirms the Institut Pasteur’s role as an international institution that can be mobilized to deal with health challenges and emerging infectious diseases.

The Institut Pasteur will endeavor to consolidate its Network into a more coherent entity, represented by the Pasteur International Network Association, to ensure that its action reflects a culture of international solidarity. It will work to promote scientific leadership in the Network to tackle various specific global health challenges.

Creating a sense of ownership around the Network’s scientific strategy and ensuring its implementation are among the Institut Pasteur’s priorities. At the same time, within the Network, the Institut Pasteur will help bolster the region-wide development of transferable expertise at some institutes, to encourage the creation of regional technological “platforms” (bioinformatics, biobanks, “vectopoles” for vector research, imaging)

and facilitate their mutual collaboration.

In line with the spirit of solidarity that unites the institutes in the Network, and with a renewed Ethics Charter, the Institut Pasteur will work towards a harmonized policy for the preservation of biological samples and will initiate discussions on how these resources might be shared within the Network in relation with the authorities of the countries concerned.

As part of its efforts to boost the Network’s competitiveness and visibility at international level, and in accordance with its scientific objectives, the Institut Pasteur will pursue its policy of setting up groups of junior researchers (G4s) and joint units with institutes in the Network in partnership with other French and international institutions. The Institut Pasteur will work with the Network to create an international quality label for Institut Pasteur training.

The three priority areas in the Institut Pasteur’s scientific strategy are among the priorities in the Network’s scientific strategy as approved by the Council of Directors at its meeting in September 2017 (emerging infectious diseases, especially zoonotic diseases; vector-borne diseases; mother and child health; and the impact of aging/longevity on health). The Network therefore shares the Institut Pasteur’s strategic vision and will assist in its implementation, especially when it comes to research on microbial

and infectious ecology, taking into consideration the diversity of ecosystems associated with its global distribution.

The cross-cutting, structural measures that will support the Network's ambition to become a global health player require the pooling of best laboratory practices (including biosafety); the mutually beneficial management and use of biological resources via a network of biobanks; and the identification of concerted measures for monitoring, alert and response.

## MEASURES

1. Implement the scientific strategy.
2. Position the Network as a global health player in the eyes of major international sponsors.
3. Strengthen existing mechanisms to boost attractiveness, mobility and shared expertise (joint international units, G4s, biobanks and regional technological platforms).
4. Step up coordinated action in the area of training by creating an internationally recognized quality label for Institut Pasteur courses.
5. Promote more integrated means of intervention between the Institut Pasteur and the Network to tackle infectious diseases in the countries and regions where the 32 institutes are based.



## OBJECTIVE 2



# Build the Network's influence by working towards a more structured governance framework and business model

To provide a coherent framework for dealing with the many applications to join or cooperate with the Network from other institutions and third countries, it seems appropriate for the members of the Network to collectively review the collaboration agreement governing the Network which lays down the arrangements for joining and withdrawing from the Network and the resulting collective commitments.

The Institut Pasteur is committed to changing the Network's governance to make it more balanced and participatory, especially by laying down arrangements for how the Network is represented in the Institut Pasteur's governing bodies. This will also involve a thorough analysis of how the status of the Pasteur International Network Association can be adapted so that it is better equipped to carry out its missions.

A Board of Scientific Advisors will be set up to facilitate the convergence of scientific priorities at international level, enable collective monitoring of joint measures and improve the circulation of ideas.

Coordinating any measures taken by the Network in response to disease outbreaks is a priority. There needs to be a framework to improve the responsiveness and engagement of all the members in the Network and to guarantee a coordinated approach to management:

- field-based measures;
- equipment required to respond to needs;
- post-outbreak monitoring.

Finally, the Institut Pasteur will develop an appropriate business model to guarantee the Network's resilience in view of international challenges and bolster its ability to carry out its activities to improve global health. To this end, it will make better use of existing political and diplomatic instruments (such as joint committees



between France and the governments in host countries) to encourage bi- and multilateral financial commitments between France and its partners in the priority fields for cooperation implemented by the institutes in their respective countries.

To provide itself with the tools it needs to boost the visibility and capabilities of the Network, the Institut Pasteur will endeavor to create the optimal conditions for dedicated, sustainable funding. This will pave the way for an increase in the resources allocated to the Network and the establishment of a shared scientific vision, and will provide assurances concerning medium- and long-term action.

All stakeholders, including the international Pasteur foundations, will be called on to launch dedicated communications campaigns focusing on international action and appealing for national and international funding for the implementation of the Network's activities.

## MEASURES

1. Review the Articles of Association of the Pasteur International Network Association as a representative body of the Network and bring them into line with the International Network Collaboration Agreement.
2. Improve scientific coordination among the institutes in the Network by setting up a Board of Scientific Advisors.
3. Support the development of a sustainable international policy for the Network by raising and earmarking dedicated funds.





## OBJECTIVE 3

# Increase the Institut Pasteur's attractiveness at international level

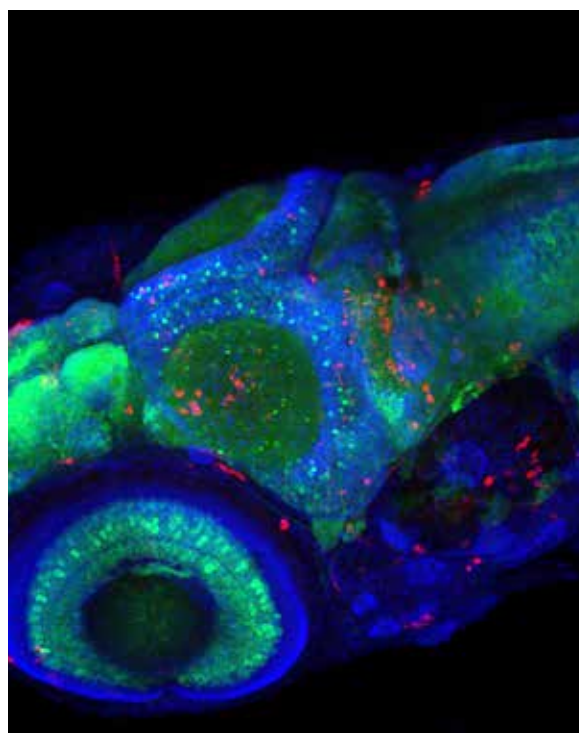
The aim of the Institut Pasteur's international strategy is both to strengthen its privileged ties with the Network and to carry out cooperation activities to strengthen partnerships with key institutions in other geographical areas.

Outside the Network, the Institut Pasteur will support the engagement of its scientists in other networks for international scientific cooperation that facilitate complementarity, multidisciplinary, cross-fertilization and efforts to secure joint funding. To this end, the scientific initiatives led by the Institut Pasteur campus will be carried out within long-term institutional frameworks (joint international Pasteur units, partnership agreements, etc.).

To promote the attractiveness of its Paris-based campus with foreign students, the Institut Pasteur will also undertake to improve conditions for researcher mobility and hosting.

In Europe, the Institut Pasteur will lobby institutions to share its strategic vision when framework programs for technological research and development are being drawn up. It will develop new partnerships with European research institutions by identifying scientific and technological complementarities for the implementation of its strategic plan. These partnerships may also give the Institut Pasteur access to new financial resources and synergies so that it

is better positioned to respond to calls for proposals launched within European funding programs, especially Horizon Europe. The Institut Pasteur will endeavor to ensure that the impact of these outreach



activities also benefits the institutes in the Network and vice versa.

Moreover, the Institut Pasteur will support institutes wishing to create “open platforms” to host international scientists for collaborative scientific programs involving several institutes in the Network. Working together with any Network institutes that wish to be involved, the Institut Pasteur may make its network of European partners available to facilitate collaboration and field-based measures.

The Institut Pasteur will play an active part in cooperation initiatives in third countries, whether led by international or European partners (e.g. regional cooperation centered on overseas regions, or triangular cooperation in partnership with European research institutes and some European Commission Directorate-Generals such as DG DEVCO). Where possible, it will act in cooperation with other French research institutions working abroad, especially the IRD, CIRAD, the CNRS, Inserm and the Mérieux Foundation.

In Africa, the Institut Pasteur will foster new scientific partnerships with the aim of strengthening the Institut Pasteur International Network, especially with English-speaking countries and also with vulnerable countries or those under reconstruction.

Finally, as a key player in official development assistance, the Institut Pasteur will undertake to incorporate the UN’s Sustainable Development Goals in its international action, in collaboration with the other French players involved in development (e.g. the French Development Agency).



## MEASURES

1. Set priorities for the creation of new Pasteur Joint International Units in connection with the international scientific strategy and joint funding possibilities.
2. Facilitate arrangements for hosting international scientists and ensure proactive monitoring of new legislative mechanisms created for this purpose.
3. Boost the visibility of the Institut Pasteur and the Network among international bodies and organizations.
4. Promote the development of cooperation between French and international research institutes and the institutes in the Network (development of scientific projects, hosting of international teams in the Network, etc.).





A woman with long dark hair and glasses, wearing a white lab coat, is smiling. She is holding a white, porous, 3D-printed object in her right hand. The object has a complex, cellular structure. In the foreground, there is a black platform with several other similar white, porous objects. The background is a bright yellow wall with a blue and white geometric pattern.

PRIORITY 2

**Promote creativity and  
openness to society**

## OBJECTIVES

**1**

Improve monitoring of scientific and technical developments so as to anticipate emerging issues

**2**

Identify working methods that encourage creativity

**3**

Facilitate the emergence of new talent

**4**

Continue to strengthen the Institut Pasteur's visibility and reputation by fostering a contemporary image

**5**

Promote open access to publications and research data

**6**

Develop interactions between the Institut Pasteur and civil society



Scientific discovery requires an approach that is both rigorous and creative; in other words, the ability to distance oneself from previous theoretical models. Creativity is a complex blend of intuition, controlled innovation and “organized transgression”. The Institut Pasteur has a duty to promote the creativity of its scientists and all its staff. To this end, it must identify a number of methods. The Institut Pasteur’s strategy is clearly shaped by the legacy of Louis Pasteur: its research must aim to push back the boundaries of knowledge, while responding to the global challenges facing public health. Researchers must be given freedom in their scientific choices – this guarantees their creativity. But scientific discovery processes are constantly changing, and the Institut Pasteur must anticipate these developments. The dissemination of research findings to society at large, for example, is now a crucial aspect that is influencing scientific practices and redefining the link between science and society. The Institut Pasteur therefore needs to develop to become a key player in open science.



## OBJECTIVE 1

# Improve monitoring of scientific and technical developments so as to anticipate emerging issues

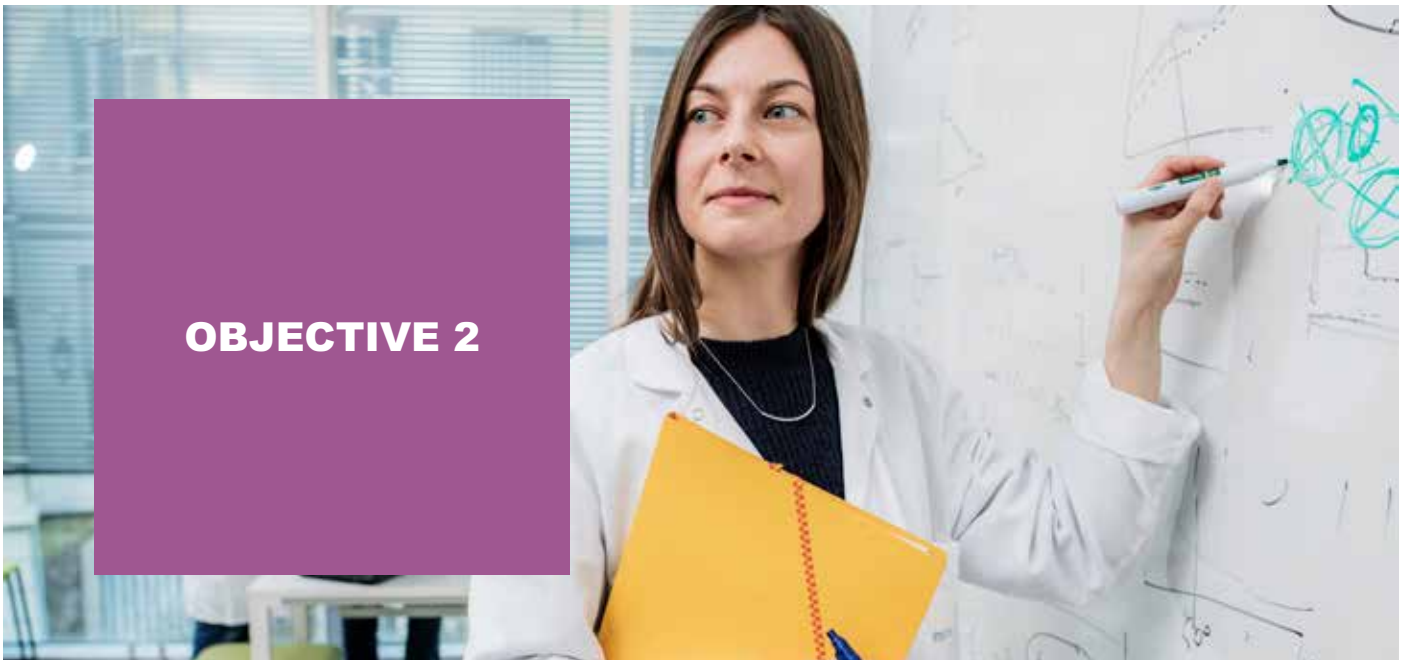
An increasingly competitive scientific environment, together with the emergence of new public health challenges, is leading to rapid developments in scientific topics and in the technologies and methods used. It is therefore vital for the Institut Pasteur to anticipate these developments so that it can enjoy a competitive scientific advantage, plan its recruitment activities to take account of these changes, and adapt its scientific infrastructure.

There is currently insufficient coordination of efforts to monitor scientific and technological developments. It is therefore important to develop scientific intelligence at institutional level by making use of existing structures such as the Scientific Council.



### MEASURE

- Set up a scientific foresight unit.



## OBJECTIVE 2

# Identify working methods that encourage creativity

**C**reativity is vital for achieving scientific excellence. It enables the emergence of new concepts that can bring about scientific revolutions.

The Institut Pasteur will support outstanding research that pushes back the boundaries of knowledge. The freedom of scientists to choose their research projects is essential. This is an important element of creativity and must be encouraged.

Schemes for employee mobility should be set up with the aim of enabling all Institut Pasteur staff to exchange ideas and acquire new skills in new working environments. The mobility program for scientists between the institutes in the Network will be strengthened, as will dialog between scientists in the Network, so as to create an attractive area for mobility that is open to external institutions (through the organization of courses, internships, scientific exchanges, scientific seminars, joint retreats, etc.).

Multidisciplinarity is a real strength in encouraging scientific creativity. The Institut Pasteur's scientific diversity is a valuable asset that should be supported by means of incentive measures. But expertise in some disciplines, such as social sciences and humanities, is still lacking. This represents an obstacle for the development of ambitious scientific projects. It is important to develop partnerships so that the Institut Pasteur's scientists can find complementary synergies.

Creativity also thrives in dedicated spaces and through dedicated events. To this end, the Education Center should encourage dialog between scientific disciplines and generations of scientists. Further

events will be held to promote entrepreneurship among junior scientists. "Hackathons" will be organized to challenge several teams to propose a solution to resolve a scientific problem associated with public health issues. This alchemy between straightforward collaboration and intense competition, driven by a sense of urgency, can help stimulate participants' creativity and trigger innovation.

## MEASURES

1. Encourage internal mobility by clarifying our policy and setting out possible options.
2. Promote international mobility within the Institut Pasteur International Network.
3. Develop intersectoral mobility, especially between the Institut Pasteur and industry partners.
4. Promote multidisciplinarity through targeted funding.
5. Support initiatives taken by scientists on campus to promote creativity.



## OBJECTIVE 3

# Facilitate the emergence of new talent

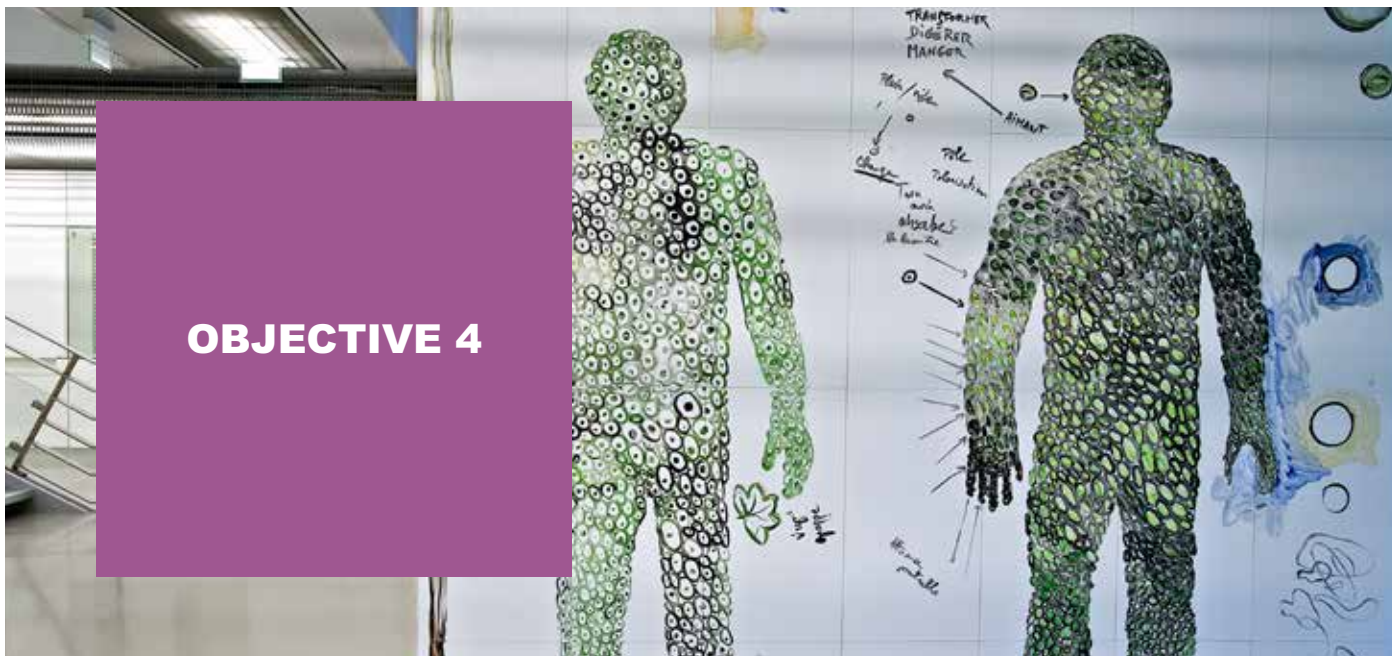
Human capital is the Institut Pasteur's greatest asset. Ensuring that the expertise and professional development of its staff are in line with its strategic requirements is therefore an ongoing challenge. Establishing a method for forward-looking management of jobs and skills should help address this challenge. It will also be a means of identifying and managing the Institut Pasteur's talent. The Institut Pasteur has wide-ranging talent among its scientific and administrative staff in terms of their qualifications, professional experience and extensive knowledge of the sector in which they are working. These individuals have huge potential and represent a major source of creativity. The Institut Pasteur therefore has a responsibility to introduce tools that promote the emergence of new talent by developing the skills of all its staff, to acquire new talent by boosting the employer brand, and to introduce a talent retention policy by fostering loyalty to the Institut Pasteur. Mobility opportunities for talented young staff within the Institut Pasteur International Network will also be encouraged.

The young generation represents a major pool of talent. But the Institut Pasteur must review its managerial practices to make sure it meets the needs of these employees, who are shaking up the world of work with their new aspirations. We will involve young employees more closely in strategic decisions, enabling them to voice their views to the Senior Management Board and to lead new projects.



## MEASURES

1. Introduce team reviews to optimize identification of talent.
2. Introduce measures to involve young employees more closely in the decision-making process.
3. Support initiatives led by junior scientists.



## OBJECTIVE 4

# Continue to strengthen the Institut Pasteur’s visibility and reputation by fostering a contemporary image

The Institut Pasteur has a strong reputation at the national level and also, to a lesser extent, internationally. It enjoys a prestigious institutional image, particularly because of its charismatic founder, its long history of major discoveries that attest to its excellence, a specific culture and values, and a high level of public trust. This image is based on the fundamental characteristics of the institute and on underlying values that define the Pasteurian mission and the Institut Pasteur itself: humanitarianism, universalism, perseverance and transmission of knowledge.

But the Institut Pasteur has several challenges to address in terms of communication:

- its image can be improved, especially in certain respects: modernity, knowledge and understanding of professions and projects; institutional alignment; and awareness of issues facing civil society.
- its brand potential can be further exploited by improving efficacy (coordinating all messages, brand promotion) and intensity (share of media voice).

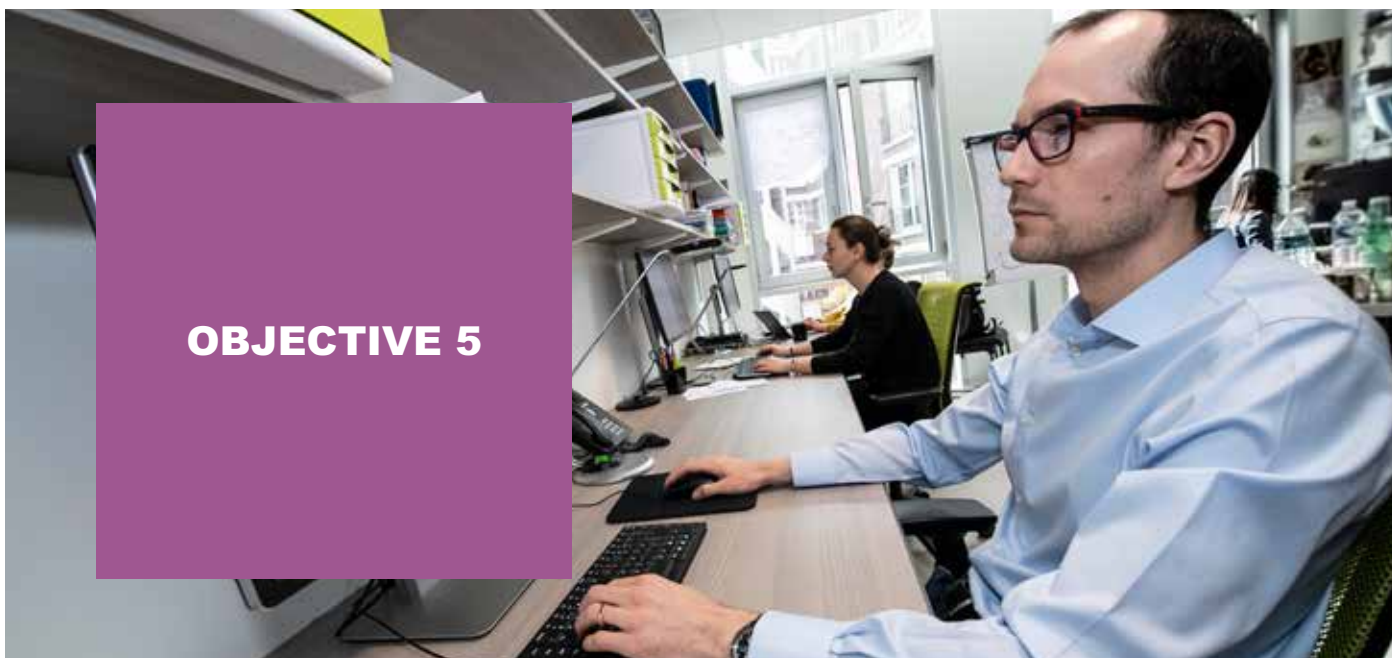
A more strategic approach to communication that enhances the visibility of the Institut Pasteur both in France and abroad would ultimately increase revenue from public gifts and donations through a brand strategy designed to appeal to public generosity (donations, sponsorship and legacies); secure public subsidies; and attract and retain the best talent (the notion of “employer brand”).

The “Institut Pasteur” institutional brand is a significant asset that deserves higher levels of strategic investment (brand platform, communications master plan, visual identity, one-off campaigns, etc.) to exploit its full potential. These investments are crucial in a context of higher communications expenditure and fundraising efforts by our “competitors”.

## MEASURES

1. Pursue the development of strategic communications based on the “Institut Pasteur” institutional brand platform, capitalizing on all its assets.
2. Develop the commitment and visibility of scientists and the scientific community in all our communications initiatives (this aim should be carried out in close cooperation with the Department of Scientific Affairs) by setting up and leading a committee of “communications experts” and a multidisciplinary pool of scientific experts for communications campaigns to the general public.





## OBJECTIVE 5

# Promote open access to publications and research data

Science is a common good, and we need to encourage its dissemination. The promotion of open science is leading to a democratization of access to knowledge that is having a positive impact on research, training, the economy and society. It reduces duplication of effort in collecting, creating, transferring and reusing scientific data, thereby improving the efficacy of research and fostering scientific progress. Finally, open science is a driver for scientific integrity, which boosts public confidence in science. Aware of these advantages, public authorities and research funding bodies have committed to promoting open access to research publications and data. The principle of open science will become the *modus operandi* of the Horizon Europe program. France has adopted an open science plan, which the National Research Agency (ANR) used as the basis for its 2019 action plan.

The Institut Pasteur is a proactive player in open science: it signed the Berlin Declaration on Open Access to Knowledge in 2004, it has developed digital methods to communicate its research results and it has implemented incentive measures for scientists. But progress still needs to be made before all its publications are available on an open access basis. Open access to data raises both technical and regulatory challenges. Some of the bodies that fund our research, especially the European Commission and the ANR, will make it a condition in future that all funded research projects are accompanied by a data management plan.

## MEASURES

1. Continue to encourage scientists to deposit their publications on the HAL-Pasteur platform (pursuing a strategy introduced in 2007).
2. Train and assist scientists in drawing up a data management plan.
3. Boost incentive measures to ensure that all publications are available on an open access basis (e.g. by making budget allocations for units dependent on open access publications or only taking open access publications into account in assessments).
4. Develop an open publications platform for the Institut Pasteur and the Institut Pasteur International Network, including a pre-publication deposit mechanism.



## OBJECTIVE 6

# Develop interactions between the Institut Pasteur and civil society

**K**nowledge production is still considered in society as an end in itself; but at the same time, it is also viewed as a way for society to respond to ongoing economic, environmental and health challenges. The emergence or re-emergence of infectious diseases, the challenge of neurodegenerative diseases and the need for new antimicrobials are examples of particular concern to us. Technological developments and related political choices can also have considerable impact on daily life by generating questions or even opposition and conflict, which has repercussions on research and science. On the other hand, several stakeholders see research as a vital activity and are keen to be associated with our activities. Working with these players can be a source of opportunities, commitments and renewed support, and can lead to a new understanding of the issues at stake, resulting in new progress in scientific knowledge.

These major, long-term developments have encouraged governments to promote and prioritize “interactions between science and society”. This aim was laid down in the 2013 French Higher Education and Research Act, and some funding bodies, such as the European Commission, require it for some of their programs. In a broad sense, these interactions may take many forms, ranging from the dissemination of scientific and technical culture to the involvement of

civil society in research and innovation processes or in planning scientific and technological policies.

The Institut Pasteur is committed to fostering a dialog between science and society. It recently joined the ALLISS platform, a forum for interaction and reflection between research organizations and civil society bodies (such as non-profit associations and local authorities). There is an Institut Pasteur course on the relationship between science and society, primarily



aimed at PhD students, post-doctoral fellows and junior scientists but also open to non-scientists. The aim of this course is to stimulate reflection on the changing role of science in today's society. For several years, the ICAReB platform, in charge of cohorts of healthy donors of samples to the Institut Pasteur, has been exploring the question of how donors can be involved in the research conducted using their samples, and it offers donors the opportunity to interact with scientists. There are also a number of scientist-led initiatives, not all of which are widely known. These initiatives reflect changing perceptions of the relationship between the Institut Pasteur and society. One challenge for the Institut Pasteur is to take these changes on board and to integrate this dimension into its strategy.

## MEASURES

1. Create a "science-society" position, affiliated to the Department of Scientific Affairs in conjunction with the Department of Communications.
2. Take stock of the activities that the Institut Pasteur already carries out to promote dialog between science and society.
3. Develop an Institut Pasteur doctrine on the relationship between science and society.
4. Establish mechanisms to promote "science and society" projects.
5. Introduce mechanisms to recognize the engagement of Institut Pasteur scientists in activities involving relations with society.



A modern office interior with a large glass atrium. In the foreground, a man in a red sweater is walking and talking on a mobile phone. In the middle ground, a man in a dark shirt is standing on a staircase. In the background, a man in a blue shirt is sitting in a blue chair, and another man in a dark shirt is standing. The atrium has a glass railing with a large red number '5' on it. The ceiling is high with a glass skylight. The floor is polished and reflects the light.

PRIORITY 3

**Work more effectively together and empower each individual so as to create an attractive, collaborative working environment**

## OBJECTIVES

1

Look to the future, adapt to our environment and work together to make any changes needed

2

Improve the quality of working life

3

Promote gender equality and especially improve the representation of women in senior scientific positions

4

Cultivate a reflective attitude and guarantee compliance with principles in the areas of ethics, scientific integrity and professional conduct



Staff at the Institut Pasteur, both our employees and those from external research organizations, are vital to the Pasteurian mission. To ensure it provides effective support for its staff, the Institut Pasteur needs a human resources policy that takes into account each individual's specific needs. By encouraging respect, collaboration, dialog and mutual tolerance among all its staff, the working environment will improve and boost attractiveness. This priority requires managers to implement the policy by adapting it to meet the needs of their teams. The Institut Pasteur will therefore support all managers by reaffirming their roles and responsibilities.

All the measures planned to achieve this priority will be conducted in close contact with management and unions, as part of a constructive process of social dialog.



## OBJECTIVE 1

# Look to the future, adapt to our environment and work together

The Institut Pasteur's desire for excellence requires the development of open, innovative research. The research landscape is developing amidst a dense web of collaborations, interdisciplinary approaches and new technologies. The possibilities raised by the use of big data, artificial intelligence and robotics are already transforming our organizations and our professions, requiring the acquisition and development of new skills. These changes should encourage us to work differently by implementing a policy of careers management centered on the diversification of career paths and expertise. Support staff and scientists should work in synergy to anticipate and play an active role in the development of organizations, professions and activities.

To anticipate these changes, forward-looking management of jobs and skills (known by the French abbreviation GPEC) is vital. This prospective approach to management will enable the Institut Pasteur to adapt its jobs, workforce and skills over the short and medium term to meet both the requirements of its corporate strategy and external developments.

The EU's "Human Resources Strategy for Researchers – HRS4R" is part of this approach. Its priority areas, which include training, professional development and transparent recruitment, are vital for the forward-

looking management of jobs and skills. This strategy will give rise to continued improvements to the Institut Pasteur's HR practices, while boosting its attractiveness in scientific terms.

Proactive management of jobs and skills is required. The estimated number of retirements will reach 16% of the permanent workforce (254 employees) by



the end of the strategic plan (2023) and 34% of the permanent workforce (541 employees) over the next 10 years (by 2028).

Two years ago the Institut Pasteur embarked on the introduction of a dedicated Human Resources Information System. The efforts to modernize HR management will be continued. This will enable us to respond to the needs of our workforce, and to facilitate online access to information about staff development at the Institut Pasteur.

## MEASURES

1. Introduce a strategy for forward-looking management of jobs and skills (GPEC) – initially for scientific professions and then extended to non-scientific positions.
2. Secure the EU's "HR Excellence in Research" award.
3. Support managers in the acquisition of new professional skills by offering suitable training.
4. Guide managers in any developments to their organizational structure to make sure they meet the Institut Pasteur's changing needs.
5. Recruit wisely in view of the priorities of our strategic plan to enable us to return to a balanced budget.
6. Propose clearer processes and rules for remuneration.







## OBJECTIVE 2

# Improve the quality of working life

The concept of “quality of working life” (QWL) is defined as follows by the French Ministry of Labor:<sup>5</sup> *“Quality of working life is primarily associated with work, working conditions and whether or not they enable individuals to “work well” in a conducive atmosphere within their organization. It is also associated with strong expectations of being fully acknowledged in the workplace and being able to achieve a better balance between professional and personal life. [...] Companies’ competitiveness particularly involves their ability to invest and place their trust in individual and collective intelligence for effective, quality work.”*

Various initiatives have already been introduced at the Institut Pasteur (home office, prevention of psychosocial risks, assessment of working conditions in some departments, etc.) but there is a lack of coordination and overall vision.

It is important to provide a more effective structure for our QWL policy, to reflect on the issues we wish to address and the most appropriate measures for our institute.

We need to respond to societal challenges associated with the demographic characteristics of the Institut



5 / The French National Interprofessional Agreement, “Towards a policy to improve the quality of working life and professional equality”, signed in June 2013, provides a definition of quality of working life and encourages companies to explore new methods to reconcile performance and ways of organizing work that provide good working and living conditions for employees.

Pasteur community and also work-related challenges such as autonomy, maintaining interest at work, the value attributed to work, the ability to express oneself and the feeling of usefulness.

## MEASURES

1. Introduce QWL indicators and adopt measures that correspond to the priority areas for progress identified.
2. Adopt preventive measures to ensure health in the workplace, especially by introducing a procedure of dialog and investigation of difficult situations, making sure every voice is heard and facilitating discussion, with the aim of limiting psychosocial risks.
3. Propose key behavioral principles that will encourage cooperation in an environment that increasingly requires a collaborative approach.
4. Lay the foundations for a healthy balance between personal and professional life by introducing best practices associated with the use of IT methods (renewing the agreement on working from home, right to disconnect, etc.).
5. Introduce suitable measures for senior employees and encourage the transfer of knowledge, for example through mentoring systems.
6. Develop measures and spaces that encourage a good working atmosphere.
7. Step up internal communications to facilitate information sharing, understanding and acceptance of organizational changes.
8. Promote good labor relations and take into account feedback and campus requirements.





## OBJECTIVE 3

# Promote gender equality and especially improve the representation of women in senior scientific positions

**T**he Institut Pasteur will strengthen its gender equality policy, especially to improve female representation within the scientific management.

Like other research organizations in France<sup>6</sup> and abroad, the Institut Pasteur is not immune to the phenomenon of under-representation of women within the scientific management. While biology and related subjects attract female students up to the PhD level, where there is parity, female scientists at the Institut Pasteur experience much slower career development than their male counterparts. The gap is already noticeable at research associate level: just 45% of research associates are women, with a median age of 49, as opposed to 42 for men. Only 28% of research directors and 25% of unit heads are women. For heads of five-year research groups (junior groups), the situation is barely better, with just 35% of women in these positions.

The Institut Pasteur needs to identify what is standing in the way of women scientists' career development (self-censorship, professional/family life balance,<sup>7</sup> recruitment bias, gender makeup of assessment bodies, representation of women at scientific events, etc.) so as to propose action plans that will reverse the trend.

## MEASURES

1. Set up a dedicated group to improve understanding of the current situation and propose recommendations (gender parity in assessment bodies, a dedicated program for the most promising young female scientists, etc.).
2. Make sure this strategy is also taken into account in the scientific policy and the other key human resources projects, whether quality of working life or efforts to obtain the EU award.
3. Step up existing measures: guidance for young female scientists during and after their PhD to make sure they do not engage in self-censorship (leadership training, Careers Committee, encouragement to put themselves forward for higher-level positions, etc.).

<sup>6</sup> / A report by the National Assembly on female representation in science was submitted to the French Ministry of Higher Education, Research and Innovation in spring 2018. The report highlights the under-representation of women in science and notes that the situation is developing too slowly.

<sup>7</sup> / Given the development of scientific careers, the age of recruitment to permanent positions has risen significantly and now stands between 32 and 37, coinciding with the time of life when people tend to start a family – which could represent an additional difficulty for the promotion of women's careers.



## OBJECTIVE 4

# Cultivate a reflective attitude and guarantee compliance with principles in the areas of ethics, scientific integrity and professional conduct

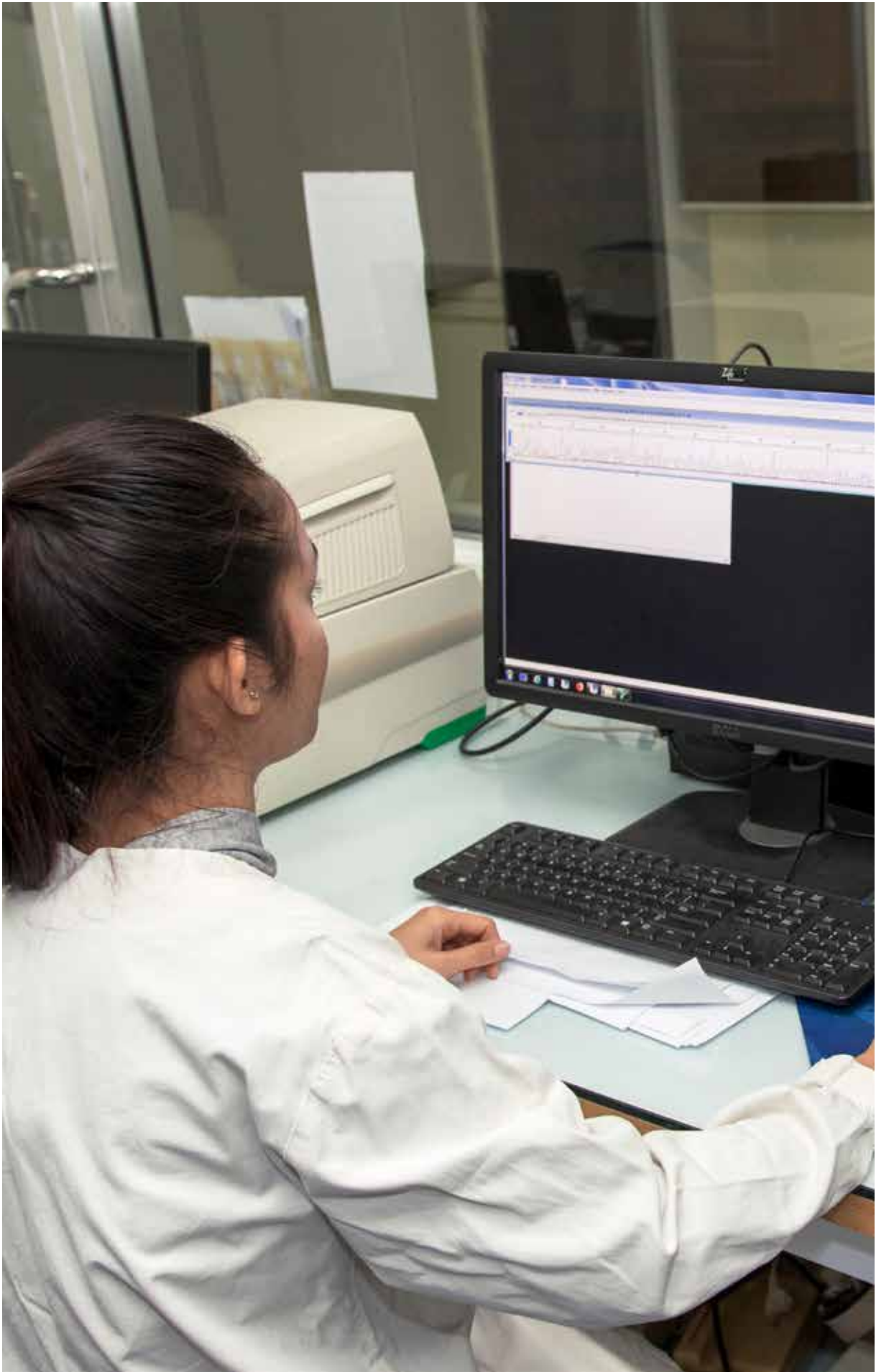
Scientific research is undergoing major changes in terms of both its practices and its organizational methods. The increased globalization of research since the 1980s, the emergence of new stakeholders and the prevalence of project-based research funding have also affected scientific timescales, objectives and assessment criteria. These developments have led to shortcomings in scientific integrity, resulting in a negative impact on the reputation and credibility of research institutions. Public institutions, funding bodies and scientific publishers have now set new standards to avoid these lapses.

The Institut Pasteur needs to continue its efforts in this area, adapting its preventive and supervisory practices to bring them into line with international and national recommendations. It will work together with the recently launched French Office for Research Integrity (OFIS) and follow its recommendations.

It is also vital to develop better links between research ethics, scientific integrity and professional conduct. These different strands all contribute to the same objective as part of the Institut Pasteur's wider social responsibility.

## MEASURES

1. Promote access to experts in research ethics, scientific integrity and professional conduct for all scientists on campus, especially newcomers.
2. Continue to raise awareness of the importance of these values.



PRIORITY 4<sup>H</sup>

**Develop financial resources to  
strengthen the Institut Pasteur  
and ensure its long-term  
sustainability**

## OBJECTIVES

1

Boost industry partnerships

2

Capitalize on the Institut Pasteur's institutional brand to foster public generosity

3

Encourage the success of Institut Pasteur scientists in calls for proposals

4

Optimize expenses

5

Guarantee good resource management and effective governance

6

Use advocacy initiatives to boost research funding



The Institut Pasteur's future depends on controlled, long-term management of its financial resources. Budget balance is a priority and will be crucial for the implementation of the 2019-2023 strategic plan. We will develop financial resources by adopting a proactive policy to improve funding for the Institut Pasteur's research. Efforts to identify new sources of funding, whether associated with public gifts and donations, public funding bodies or public-private partnerships, will be encouraged. In terms of spending, we will continue our work to optimize all expenses. It is vital that the Institut Pasteur adapts its business model to current pressures and anticipates future trends.





## OBJECTIVE 1

# Boost industry partnerships

**T**ranslational research and its applications are a major component of the Institut Pasteur's business model, generating €689 million in revenue over the past 15 years, in other words approximately €45 million each year. This revenue has primarily come from vaccines and diagnostics (three patent portfolios). Given the fall in this revenue as a result of the gradual expiry of the patents filed, the Institut Pasteur must review its business development strategy by adapting its activities to the realities of the political, economic and industrial environment.

Business development of research results should be based on two areas: the acceleration of research applications (see page 14), and the natural corollary of this approach, namely increasing the number of industrial contracts by promoting co-development strategies.

Developing the Institut Pasteur's visibility is required to increase the number of partnerships it has with industry. SMEs with strong assets sometimes invest more easily in collaborative contracts than larger companies. Here, it is vital for us to improve our knowledge of the organizational setup and strategic policies of industry stakeholders so that we can facilitate technology transfer and increase our partnerships. It is therefore important that we familiarize ourselves with any stakeholders potentially interested in embarking on a partnership process.

## MEASURES

1. Increase the number and financial value of industrial contracts.
2. Establish better links to biotechnology companies internationally.
3. Develop a partnership with the institutes in the Institut Pasteur International Network to promote technology transfer within the Network and boost business development for the results of collaborative research.
4. Diversify partners, especially by developing closer links with French SMEs.
5. Develop interpersonal skills to better understand the needs of industry.



## Capitalize on the Institut Pasteur’s institutional brand to foster public generosity

Public generosity (gifts, legacies and sponsorship) is one of the Institut Pasteur’s three main sources of funding, a cornerstone for its activities ever since its early days. It represents a significant resource that enables the Institut Pasteur to respond to health challenges. It also serves as a wonderful source of encouragement for scientists, who draw inspiration from the trust placed in them by donors. Donations, legacies and sponsorship are based on complex fundraising strategies that are essential to support.

Although gifts from individuals and companies are constantly increasing (except in 2018 because of changes to the tax framework), the Institut Pasteur needs to strengthen the resources that underpin its independence and long-term sustainability by continuing to raise awareness at all levels of the importance of public generosity for its operation and development.

To this end, the Institut Pasteur needs to further develop its attractiveness on a highly competitive “market”. We need to make people want to join the Institut Pasteur: in addition to traditional recruitment techniques targeting individuals (postal mailshots, telephone campaigns, etc.) or companies, all other possible means of encouraging people to get involved in “what the Institut Pasteur has to offer”



should be explored. We should then use effective communication methods (communication in a broad sense, including forums, debates, etc.) so that donors can monitor the development of projects they have donated money to. We need to make them feel as if they are full members in the Institut Pasteur community if we want to develop their loyalty. Gifts and donations should be seen as a gateway to a world of knowledge and dialog on scientific research and health. It is also vital for us to strengthen the Institut Pasteur brand. We need to encourage scientists, who elicit the public's admiration and trust, to be ambassadors for their institute.

Just as with donations, it is critical to develop the Institut Pasteur's communications strategy for legacies. The communication campaigns conducted to encourage donations and legacies should be based on coordinated, coherent and complementary strategies to strengthen the impact of our message among the public.

The Institut Pasteur's recognition at international level is a major asset that we should capitalize on to develop public generosity. It is especially important to make effective use of the international foundations – the Fondation Pasteur Suisse and the Pasteur Foundation in the United States – which are involved in improving visibility for the institute abroad through their activities and their local networks.

## MEASURES

1. Introduce the tools needed to increase the volume of online donations.
2. Continue to develop the community of online followers/interested individuals who have the potential to become donors.
3. Develop loyalty and closer links with current sponsors.
4. Design and implement a plan for systematic prospecting among potential new corporate sponsors: approach business sectors that are currently unrepresented or under-represented with a catalog of clearly presented options.
5. Set up an "Institut Pasteur sponsors club".
6. Capitalize on the prospecting/loyalty campaign for major individual donors in France, turning it into a France-wide capital campaign with a support committee.
7. Strengthen the strategies and action plans of the Pasteur foundations abroad.
8. In conjunction with the Pasteur foundations abroad, launch new international campaigns in areas where the Institut Pasteur can leverage support and carry out large-scale fundraising among major individual donors and philanthropic foundations.





## OBJECTIVE 3

# Encourage the success of Institut Pasteur scientists in calls for proposals

**R**esearch is currently funded to a large extent by calls for proposals. In rewarding the most innovative teams of scientists, it is a funding method that promotes scientific excellence. But this approach, which emerged in France later than in other industrialized countries, has had an impact on scientific practices. As a global research institution in terms of both its International Network and its many partnerships, the Institut Pasteur is in a position to respond to a significant number of calls for proposals. It is therefore important to introduce effective strategies to support scientists in this endeavor. Identifying new funding bodies that correspond with the Institut Pasteur's research activities is vital, especially as the success rate in calls issued by the French National Research Agency (ANR) and the EU's Horizon 2020 program has fallen significantly. The new Horizon Europe program, which will fund research in the EU over the coming years, will be monitored closely to make sure that the Institut Pasteur remains a major player in the European Research Area.

Awareness will be raised to calls that are in line with the Institut Pasteur's scientific strategy so that our scientists can develop ambitious, competitive projects. Finally, the Institut Pasteur will provide effective support for its scientists in grant applications generally.

## MEASURES

1. Carry out a prospecting campaign to identify new funding bodies.
2. Identify, encourage and support scientists to submit more proposals.
3. Work with scientists and carry out advocacy initiatives to promote the Institut Pasteur's activities.
4. Support scientists who are coordinating collaborative European projects.
5. Inform scientists of funding opportunities as far in advance as possible.

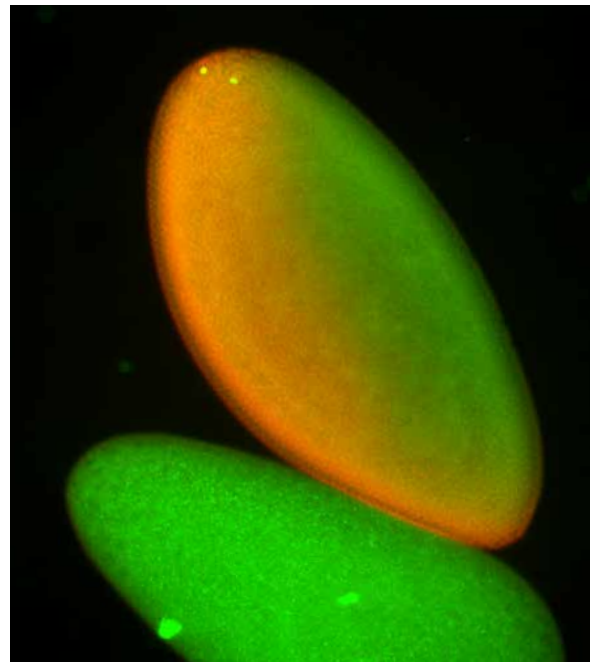


## OBJECTIVE 4

# Optimize expenses

**A**fter a considerable development phase between 2014-2018 that gave new impetus to the Institut Pasteur's research, we will seek to bend the spending curve. By establishing clear scientific priorities, we will be in a better position to target recruitments and investments, while maintaining the fundamental aspects required for the Institut Pasteur's research (campus size, multidisciplinary, etc.).

A Department for Internal Audit and Control will be established to boost internal control mechanisms and measures to limit risks and costs.



## MEASURES

1. Allocate more expenditure to research contracts.
2. Introduce a full-cost management system for projects.
3. Boost efforts to pool facilities and equipment.
4. Extend internal chargeback.
5. Pursue the modernization of support staff roles.

## OBJECTIVE 5



# Guarantee good resource management and effective governance

As a foundation with officially recognized charitable status funded by public donations, the Institut Pasteur must provide strong guarantees concerning its operation and governance and its supervisory, audit and regulatory procedures. This requires exemplary governance to guarantee that the Foundation is supervised in accordance with the highest international standards.

The Institut Pasteur undergoes regular external checks and audits of various kinds: certification of its accounts, annual audit by the French Code of Trusted Donations Committee, audits by the General Inspectorate of Social Affairs or the French Court of Auditors as a Foundation funded by public donations, etc. In addition to these external audit procedures, the Institut Pasteur enforces strict procedures for rigorous internal controls; it has several committees that deal with its audit and control procedures, especially the Board of Directors' Finance and Audit Committee and the Ethics and Compliance Committee, set up in 2018.

The Board of Directors which began its term in October 2016 has stepped up its supervisory role over the Foundation to guarantee that its governance is both effective and compliant with internal regulations. It intends to continue these efforts and to make use of its role in monitoring the implementation of the strategic plan to fully assume its guidance and oversight tasks.

In addition, again with the aim of strengthening the Foundation's governance and supervisory procedures, the Institut Pasteur is currently pursuing a rigorous risk management policy, which includes drawing up appropriate action plans that are submitted to the committees of the Board of Directors for examination.

The Institut Pasteur intends to continue strengthening its procedures over the period 2019-2023. Several recommendations from the Court of Auditors and the interministerial mission have been incorporated into the drafting of the 2019-2023 strategic plan: structuring the Institut Pasteur's relationships with its university partners, establishing a clear strategy for the Institut Pasteur Medical Center, drawing up mid-term budget projections, strengthening international fundraising structures, improving monitoring of Institut Pasteur procurement activities by the Financial Affairs Department, etc.

Several risk management audits have already been carried out and the recommendations are currently being implemented, but to ensure optimal monitoring of this risk management strategy, a Department for Internal Audit and Control was established. This ensures that risk management can be fully incorporated into the Institut Pasteur's daily activities and the efficacy of internal control mechanisms can be guaranteed. The department will be responsible for

monitoring the achievement of strategic objectives, risk management, compliance with laws and regulations, effective management, the reliability of information and the relevance of communications, in line with best practices for internal control.

The priorities will be to produce a risk map for the Institut Pasteur, to support the implementation of action plans following the audits carried out in the financial years 2015 to 2017, to draw up a plan for the development of an internal control culture at the Institut Pasteur and to propose annual internal audit plans to the Board of Directors. The department will be responsible for both internal control and internal audits. Its independence, which is vital to give it authority and enable it to carry out its work, will be guaranteed by its dual affiliation to both the President and the Chairman of the Board of Directors.

As well as improving the Foundation's governance and audit capabilities, the Institut Pasteur intends to improve its project management capabilities, by establishing clear priorities. This strategic choice involves prioritizing the Institut Pasteur's flagship projects and concentrating our efforts on a smaller number of better funded projects. In line with the recommendations of an audit on project management carried out in 2017, the Institut Pasteur will systematically appoint a leader for each large-scale project, ensuring effective interdisciplinarity and circulation of information among the various project stakeholders.

## MEASURES

1. Set up a Department for Internal Audit and Control under the dual authority of the Institut Pasteur senior management and the Board of Directors.
2. Improve risk management and project management by introducing appropriate tools.





## OBJECTIVE 6

# Use advocacy initiatives to boost research funding

Public funding of research laboratories is an essential driver for scientific excellence at the Institut Pasteur. France still occupies a leading position on the global stage in terms of research funding, but its leadership is starting to wane. It is therefore important for the Institut Pasteur to make every effort to sustain research funding at a high level. This is a guarantee of scientific excellence and economic competitiveness for any country. Financial support for basic research is becoming increasingly fragile, despite its major role in facilitating discovery and enabling groundbreaking technologies. Here again, the Institut Pasteur must play a proactive advocacy role with national authorities to defend basic research. European institutions also need to be taken into account in these efforts, as their funding programs appear to be increasingly focused on applied research. Collaborative basic research therefore needs to be maintained and defended. The Institut Pasteur will play an active role in debates on public research and innovation policies. It will use advocacy initiatives to defend its interests.



## MEASURES

1. Introduce a “public affairs” position in conjunction with the Department of Communications.
2. Working in conjunction with scientists, carry out advocacy among public institutions and citizens to promote the Institut Pasteur’s activities and raise awareness of the need to boost research funding.





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A non-profit foundation with recognized charitable status