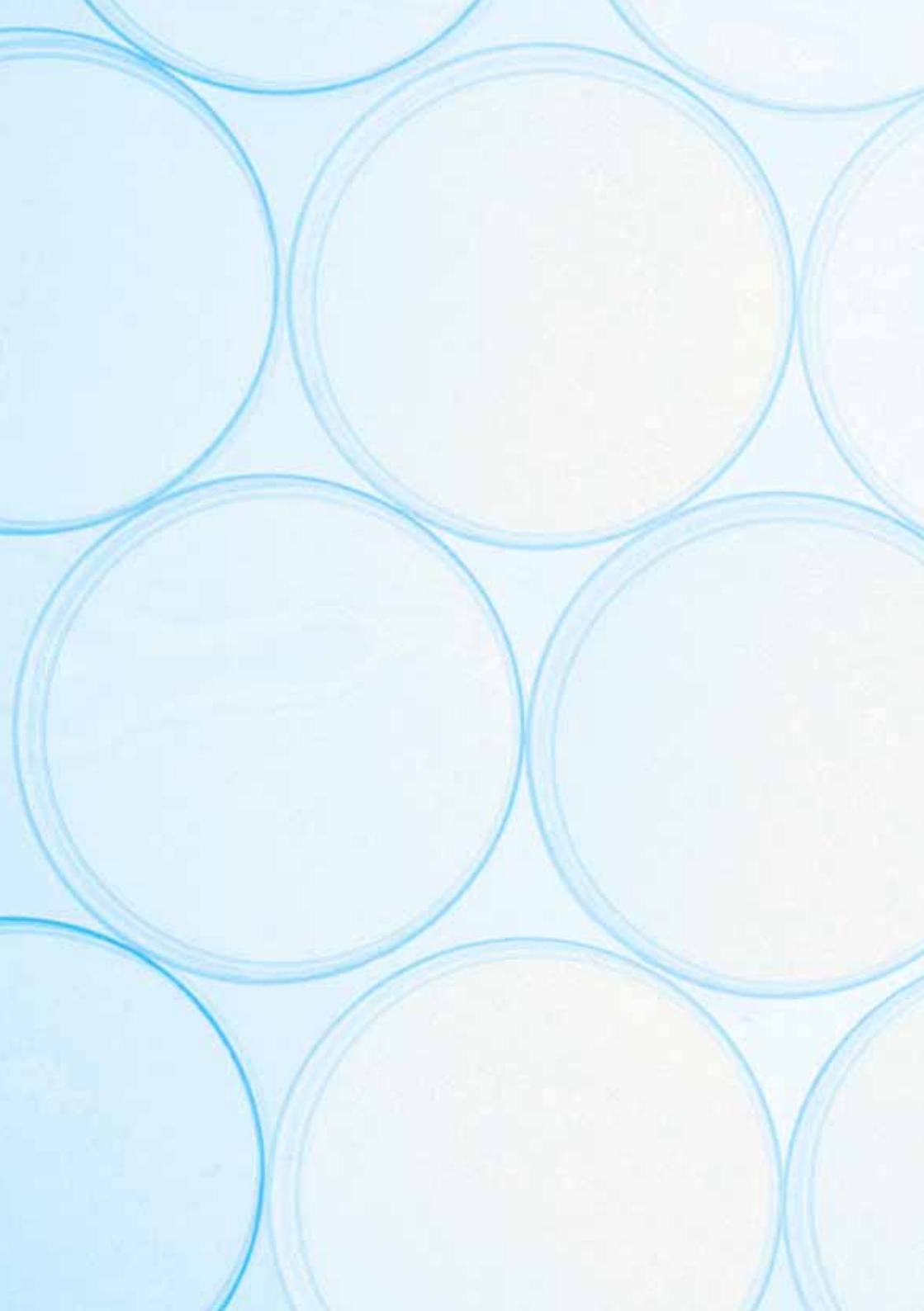
The background features a large, light blue circle with a thin, darker blue outline. Surrounding this circle are several abstract, organic shapes in various shades of teal and blue, some solid and some with a slight gradient, creating a dynamic and modern aesthetic.

Strategy  
& Objectives  
2009-2011

# STRATEGIC PLAN



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## INTRODUCTION

# Innovation in healthcare, a strategic issue

# Building the future with Medicen Paris Region

**T**he healthcare industry (within which innovation is a key activity) has played and will continue to play a major role in the growth of a science-based knowledge economy.

The pharmaceutical market is a particularly high-added-value sector with strong growth potential. Indeed, it is one of the few remaining industrial sectors creating jobs in France and the rest of Europe! However, few countries have all the technical, scientific, medical and industrial skills and resources needed to discover and develop innovations in the field of human healthcare. France (particularly the Paris region) remains globally competitive in the field of drug development, biomedical research and new healthcare technologies. The combination of high-level, interdisciplinary public- and private-sector research with the ability to transfer the resulting knowledge to the patient's bedside will help France to maintain its productivity and competitiveness in this strategic sector. By signing a 2009-2011 Performance Contract with the French State and local

authorities, the Medicen Paris Region cluster has resolutely committed to a new phase in its development. The goal is to maintain and **accentuate the Paris region as Europe's leading industrial center for diagnostic & therapeutic innovation and health technologies** and catalyze the continued growth of solidly anchored, competitive pharmaceutical research capabilities in France.

The cluster's top priority is to maintain the continuum between fundamental research, clinical research and therapeutic research, to integrate and exploit the fruits of translational research («from the bench to the bedside and from the bedside to the bench») in the development of new therapeutic products and novel medical and therapeutic practices. By bringing together physicians, public- and private-sector researchers and patients in centers of excellence with a critical mass of skills and an integrated strategy for healthcare, teaching and research, translational medicine enables new knowledge to be interpreted and applied as quickly as possible.

Translational medicine enables physicians and researchers to test the pertinence of a biological hypothesis or an innovative diagnostic or therapeutic approach and to determine the biological basis of a clinical observation (in a single patient or a population) likely to open up new avenues in therapeutic research. Hence, translational medicine is undoubtedly a key competitiveness factor for pharmaceutical and biotech companies.

With this perspective, and given the assets of the Paris region and unmet therapeutic needs in well-identified diseases, Medicen Paris Region has placed **translational medicine** at the heart of its strategic plan. Clinical research and imaging are necessarily strong program-oriented axes in this field, whereas **biological tools** for research, diagnostics or therapeutics (biomarkers, innovative model systems and biotherapeutics) and **digital biology** (integrated biology, bioinformatics, the brain-machine interface and e-health) are also essential success factors.

Moreover, the cluster will facilitate the development of **higher education** and **vocational qualifications** in response to the needs expressed by academic and business stakeholders.

### Medicen Paris Region has placed translational medicine at the heart of its strategic plan

The ambitiousness of Medicen's objectives is matched by the Paris region's assets in the healthcare and life science sectors. The region's stakeholders cover the entire development chain for therapeutic and diagnostic products and the great majority are already cluster members.

As the European Union's leading center for science and technology (accounting for 7.5% of Europe's R&D expenditure), the Paris region has remarkable R&D firepower. Alongside healthcare players, the region is home to major clusters and centers of research excellence in physics, applied mathematics, statistics, computing and information & communication technology. These clusters complement and reinforce our own activities; indeed, Medicen Paris Region intends to form a strong partnership with the System@tic Paris Region cluster (dedicated to the design, development and control of complex systems).

Medicen is now committed to pro-actively translating the Paris region's extraordinary potential into high-volume economic value creation. One of its core strategic priorities is to break down silos in the innovation ecosystem (in close cooperation with other regional players in economic development),

improve knowledge/technology transfer to industry and, more generally, set up the right conditions for taking innovations to market.

By relying on strong commitments from cluster members in general and multinational companies in particular, Medicen Paris Region intends to foster the emergence of common approaches, objectives and actions founded on dynamic dialogue and experience sharing between its members. The cluster has revised its governance by appointing a new Delegate General and setting up three strategic steering committees (R&D, Development & the Innovation Ecosystem and Activities & Public Relations) mandated by its Executive Management Board and its Administrative Council. Medicen will act decisively to (i) promote the emergence of the small and medium-sized companies (biotech firms, medtech companies and CROs) that are primarily responsible for growth in the region's healthcare sector, (ii) reinforce the cluster's roots with the Paris area, (iii) forge collaborations with other clusters in France and worldwide and (iv) raise the cluster's profile and that of its members.

Medicen Paris Region would not have been able to launch this new phase in its development without extraordinary support from cluster members during negotiation of the 2009-2011 Performance Contract and the

unfailing support of its public-sector partners: the French State, the Ile-de-France Regional Council, Paris City Council and other local authorities. By pooling expertise and know-how in order to grow the French healthcare sector, Medicen Paris Region has the ability to create an ecosystem that will deliver major innovations in the field of human healthcare and provide concrete answers to business issues and patient needs through medical progress.

Emmanuel Canet  
President of the Medicen  
Paris Region cluster



# THE CLUSTER'S OBJECTIVES

## To achieve true medical breakthroughs

and so contribute to improvements in public health, Medicen Paris Region is seeking to maintain and **accentuate the Paris region as Europe's leading industrial center for diagnostic & therapeutic innovation and health technologies**. This will translate into the creation of economic value for the region as a whole and its individual stakeholders.

With a very high attrition rate and ever-increasing R&D costs and time constraints, life science and healthcare businesses must sharpen their ability to innovate and take the resulting innovations to market as rapidly as possible.

Medicen Paris Region's goal is to encourage and facilitate these efforts and to ensure the lasting presence of strong, competitive pharmaceutical research capacities in France and Europe by performing knowledge/technology transfer and cross-fertilizing cultures that must remain complementary in terms of their contributions and objectives. The cluster will work to maintain the continuum between fundamental research, clinical research and therapeutic research and to integrate and exploit the fruits of translational research in the development of new therapeutic products and novel medical and therapeutic practices.



With this perspective, Medicen Paris Region has placed therapeutic innovation and the patient at the heart of its strategy and will focus on three high-priority axes: **translational medicine, biological tools and digital biology**. This strategy matches the Paris region's assets in these fields (which are essential for therapeutic progress) on one hand with unmet medical needs in well-identified diseases on the other.

**Medicen Paris Region is seeking to become a networked center of excellence dedicated to therapeutic progress in human healthcare. It will adopt a dynamic, cluster-based approach for:**

### **Developing business and employment**

in high-potential markets by promoting dynamic networking between SMEs, large companies, academic labs, clinical centers and teaching & training centers and stimulating the transfer of innovative technologies.

### **Reinforcing international competitiveness**

in France's hi-tech healthcare sector by stimulating the Paris region's ability to innovate.

### **Boosting the attractiveness**

and dynamism of the Paris region.

# THE CLUSTER'S R&D STRATEGY



# Medicen Paris Region's new R&D strategy

is based on the many skills available in the Paris region. It will stimulate academic and clinical stakeholders, meet industry's needs and help develop the region's economic fabric by leveraging the technological offering of its start-ups/SMEs and CROs.

## Medicen Paris Region has selected

### 3 major R&D themes

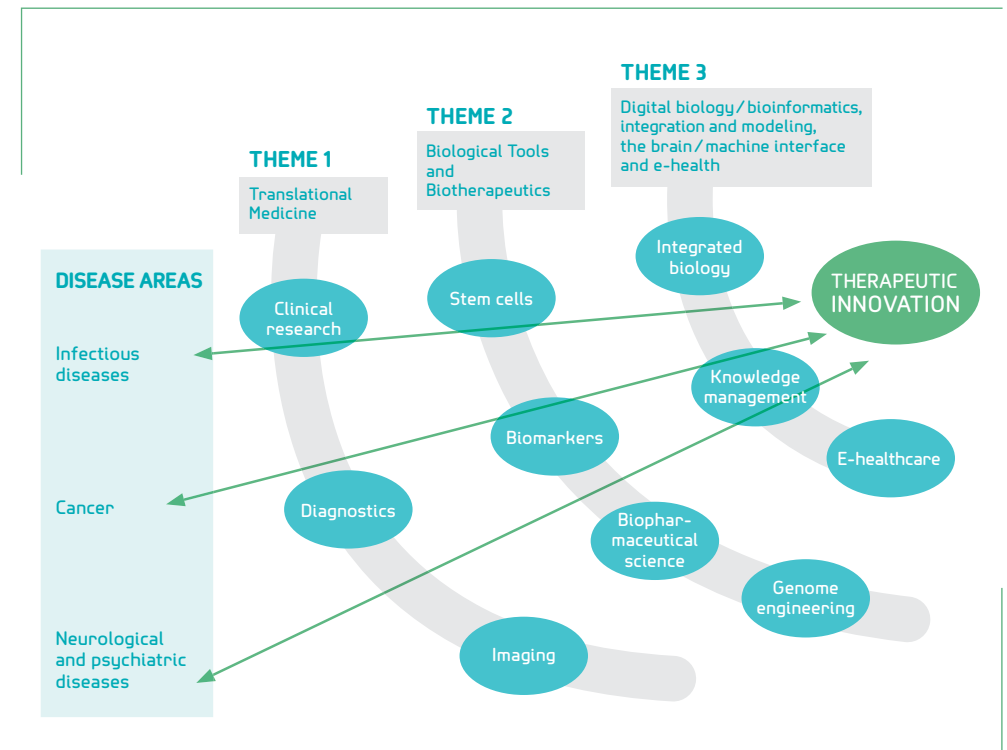
**THEME 1** Translational medicine - an innovation - generating approach.

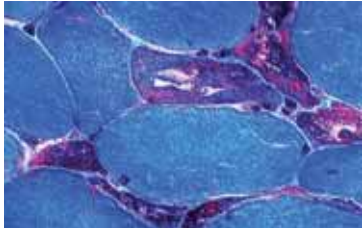
**THEME 2** Biological tools for industrial use and biotherapeutics products for better diagnosis, treatment and prognosis.

**THEME 3** Digital biology: bioinformatics, integrated biology, modeling, e-health and the brain machine interface, in order to better understand, model and simulate disease.



## A CROSS-DISCIPLINARY, CROSS-SECTOR APPROACH





### 3 major disease areas with unmet diagnostic and therapeutic needs

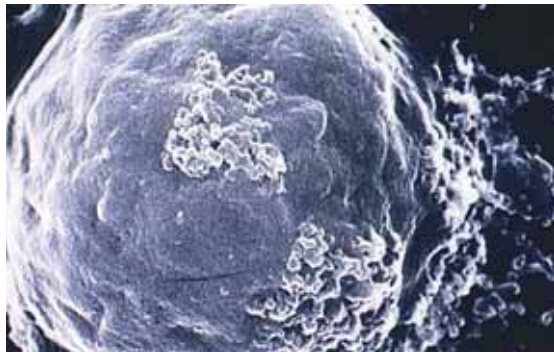
**FIELD 1** Cancer

**FIELD 2** Neurodegenerative, sensory and psychiatric diseases

**FIELD 3** Infectious diseases

**Medicen Paris Region's defined field of activity** will, in the long term, open out to other disease areas. Moreover, the R&D-focused activities led by the cluster will generate solutions for needs in the imaging and biological tools markets.

To achieve its objectives, the cluster has placed the intensification of innovation transfer from research organizations to industry (both SMEs and multinationals) and accelerated market access for therapeutic and/or technological innovations at the heart of its strategy.



THE CLUSTER'S  
KEY DISEASE AREAS  
AND HIGH-PRIORITY  
MARKETS

# The cluster's target diagnostic and therapeutic markets

concern drug development (with priorities in cancer, neurodegenerative & psychiatric diseases and infectious diseases) because of the significant unmet medical needs and the presence of strong assets in the Paris region. Innovation in these fields requires significant technological developments in fast-moving markets - imaging, biological tools and digital biology.

The Paris region - Europe's most economically powerful region in life science and healthcare

- **50%** of all French biotech companies
- **40%** of French academic research
- **9** universities and **20** high-level business and engineering schools
- **300** public-and private-sector research labs
- **The Paris Public Hospitals Group (AP-HP)**, Europe's largest network of hospitals

Biotech, the Paris life science park

- **8 hectares**
- **28,500 m<sup>2</sup>** of office and lab space
- **Land available for the construction** of an additional **40,000 m<sup>2</sup>** of real estate
- **24 companies**, including 8 start-ups

Key figures for 2008:

- **34 patent applications**
- **6 proofs** of concept
- achievement of **7 preclinical milestones** and **2 clinical milestones**
- **18 major scientific advances** and many scientific publications and presentations



## Pharmaceuticals

### Cancer, the leading cause of mortality in developed countries

In Western Europe and the USA, 70% of cancer drug sales come from products launched less than 10 years ago and over 30% come from drugs launched in the last 5 years – striking proof of the dynamism of therapeutic innovation in this field.



The «Canceropôle Île-de-France» cancer cluster\*

- **42%** of France's public-sector oncology research
- **over 5,000** researchers, post-docs and PhD students
- **over 150** research groups (INSERM, CNRS, universities, CEA)
- **70,000** patients treated every year
- **500** dedicated beds
- **135** clinical studies

\* AP-HP, René Huguenin Centre, Curie Institute, Gustave Roussy Institute, Pasteur Institute, Paris-Diderot University, University Hematology Institute, Pierre and Marie Curie University.

Major French pharmaceutical companies

are based in the Paris region and have acknowledged research expertise in oncology: sanofi-aventis, Ipsen and Servier.

## A sharp increase in the incidence of neurodegenerative, sensory and psychiatric diseases

### The Paris region's assets

- **48%** of France's publicly funded neuroscience research
- **215** research groups in 69 different units or research labs (INSERM, CNRS, INRIA/CNRS, INRA and CEA)
- **60,000 m<sup>2</sup>** of dedicated lab space

Given the ageing population and the lack of efficacious treatments, neurodegenerative, sensory and psychiatric diseases are generating increasingly significant medical needs.

In France, about 350,000 patients are receiving long-term treatment for Alzheimer's disease and related conditions; 100,000 people are suffering from Parkinson's disease and 80,000 have multiple sclerosis.

### Key players in the Neuropôle de Recherche Francilien neuroscience research network

- The Paris Île-de-France **École des Neurosciences** advanced research network, which includes most of the region's top neuroscience groups
- **The Fondation Fondamental**, which has prompted university medical centers throughout France to form the country's first ever nationwide mental health network
- **The Fondation Voir et Entendre**, funding research on sensory handicaps in vision and hearing

### Examples of cutting-edge infrastructure

- **The Vision Institute**, Europe's first ever integrated research center fully dedicated to eye disease
- The joint **CEA-INSERM MIRCen** preclinical imaging facility
- **NeuroSpin**, the CEA's center for magnetic resonance imaging of the brain

### Leading corporate players

France's major pharmaceutical companies are also highly involved in neuroscience.

For example, in February 2008, sanofi-aventis' development pipeline contained 24 therapeutics for central nervous system diseases.

Around thirty extremely innovative biotech companies (such as Biocortech, Genescore, Fovea Pharma, Mauna Kea Technologies, Pharmavectys, Theraptosis, etc) work in close collaboration with the multinationals and academic research centers.

## Infectious disease: unmet medical needs are still present!

Infectious disease is the world's second ranked-cause of mortality in adults and is making a comeback: the emergence of new pathogens, the appearance of resistant forms of known pathogens and the chronic nature of certain infectious conditions.

Fear of a true pandemic has also reactivated public health concerns by emphasizing the lack of truly effective antivirals and the need for a country to have its own vaccine production facilities.

### The Paris region's assets

- **Exceptional academic research firepower:** The Pasteur Institute, 19 INSERM units dedicated to infectious disease research, 8 CNRS units and the AP-HP
- **Growing commitment** from major pharmaceutical companies (sanofi-aventis, Bio-Rad) and over 40 biotech companies, including many start-ups (Novoxel, CellVir, etc.)

## The imaging market

PRIORITY  
#2

The worldwide imaging market has displayed steady growth over the last few years. The imaging companies are no longer just focusing on diagnosing a disease but are positioning themselves along the whole care continuum:

- screening, prevention and predictive diagnostics
- diagnosis
- modulation of treatment and care provision
- monitoring of treatment efficacy
- recovery
- follow-up

The market is also witnessing the development of a third type of biomedical imaging - molecular and cellular imaging.

### The Paris region's business and industrial assets

- **R&D centers** from the world's top three biomedical imaging companies (GE Medical Systems SCS, Siemens Healthcare France, and Philips Healthcare Medisys)
- **Guerbet**, ranked fifth in the world for contrast and radiopharmaceutical products
- **CISbio international**, a specialist in the development, production and sale of radiolabels
- **A dozen** specialist SMEs

PRIORITY  
#3

## The biological tools market

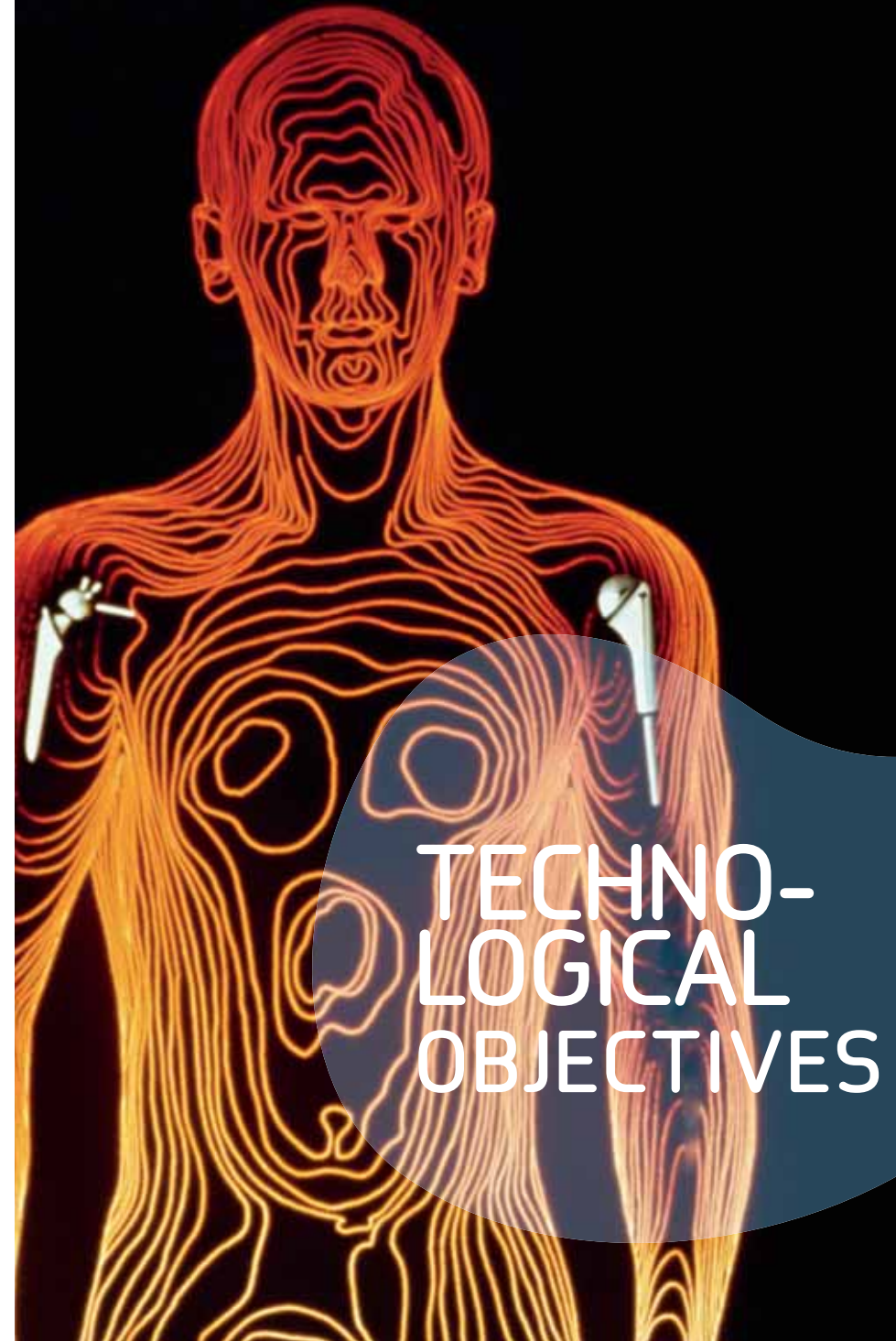
Biological approaches in general (and the engineering of living systems for therapeutic or diagnostic purposes in particular) constitute a rich seam of innovative products and services for the years to come.

The creation of new experimental models (from molecular systems and animal models to genome engineering and pluripotent human cell lines), gene transfer vectors, biomarkers and other innovative tools is essential for the identification and the development of new therapeutic approaches.

The challenge here is to provide translational medicine with the tools it needs and to develop new biotherapeutics which reflect the cluster members' potential for therapeutic innovation.

Genopole®:  
France's leading life science park

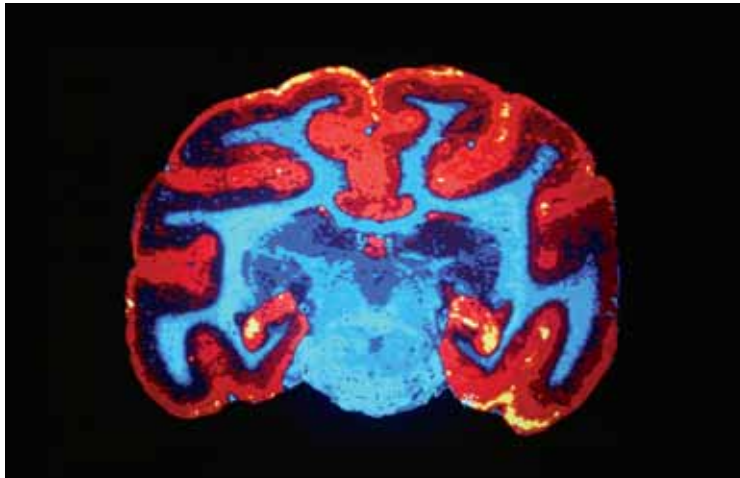
- **20 academic research labs**, including the CEA Genomics Institute which houses the French national sequencing and genotyping centers.
- **69 life science companies**
- **19 shared-access technical facilities and technology platforms**
- **87,298 m<sup>2</sup>** of lab and office space
- **2,293** staff based on the biopark



TECHNO-  
LOGICAL  
OBJECTIVES

# Translational medicine is a pivotal part of clinical research.

It encompasses (and is enriched by) investigative techniques with imaging and biomarkers and relies on a vast but evolving set of biological tools and advances in bioinformatics and integrated biology.



PRIORITY  
#1

## Foster high-level translational medicine in the following fields:

### Clinical research

**GOAL 1 Help** develop and/or create at least five centers of excellence in translational medicine.

**GOAL 2 Promote** the emergence of innovative collaborative projects or technology platforms likely to contribute to the centers' development or international visibility.

**GOAL 3 Implement** a comprehensive training program for the researchers and medical & paramedical personnel who are managing projects and steering the development of these centers.



### Imaging

**GOAL 1 Structure** and raise the profile of the region's centers of excellence in imaging and organize access for stakeholders in translational medicine.

**GOAL 2 Catalyze** breakthrough collaborations on imaging and related technologies, with a view to increasing our understanding of how healthy and diseased living systems operate on the cellular and tissue levels.

**GOAL 3 Develop** new biomedical applications in diagnosis, prognosis and imaging-guided therapeutic intervention.

## Discover and develop biological tools for industrial use and produce innovative biotherapeutics

### The Paris region's skills

- Genetic and protein sciences
- Cell and tissue engineering
- Industrial bioengineering

### Biomarkers

Biomarkers embody two aspects of the promise of translational medicine.

**Industrial potential:** biomarkers help improve the productivity, efficiency and speed of pharmaceutical R&D through better definition of the patient populations likely to benefit from a given therapeutic innovation and more rapid validation of successful treatments.

**Medical potential:** biomarkers provide physicians with support tools for personalized therapeutic decisions and follow-up procedures for a given patient.

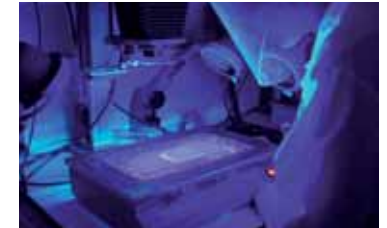
**GOAL Promote** the emergence of a biomarkers sector that is able to cover the continuum between fundamental research and medical practice and reinforce cooperation between biotech firms and pharmaceutical companies.

### Models which are more representative of the target human diseases

**GOAL 1 Federate** cluster members around the development and validation of cell or animal models that are not only representative of human physiology and disease but also take account of the diversity and variability found in human populations. The goal is to set up a system for the widespread dissemination of toxicological cell models, «simple» (monogenic) disease models and then «complex» (polygenic or acquired) disease models.

**GOAL 2 Industrialize** the production of models and facilitate their use by anchoring the know-how and skills within the Paris region.

**GOAL 3 Reinforce** the chemistry-biology interface (and structural biology in particular), in order to better model the targets of interest and accelerate drug discovery.



### Safe, effective biotherapeutics

**GOAL 1 Design** new technological approaches for innovative biotherapies and contribute to the emergence of at least one of these approaches in the Paris region. Technologies related to drug formulation and targeting form an integral part of this objective.

**GOAL 2 Structure** the industrialization of stem cell technologies and help validate their therapeutic potential. Stem cells will become true industrial components and potentially transplantable materials by overcoming the obstacles on which previous approaches have foundered. This will lead to the implementation of reproducible, controlled industrial production and logistics, allogeneic transplants rather than autologous transplants and better understanding of and control over the biological object and transplant procedures.

**GOAL 3 Create** qualifications in the field of innovative biotherapies and bio-engineering.

## Promoting digital biology – an alliance between biology and information & communication technology

Thanks to progress in the exploration of living systems, molecular data are now being produced on a very broad scale - which increases the volume, heterogeneity and complexity of the biological and clinical dataset to be analyzed. Designing new therapeutic strategies based on the effective exploitation of this huge mass of information and the modeling of integrated systems constitute one of the main challenges in life science in the years to come.



There are two main fields:

### Bioinformatics and integrated biology

**GOAL 1 Identify and accentuate** the competitiveness of academic and industrial stakeholders in the field of integrated biology.

**GOAL 2 Develop** training and teaching programs in integrated biology and the use of ICT in translational medicine.

**GOAL 3 Create** in silico predictive models for use in biology, medicine and biopharmaceuticals.

### Emerging themes: the brain-machine interface and e-health

**GOAL 1 Build** an «e-health task force» (telemedicine, remote monitoring, etc.) associating four clusters from the Paris region: Cap Digital, Advancity, System@tic and Medicen.

**GOAL 2 Set up** a think-tank on brain-machine interfaces with a view to identifying the associated technological issues and industrial challenges and defining strategic priorities and projects.



DEVELOPMENT  
OBJECTIVES FOR  
THE CLUSTER AND ITS  
ECOSYSTEM

Creating truly cluster-based dynamism, contributing to the creation and development of SMEs (major stakeholders in the cluster) and reinforcing the cluster's industrial attractiveness are all key objectives for Medicen Paris Region.

**Drawing up an inventory of cluster stakeholders, strengths and resources**

One high-priority action will be to map the cluster skills which match our R&D strategies and high-priority development axes.

**Promoting our members**

in general and our SMEs in particular is an ever-present concern for the cluster. This is achieved by helping members to attend international events, establishing a dedicated public relations strategy, disseminating their corporate news and providing them with the latest

sector-specific information and calls for proposals.

**Providing SMEs with business support**

In order to help SMEs access private- and public-sector funding on the regional, national and European levels and grow their business activities, the cluster will have to work to better explain the diversity of life science business models to a broad community of investors so that each type of company and each stage in corporate life can be matched with the appropriate sort of funding.



## Foster the emergence of common approaches, objectives and actions founded on dynamic dialogue and experience sharing between its members

**GOAL Reinforce** the members' reciprocal knowledge of their activities and their commitment to joint objectives and promote top-level collaborative projects.



## Reinforce the cluster's resources and territorial anchorage so that it becomes a key player in healthcare in the Paris region

**GOAL 1 Develop** the cluster's financial resources, by signing annual contracts with public-sector funding bodies and growing its self-generated income.

**GOAL 2 Act** as a preferred advisor to public-sector partners by informing them on the most pertinent initiatives and activities, notably in terms of territorial planning in the healthcare field.

**GOAL 3 Promote** the development of training and teaching programs that meet the needs of companies and research organizations, with a view to reinforcing the long-term attractiveness of the Paris region's universities.

PRIORITY  
#3

## Help the Paris region's SMEs to integrate themselves into healthcare market subsectors

**GOAL 1 Assist** the region's healthcare SMEs to integrate themselves into technology-based or disease-area-based market subsectors.

**GOAL 2 Optimize** access for SMEs to private and public-sector funding on the regional, national and European levels and boost their R&D activity and turnover.



PRIORITY  
#4

## Develop national and international collaborations and raise the profile of the cluster and its members

The true complementarity between the Paris region's clusters constitutes a rare opportunity to promote the development of each organization.

**GOAL 1 Sign** collaboration agreements with three other clusters in the Paris region.

- **System@tic**, dedicated to the design, development and control complex systems. Medicen Paris Region intends to establish synergy in the fields of modeling, simulation, imaging, decision-support and e-health.

- **Cap Digital**, whose goal is to constitute a world-class cluster for the creation, modification and dissemination of digital content.

- **Advancity**, a cluster for the sustainable city and urban ecotechnologies, has developed an «Accessibility and Urban Healthcare» theme with the support of the Centrale-Santé think tank. It is considering a collaboration with Medicen Paris Region on the interface between healthcare and the urban environment.

**GOAL 2 Develop** collaborations with French, European and international life science clusters in order to give its members access to resources and opportunities that are not available in the Paris region.

Medicen Paris Region is involved in a major European project

**The Advanced Biocluster for Europe** project features 13 European clusters. It seeks to reinforce collaborations between clusters and their constituent companies and provide better quality services to biotech companies. The ultimate goal is to develop and apply good practice and help cluster SMEs to grow their international business.

By improving its members' ecosystem, facilitating dialogue between stakeholders in innovation, fostering the emergence of a collaborative state of mind and forging long-term international links, Medicen Paris Region will have achieved its objective: to create economic value for the Paris region and its stakeholders.

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[www.medicen.org](http://www.medicen.org)



Cluster and project's funding partners

