



**FRENCH
EXPERTISE
IN ONCOLOGY
CHART**

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PREFACES



Jean-François Gendron,
President of the French Health Association

Within the French Healthcare system, the [French Healthcare Association](#) brings together French healthcare key players wishing to jointly promote their activities internationally. Reflecting the diversity of the French healthcare ecosystem, it aims to promote the excellence of French healthcare offers internationally, in conjunction with other key players in the healthcare sector and in line with the international aspect of the healthcare sector, health technologies and industries sector strategic committee (CSF-ITS).

The Association has previously produced thematic sheets (Hospital infrastructures, Management of potentially infectious waste, Mobile healthcare, Medical imaging, etc.) and a project around a major public health issue, diabetes, with the creation of a chart showing all the French key players and businesses that work with this disease (www.frenchhealthcare-association.fr/en/our-publications/).

We are offering you this new chart, the aim of which is to highlight the differences of an international French offer in terms of cancer care: consulting and training expertise, exportable organizations (transversal cancer units, molecular diagnostic platforms, etc.), exportable industrial solutions (drugs, medical devices, telemedicine, information systems, etc.), research partnerships, training of international professionals in France and reception of international patients.

Such a document is intended to be widely distributed internationally (at conferences, to embassies, health clubs, chambers of commerce abroad, etc.) to promote the excellence of this French sector. We hope that it will enable constructive and fruitful dialogues to be initiated between French key players and their international partners.



Jean Patrick Lajonchère,

Export health federator, to the Minister for Europe and Foreign Affairs and to the Minister for Foreign Trade and Attractiveness

The cause of nearly 10 million deaths in 2020, cancers are one of the leading causes of death worldwide. Almost one in six deaths is due to cancer according to the World Health Organization. Cancers are also the leading cause of preventable death, as it is currently estimated that nearly one in two cancer deaths could be prevented. The fight against cancer is in this regard a major public health issue, which affects all countries.

France has made it a long-standing priority, relying on ambitious national cancer control plans, renewed since the beginning of the 2000s, which have enabled significant investments in prevention, diagnosis and treatment, patient care and improved quality of life, as well as basic research, an important source of future progress.

France benefits today from the contribution of very high-level medical research, particularly in immunology and targeted therapies. Our healthcare system has excellent public and private healthcare. This is based on a regional network suitable for providing access to healthcare for all, made up of specialized centers for the fight against cancer active internationally. Finally, our country has a particularly rich fabric of healthcare industries, which are efficient and innovative in this area.

It is these ambitions and this French expertise that underpin French Healthcare. This innovative public-private initiative supported by the Ministry for Europe and Foreign Affairs brings together, under a common banner, all French health key players (companies, health establishments, research institutes, innovation centers, researchers, etc.) to promote their activities, expertise, technology and innovations internationally.

The document presented to you here is the result of an inventory of the offer made by this ecosystem committed to the fight against all types of cancer.



Professor Jean-Yves Blay

President of Unicancer and Managing Director of the Léon Bérard Comprehensive Cancer Centers

France has a solid history in the field of oncology: with specialized centers identified in the 1920s and formalized by the creation of the Centers for the Fight against Cancer (FCCC) in 1945, commitments in clinical research from the start of the 1950s at national and European level, for example with the creation of the European Organisation for Research and Treatment of Cancer (EORTC) in 1962¹, the gradual installation of Cooperative Groups in Oncology since 1980, as well as the creation of the National Cancer Institute in 2005.

France has played a driving role in the establishment of international care standards and the resolute organization of optimal routine care for all across the country, in parallel with the development of flourishing clinical research and transfer.

Our country's commitment also relates to training. Welcoming practitioners from around the world to teaching is a tradition that is also rooted in many establishments. It is now a question of transmitting increasingly complex and rapidly evolving skills, which characterize oncology in 2021, of sharing care standards, but also of encouraging the construction of joint projects between hospital structures, for example through twinning and the dissemination of expertise worldwide.

The Cancer Centers of the Unicancer federation, many University Hospital Centers (CHU in French) and public or private hospitals are therefore committed to welcoming practitioners from all countries, with an offer of dedicated courses, training sessions, pre- or post-doctoral internships, on-site training with our foreign partners, as well as twinning arrangements for partner universities and hospitals. Welcoming foreign patients for the implementation of complex treatments and the application of innovative technologies is also one of our missions.

Our ambition is to disseminate innovation and excellence in oncology to as many people as possible. To do this, the France Healthcare association has compiled a chart of the French oncology offer. The ambition of this rapidly evolving document is to share knowledge, organizations, training, technological innovations and research programs with as many practitioners and patients as possible.

We hope you enjoy reading it and look forward to meeting you.

Acronyms

AI: Artificial Intelligence

CHU: Centre Hospitalier Universitaire, which refers to a hospital or university hospital

CIC: Centers for Clinical Investigations

CICT: Centre International des Cancers Thoraciques, which refers to International Center for Chest Cancer

FCCC: French Comprehensive Cancer Centers (FCCC), CLCC in French

GCS: Groupement de coopération sanitaire, which is the health cooperation group

HAS: Haute Autorité de Santé, which is the French National Authority for Health

HCL: Hospices Civils de Lyon, which is Lyon University Hospital

INCa: Institut National du Cancer, which refers to The French National Cancer Institute

Inserm: L'Institut national de la santé et de la recherche médicale, which refers to the National Institute for Health and Medical Research

LEA: European Associated Laboratory

Radboud UMC: Radboud University Medical Center

INTRODUCTION



Cancer is a major public health problem internationally and is the leading cause of death in the world.

Cancer : 10 millions deaths, or almost one in six deaths in 2020²

Is estimated in 2018³

New cases: 18,1 million
New cancer deaths: 9,6 million

♂ **1 in 8 men** will die from cancer
♀ **1 in 11 women** will die from cancer

♂ **1 in 5 men** will develop cancer in their lifetime
♀ **1 in 6 women** will develop cancer in their lifetime

In France, cancer has become the leading cause of death, ahead of cardiovascular disease.

It is estimated that nearly half of cancers in people over 30 are attributable to modifiable risk factors such as smoking, alcohol consumption, diet, physical inactivity, certain infectious agents, certain occupational exposures, exposure to natural and artificial ultraviolet rays and air pollution. There are many challenges:

- Prevention to fight against the large proportion of preventable cancers.
- Screening, to improve the prognosis by intervening as early as possible. It is estimated that 50% of patients can be cured, especially if they are diagnosed and taken care of as early as possible.
- More and more precise and personalized diagnoses, with techniques of imaging, biology, genetics, molecular diagnosis, etc.
- Precision and personalization of therapies, not only falling under conventional treatments (surgery, radiotherapy, chemotherapy).
- Follow-up, life after cancer.
- Equal opportunities for patients, access to innovative molecules, etc.

There are many innovations to strengthen cancer management in all areas: evolution of surgical techniques (ambulatory, robotization, interventional radiology, virtual and augmented reality), radiotherapy (proton therapy), new generations of immunotherapies, targeted therapies, genome sequencing, increasing influence of data, artificial intelligence in research, evolution of the course of care and the organization of care under the effect of digital transformation. With various Cancer Plans, France has been structured since 2003 by mobilizing health key players around prevention,

screening, care, research, support for the patient and their relatives, as well as “living before and after cancer”. They have set minimum quality standards for patient care, fought to reduce inequalities and losses of opportunity, established networks, shared molecular biology platforms, and made it possible for everyone to have access to the latest and most innovative therapies, which are often very expensive. The ten-year strategy launched in 2021 aims to significantly reduce the presence of cancer in the daily lives of French people.

To meet the aims of the first Cancer Plan, France created the INCa (Institut national du cancer) in 2004. INCa is the state’s health and scientific expertise agency in oncology. Responsible for coordinating actions to combat cancer, the agency, through its integrated vision of all the health, medical, scientific, social and economic dimensions linked to cancer pathologies, works to help sick people, their relatives, users of the healthcare system, the general population, healthcare professionals, researchers and decision-makers in the fields of prevention, screening, care and research.

France has exceptional cancer care facilities, such as the 18 Comprehensive Cancer Centers (FCCC or CLCC in French) of the Unicancer network, University Hospital Centers (CHU in French) and private sites of excellence. Twelve out of 18 Comprehensive Cancer Centers are ranked among the best oncology hospitals in the world, two of which are among the top 50 (Gustave Roussy and Curie Institute are respectively 5th and 31st) – (Ranking of the World’s Best Hospitals 2021 of the American magazine Newsweek, published in October 2020).

12 out of 18 Comprehensive Cancer Centers are ranked amongst the best oncology hospitals in the world, 2 of which are among the top 50*



5e



31e

Several French University Hospital Centers included among the 100 best hospitals in the world*



Several French private institutions among the 100 best hospitals in the world*



Five FCCCs, institutions of the Unicancer network – Curie Institute, Léon Bérard Center, François Baclesse Center, Paoli-Calmettes Institute and Claudius Regaud Institute, Toulouse University Cancer Institute – have received the Comprehensive Cancer Center accreditation given by the Organisation of European Cancer Institutes (OECI). This official designation rewards cancer institutes that integrate a maximum of medical and technical skills (radiotherapy, imaging, surgery, nuclear medicine, laboratory, hematology, etc.) and research, both basic, translational and clinical.

This model of integrating research, care and teaching, and aiming for global, excellent and accessible care, is taken up in all the Unicancer network centers, private non-profit health institutions, spread over 21 hospital sites in France. Unicancer is the only national hospital federation entirely dedicated to cancer research, as well as the leading academic promoter of clinical trials in oncology in Europe.

French expertise in the field of cancer innovation is recognized. France is the only European country to have installed an academic network of 28 molecular genetics platforms that carry out molecular diagnostics to guide the patient’s diagnosis and the proposed therapeutic approach, particularly medicinal. Some 100,000 molecular tests are performed annually for 75,000 patients.

The health-care industry in France



More than 3100 businesses



More than 200k direct jobs



#1 for the number of patents filed in the medical field



3rd largest export sector in France

* Ranking of the World’s Best Hospitals 2021 of the American magazine Newsweek, published in October 2020

2. [who.int/fr/news-room/fact-sheets/detail/cancer](https://www.who.int/fr/news-room/fact-sheets/detail/cancer)
3. santepubliquefrance.fr/maladies-et-traumatismes/cancers

CHAPTER

1

THE FRENCH
OFFER IN
HUMAN
EXPERTISE



1. CONSULTING

National expertise, public health models and professional organizations set up in France within the framework of the Cancer Plans within institutions can be deployed internationally.

French experts have the capacity to assess a country's oncology needs and then to support it in the implementation of a national cancer strategy (Cancer Plan).



The Curie Institute

The Curie Institute operates in several countries. It advises and assists Tanzania in the implementation of a National Strategy for the Prevention, Screening, Implementation of Radiotherapy and Anatomic Pathology Laboratories with funding from the French Development Agency (AFD). It also supports Lebanon in the realization of a flash diagnosis in oncology, gives follow-up recommendations on several levels (organizational, training, equipment, etc.) and

helps in the implementation of the chosen solutions. In Kazakhstan, the Curie Institute is supporting the creation of a new cancer institute.

The Curie Institute can also help an institution already specialized in oncology to obtain the Comprehensive Cancer Center accreditation, or even certify it, with the Institute being authorized as a certifier.



Gustave Roussy

Expertise in the organization of care can also be adopted internationally. Gustave Roussy, the first European Cancer Center, has developed an international consulting activity. Gustave Roussy exports a specific method linked to the organization of a breast cancer detection center in one day. This model, called the One Stop Clinic, aims to improve the quality of diagnostics, reduce the time taken to care and reduce the cost of complete procedures. This model is based on an organization that provides immediate patient care and up to the same day submission of a treatment plan, if necessary. The management of the advertisement and psychological support are also part of the process.

One Stop Clinic has also been designed to reduce patient anxiety, improve patient satisfaction and pain management. This organizational model also treats prostate cancer and sarcoma. The One Stop Clinic model is market-

ed to state agencies, with the aim of being integrated into their health system (for example in Egypt or Peru).

Support can also be provided at the level of an institution or department. The Centers for Cancer Control, which are entirely dedicated to this disease, can share the expertise of setting up a center.



Léon Bérard Center

The Léon Bérard Center has developed a support service to set up an oncology center and help organize care (multidisciplinary concertation meetings, patient journeys from cancer suspicion to post-cancer, including support care). It led a consulting mission to Morocco for the Oncology and Diagnostic Group of Morocco (ODM), a Moroccan health platform offering oncology services. The mission was

structured around four main areas: medical supply, training of medical and paramedical personnel, sharing of expertise and scientific research. Currently, Léon Bérard Center is working on a project with Egypt to export their expertise in the field of multidisciplinary concertation meetings.



Foch Hospital

Foch Hospital is involved in international health advisory missions by cooperating with public and private health institutions, as well as ministries in the development of their health projects. The methodology used is based on an audit, which allows for adaptation to the specific characteristics of each partner and the context in which it operates. A delegation from Foch Hospital, for example, audited two university hospital centers in Cotonou, Benin, in December 2020 to set up a day hospital in oncology based on a centralized chemotherapy prepa-

ration unit. The support offered is based on the analysis of practices and the proposal of tailor-made solutions, but also on the training, the drafting of the medical project, the advice in equipment and the optimal structuring of the patient journey.

2. TRAINING SERVICES ABROAD

AP-HP



Created in December 2016 by AP-HP (Assistance publique – Hôpitaux de Paris), the subsidiary AP-HP International (AP-HPI) aims to provide services and expertise at international level, notably in training, auditing, consulting and participation in the management of health services. AP-HPI has been conducting several major types of contracts for the last three years: preliminary studies for the construction and/or rehabilitation of hospitals, building assistance and training.

AP-HPI intervenes upstream of a project by studying the medical and regional strategy most likely to lead to a coherent investment

project that meets the identified health needs. AP-HPI also engages in longer-term partnerships to support the operational implementation of care by providing training opportunities and advice to the organization and management of hospital structures that have drawn on its expertise. Several projects in the organization of oncology care are being implemented or are being studied (Benin, Tunisia, Latin America, Central Asia).

Training abroad is often part of long-term partnerships, to accompany other missions, such as consultancy missions, setting up new organizations or new equipment.



Unicancer



As a hospital network 100% dedicated to the fight against cancer, Unicancer is also a key player that brings together initiatives that bring together the centers of its network with foreign states to evaluate their specialized cancer centers. For example, their expertise was exported in 2017 to Algeria, when Unicancer and Astra-

Zeneca launched a partnership with the Algerian state as part of the implementation of the national plan to combat cancer. In April 2020, Unicancer signed a global partnership with French Polynesia to support the structuring of cancer care in the overseas territory.

Leon Bérard



Léon Bérard Center offers international training courses for cancer support care, including pain management, palliative care and nutrition, adapted to different types of patients, such as the elderly or children. Many training courses

in onco-hematology are regularly carried out in Morocco and Algeria.



Collective initiatives



In June 2012, the Groupe Hospitalier Paris Saint-Joseph and Gustave Roussy launched the International Center for Chest Cancer. It combines the expertise of the Marie-Lannelongue, Gustave Roussy and the Paris Saint-Joseph hospitals to achieve a common goal: provide the best treatment for patients with thorax cancers and thereby increase their chances of recovery. This reinvigorates and strengthens the Institute of Thoracic Oncology (IOT), created in 2012, which in a few years became a reference in the global management of chest cancers at all stages of the disease, as well as in clinical and translational research, offering patients access to the best of innovation.

It is with this in mind that the Marie-Lannelongue, Gustave Roussy and the Paris Saint-Joseph Hospitals have decided to combine their respective and complementary competences in this health cooperation group, providing a legal framework structuring the cooperation between the three establishments. It provides a single access platform for patients and health professionals, invests in common tools for sharing information between the three sites, and develops teaching and research.

Particular attention is paid to women for whom lung cancer is on the rise. It is now the second leading cause of cancer death among women in France, after breast cancer.

Chest cancers cover lung cancers, the leading cause of cancer death in France, as well as cancers/tumors of the trachea, mediastinum, thymus, pleura, chest wall, large vessels and the heart. Whether they are frequent or very rare, they require multidisciplinary and innovative support based on a network of experts.

Gustave Roussy



As part of institutional partnerships, Gustave Roussy offers on-site training to oncologists for the One Stop Clinic model. Their format may include the intervention of industrial players (mammograph manufacturers for exam-

ple). They are based on Gustave Roussy's expertise in detection campaigns, diagnostic and treatment methodologies.



American Hospital of Paris



The American Hospital of Paris offers continuous training both in France and abroad, with the

training doctors traveling to accompany the local doctors.



Foch Hospital



Foch Hospital has an international medical and paramedical training center. Training can take place at Foch Hospital or abroad, depending on the method most suited to the projects of the partners identified. The topics of the courses offered in oncology are organized around several components: medical oncology in terms of therapeutic decision (chemotherapy, immu-

notherapy, targeted treatment), anatomic pathology and histopathology (diagnosis), interventional radiology and cancer surgery. Several training projects are under consideration, notably with the Moscow Oncology Center, Kuwait, Azerbaijan, Morocco, Tunisia and Armenia.



Groupe Hospitalier Paris Saint-Joseph (GHPSJ)



The St. Joseph Hospital Foundation and the Sheik Khalifa Ibn Zaid Foundation in Casablanca, Morocco, have agreed to coordinate their health training activities for medical and paramedical personnel in Africa and the Middle East, using common human and material

resources. The aim is to strengthen the skills of healthcare professionals and improve the quality of care provided to people, through a comprehensive program of continuing education, including health simulation.

CHAPTER

2

FRENCH
SOLUTIONS



1. TRANSPOSABLES ORGANIZATIONS

In addition to supporting healthcare institutions and professionals on advisory missions, oncology experts can “transpose” a care organization.



Gustave Roussy

Gustave Roussy’s medical teams are experts in implementing a policy of early detection of the main cancers using both pathology and diagnostic imaging (MRI, PET-scan). This expertise can be structured to position Gustave Roussy as a reference center and to bring its expertise to international key players. Gustave Roussy’s department of biopathology works with several European partners (academic research centers hospitals, etc.).

Gustave Roussy is able to assist international key players in taking control of the equipment they purchase. These services are based on the expertise and medical expertise of cancer professionals.



American Hospital of Paris



The American Hospital of Paris offers breast cancer prevention through a personalized monitoring and prevention program dedicated to women and set up by the hospital’s Women’s Risk Institute. Thanks to new expert artificial intelligence software, women from the age of 35, with no history of breast cancer, can benefit from individual

screening to predict five years in advance (and thereby avoid the occurrence) of breast cancer. This screening has been offered since 2018 in the Ivory Coast thanks to DNA salivary tests that can be performed directly by the patient and teleconsultations organized with a referring oncologist.



Institut Curie AP-HP François Baclesse Center



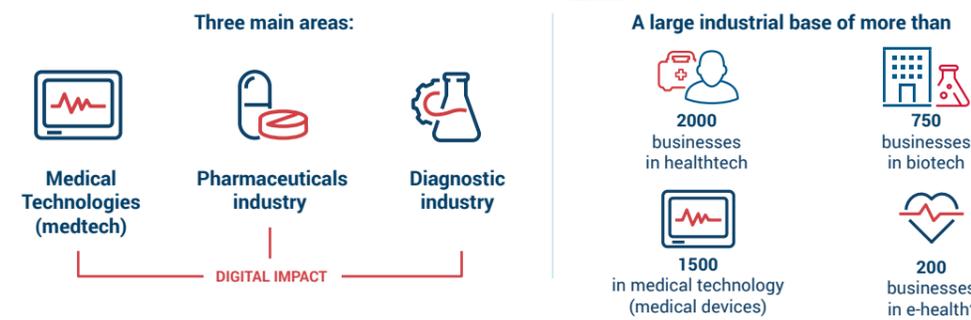
Expertise in anatomic pathology and slide reading is an activity offered by various expert centers: the Curie Institute, the AP-HP and François Baclesse Center.

Based on its expertise in anatomic pathology, the Curie Institute has developed a service for interpreting the slides of anatomic pathology paid by lump sum. The slides (or anatomical parts) are sent to the Institute by the various international professionals wishing to benefit from the “proofreading” diagnosis service. Genetic and molecular analysis can complement the pathology.

The network of pathologists at AP-HP performs the second reading of slides by telepathology on different types of cancer. These slides are scanned and then the virtual slides are networked over the internet. This anatomopathological diagnostic platform is a solution specific to AP-HP and can be made available to any professionals who would like to make a second reading of their slides.

2. EXPORTABLES INDUSTRIAL SOLUTIONS

The health-care industry in France



Medical devices industry in France⁵

Medical devices are a wide variety of health products: medical equipment, medical equipment, implants, mobile health application, etc



France, historically producer of medicines

Oncology is a major issue for this sector: it represents the largest market



As regards biotechnology, 750 businesses are listed in France. These businesses are playing a major role in health innovation by revolutionizing the way drugs are discovered and produced. Oncology is today the area most investigated by French biotechs, with 114 products dedicated to oncology. Startups and SMEs produce a significant share of activity and innovation: in this field, Bpifrance has identified some thirty French startups covering a wide variety of fields of application

Wide variety of fields of applications



4. France Biotech Report 2020 france-biotech.fr/publications/ and Panorama of medical device businesses, SNITEM, 2019 snitem.fr/publications/guides-et-documents-de-reference/panorama-2019/.
 5. Panorama of medical device businesses, SNITEM, 2019.
 6. LEEM Economic Report 2020 leem.org/sites/default/files/2020-09/BilanEco2020correc_2.pdf.
 7. LEEM Cancer: Figures, Issues and Innovations leem.org/presse/cancer-chiffres-enjeux-et-innovation.
 8. Figures for the European Federation of Pharmaceutical Industries and Associations (EFPIA) encompassing all stages of development of a medicinal product from pre-clinical trials to market approval.
 9. Chiffres Panorama France Healthtech 2020

The success of biotechs cannot be the same without political and institutional support. For example, the French government launched the HealthTech Plan to support and encourage French potential and to make France a leading nation in the healthcare industry and innovation.

At the same time, the France Biotech association, which aims to energize and elevate the French life sciences industry to a leading position, has created the HealthTech Investor Days to support the development of HealthTech. The G5 Santé, the voice of the French healthcare industries, chaired by Didier Véron, brings

together the leaders of the main French healthcare and life sciences businesses (bioMérieux, Guerbet, Ipsen, Laboratoires Théa, LFB, Pierre Fabre, Sanofi, Servier). They have chosen France as the platform for their international development and each make research and development their priority.



Intrasense

Imaging diagnosis is a key point in oncology to diagnose, evaluate and implement a therapeutic approach and to support the patient.

Intrasense is a French firm founded in 2004 and specializes in medical imaging. It has developed a software platform called Myrian®, cited in more than 170 scientific articles, and approved in more than 40 countries.

The Myrian® platform, compatible with all medical imaging modalities, includes a range of clinical applications specialized in specific anatomical zones and pathologies, in particular oncological (breast, lung, liver, prostate cancer, etc.). For example, the following modules are dedicated to oncology:

- The Myrian® XP-Lung module is used for lung nodules to diagnose lung cancers.
- The Myrian® XP-Prostate module is dedicated to prostate MRI to diagnose prostate cancers

Radboud University Medical Center (UMC) in the Netherlands is a global specialist in prostate cancer care and research. The organization uses Myrian® XP-Prostate in clinical and research examinations, as well as in training based on its clinical expertise in prostatic MRI. These training courses are provided within the Prostatic MRI Reference Center (PMRC) and the network of associated expert centers deployed internationally.

- Modules dedicated to the imaging of the woman to take care of the patient during their entire course of care, in particular the Myrian® XP-Mammo Module, which enables care to be taken of mammographic examinations, tomosynthesis, breast ultrasound, breast MRI, etc.

Guerbet |

Guerbet



Guerbet is an international pharmaceutical group, specializing in diagnostic and interventional imaging. Guerbet develops and markets contrast products, injection systems, medical devices and related solutions. It is involved in the identification and characterization of tumors, prognosis and follow-up of patients. “Every second in the world, a patient benefits from an imaging act with a Guerbet product.”

A major player in the French industry, Guerbet confirms this position through a rich product/partner portfolio, with more than 60,000 customers worldwide. Today, 85% of sales are made internationally and in more than 80 countries where the group is present through commercial subsidiaries and distributors.

Guerbet has developed new solutions integrating digital technologies to offer professionals diagnostic tools and solutions to realize tissue

characterizations, so as to optimize and personalize the treatments put in place, creating new products vectorizing chemotherapies, and has expanded its range of products through the acquisition of firms.

The laboratory spends 10% of its revenues on research and development so as to position itself as a French and world leader in contrast products and associated medical devices.



Therapanacea



Radiotherapy is one of the basic treatments for cancer. Today, the workflow in radio-oncology involves a series of tedious manual tasks that add to an already large and often overwhelming workload for the clinician. To overcome this problem, TheraPanacea, a French startup, has developed ART-Plan™, the first radiotherapy planning software entirely based on artificial intelligence and the web. It makes innovative and proven technology accessible to professionals who want to streamline and standardize their cancer treatment planning. Tübingen University Hospital is a partner of TheraPanacea. Thera-

Panacea was approved by the FDA in January 2021 to address the US market. In September 2020, TheraPanacea signed an agreement with Acibadem Healthcare Group, a Turkish healthcare institution. The objective of the agreement is to work together to “reinvent” radiotherapy.



Servier

Servier is an international pharmaceutical group governed by a foundation. With a strong geographical presence and revenues of €4.7 billion in 2020 across 150 countries, Servier employs 22,500 people worldwide. Servier invests more than 20% of its revenues in research and development every year. To accelerate therapeutic innovation for patients, the group is part of an open and collaborative innovation dynamic with academic partners, pharmaceutical and biotech firms, as well as patients.

One of the success stories that marked the development of the laboratory's oncology business unit is the launch of a drug outside North America and Asia, the result of a partnership with the Japanese laboratory Taiho, and which is now available in more than 90 countries worldwide.

This medical product is today a reference drug in third line treatment and more for patients suffering from metastatic colorectal cancer.

Since the end of 2015, the achievements of Servier's early access programs on two different molecules have made it possible:

- In the first case, more than 2,650 patients can quickly benefit from a treatment option extending the continuum of care, with more than 1,100 physicians developing treatment strategies, clinical experience, and treatment management in more than 32 countries worldwide.
- In the second case, more than 1,550 patients with more than 500 physicians to develop their treatment strategies, clinical experience and treatment management in more than 22 countries around the world.



HaliDx is a laboratory specializing in immuno-oncology that provides oncologists and bio-pharmacists with immunological diagnostic products and services to measure the immune response at the tumor level and in its environment, guide the management of cancer patients and contribute to precision medicine in the era of immuno-oncology and combination therapies.

Immunoscore® technology integrates immunohistochemistry with sophisticated algorithms and advanced image analysis to extract spatially organized tissue molecular information. This test will enable the oncologist to determine the degree of severity of the patient's tumor, predict the response to treatment and thereby define the optimal therapeutic strategy, particularly in the case of colon and rectal cancer. Immunoscore® has already been included in the clinical practice guide of ESMO, the European Society of Medical Oncology. Immunoscore® is available internationally, in the form of a test labeled CE-IVD (CE Marking for all in vitro diagnostics) or carried out in their CLIA laboratories, to guide the daily decisions of oncologists.

For example, HaliDx has signed a partnership with the Dasar laboratory in Brazil. The Brazil-

ian teams carry out the immunohistochemistry themselves, send the sample to HaliDx, who analyzes, diagnoses and returns the immunoscore®. The exchanges can be done digitally, with the sending of virtual slides and the return of results by messaging. This is the case, for example, with the Dasar laboratory and with their Chinese partner.

HaliDx is also involved in major international research projects. For these projects, HaliDx brings its expertise in the development of biomarkers and diagnostic tests in immuno-oncology, notably with its proprietary technologies Immunoscore®, Immunogram, Immunosign®, but also with other confidential biomarker approaches.



Sanofi

Oncology is one of Sanofi's four strategic research areas. Significant resources have been provided in recent years. In France, two sites are experts in this field: Vitry-sur-Seine, the flagship of oncology research, and more recently the Strasbourg site, in addition to the Cambridge site (United States). Thanks to these three sites, and in particular that of Vitry-sur-Seine, Sanofi is able to explore a wide range of therapeutic modalities, from small synthetic molecules to monoclonal, bi-specific, tri-specific antibodies, or antibody-drug conjugates and, recently, nanobodies and optimized proteins (synthorin platform, allowing the synthesis of new amino acids that can be used to create new proteins), thanks to the new technologies acquired with ablynx and synthorx.

Sanofi already has major molecules in relation to its position as a major player in hematology and oncology worldwide: immunotherapy in skin and lung cancer, a monoclonal antibody targeting a CD38 surface antigen in relapsing and refractory multiple myeloma, a recombinant enzyme for the treatment and prophylaxis of acute hyperuricemia in malignant hemopathies, an inhibitor of vascular endothelium growth factor in metastatic colorectal cancer, and a second-line treatment in adults to promote mobilization of peripheral stem cells for self-transplantation in lymphoma and myeloma patients.

Beyond this rich portfolio of molecules, eleven molecules are currently in clinical development, in immuno-oncology and in molecular oncology, and fifteen more are on the doorstep of clinical research. Sanofi's oncology research budget, which accounted for 15% of the R&D budget four years ago, is now about 40%.

For example, of the 11 clinical development molecules currently in Sanofi's oncology portfolio, four are in advanced development in the four strategic areas of oncology: multiple myeloma, lung, breast and skin cancers. Among these molecules, a PD-1 inhibitor in skin cancer, which is also studied in lung cancer, a selective estrogen receptor degrader (SERD) in breast cancer, an antibody-conjugate targeting in particular lung cancer and a monoclonal antibody in multiple myeloma.



EuroBioConcept

EuroBioConcept, manufacturer of insulators, bio-decontamination systems and aseptic transfers, supports its partners in the implementation of this device through a range of services, including both design and training in use up to the maintenance of equipment.

The benefit of this support is threefold, guaranteeing the quality of the product prepared, the safety of the manipulators and the proper management of the doses to be administered. EuroBioConcept is working with the pharmaceutical industry to develop equipment for the filling of vaccines or in high-containment laboratories dedicated to the study of pathogens of risk groups three and four.

EuroBioConcept has already carried out many projects, such as

- In Cameroon: Support for the management of pediatric oncology in Yaoundé by Armand Trousseau Hospital.
- In China: Support to the Sichuan Cancer Hospital by Henri Mondor Hospital
- In Cambodia: Support in the management of hepatitis and liver cancers at the Calmette Hospital by the Paul Brousse Hospital.
- In Serbia: Framework agreement and cooperation in cancer research.



Newteam Medical

Newteam Medical is a French business created in 2011, which develops innovative customized medical devices (external breast implants). Since 2016, the firm has held operating patents in the United States, Russia and throughout Europe. Newteam Medical now offers three ranges of prostheses, each corresponding to a registered trademark: an aerated transient breast prosthesis that is adapted to the healing period after a mastectomy or partial or total breast ablation, a personalized external breast prosthesis, using interactive tools and in particular algorithms to calculate the closest natural and adapted weight, and a final prosthesis that will be launched on the market that is 100% customized and created after anatomical study of the patient.

The products are marketed either at the point of sale or on the internet with a multilingual module. Currently, Newteam Medical is present in several French cities (Paris, Lyon, Bordeaux) and still intends to open a dozen other outlets in France. The first overseas sales outlet will open in Greece in June 2021 as a pilot project. Newteam was also contacted by a Dubai firm to distribute their products.

In addition to innovative medical devices, Newteam Medical has also created satellite products, such as armbands to complement their offering. Newteam Medical is innovative and open to partnerships with other players.



CLINGROUP ClinGroup

Support for patients is key, and digital tools allow new services to be offered. Since 2006, and with the aim of promoting the health and quality of life of cancer patients, ClinGroup works and offers services related to support programs to cancer patients (Patient Support Program – PSP) generated around several axes: improving the quality of patient care through financial assistance, logistics, therapeutic education for patients and their relatives, treatment and prognosis, the creation of a link between the oncologist and the patient to improve management and record adverse events related to treatment. For this last point, ClinGroup notably offers a mobile application for directly reporting side effects.

ClinGroup currently manages more than fifteen support programs for cancer patients in the Middle East and Africa: free support programs for treated patients, programs with co-payment (national social security fund, patients, etc.).

Created by ClinGroup's digital innovation team, "PEC" for Patients Education and Centricity is an e-PSP solution that focuses on patient education and manages PSP with associated benefits for nurses, program coordinator and the patient himself. This solution was developed according to ISO certified procedures and offers enhanced security features in accordance with personal data protection and data security standards.

Using a tablet, laptop or smartphone, the PEC web platform enables management and scheduling of patient visits, lab tests, administration of medications and the setting up of reminders

with an automatic notification system. Between industrial offer and research, ClinGroup is a contract research organization (CRO) with extensive experience in cancer research. To date, ClinGroup has already managed more than fifty oncology research projects concerning, in particular, breast cancer, ovaries, lungs, prostate, colon, and leukemia.

Currently, ClinGroup is playing a role in several cancer clinical trials covering regions in Africa and the Middle East and is working on 623 clinical trial projects for general oncology.

Recently, ClinGroup played a role in two controlled cancer trials. An open-label, randomized phase three trial in subjects with non-small cell lung cancer is being conducted in 37 countries, to include 1,980 patients. Another study, prospective observational in the management of first-line metastatic colorectal cancer, is being conducted in 51 centers, to include 520 patients, is underway in Malaysia, Singapore, Taiwan, South Korea, Russia, Saudi Arabia, Lebanon, Vietnam, Jordan, Iraq and Australia.

CHAPTER

3

ACADEMIC AND INSTITUTIONAL RESEARCH



France is an ideal country for carrying out research and experimentation in the health sector, and particularly in oncology, basic, translational and clinical research. French research in oncology is now recognized worldwide for the quality of scientific output. France benefits from the presence of key academic, industrial and clinical players.

The dynamism of cancer research activity in France is reflected in particular by the quality and the number of publications with:

- 59,150 publications over 10 years (2010-2014 and 2015-2019). Their number increased by 24% between the two periods studied, corresponding respectively to 5.27% and 4.40% of the global production.
- Eighth in the world for the number of publications in the field in 2019.⁹
- Third in the world for the percentage of publications in the top 1% of the most cited articles in the field in 2019.¹⁰



INCa

The National Cancer Institute aims to play a role in accelerating progress, by providing an integrated vision of all the health, scientific, social and economic dimensions linked to cancer pathologies, as well as the different fields of intervention (prevention, screening, care, research). The INCa, together with Inserm (National Institute for Health and Medical Research) and Aviesan (ITMO Cancer) and other stakeholders, including Unicancer, actively participated in the drafting of the ten-year strategy to combat cancer.

Among its various missions, INCa must initiate and in particular financially support scientific, medical, technological and organizational innovation. It has a unique role in organizing and guiding research in Europe. This role and position enable it to carry out large-scale actions, for example with the Plan France Médecine Génomique (data matching opportunities, for example), or with France Cohorte (pooling and support for cohorts, information, legal support, financial support, etc.).

Each year, the Institute organizes a dozen competitive calls for projects in all fields of research, healthcare organization and public health. It monitors all the projects selected and financed. It also produces calls for joint projects with major associations, such as the Integrated Research Action Programs (IRAPs)

with the League Against Cancer and the ARC Foundation for Cancer Research.

The Institute also manages, on behalf of the Ministry for Solidarity and Health, the PHRC-K (hospital program for clinical research in cancer), the PRME-K (program for medical-economic research in cancer) and the translational research program in cancer (PRT-K).

The areas of intervention of the INCa in research are as follows:

- Support leading-edge areas: genome study, experimental study models, biology, immunology
- Translating fundamental discoveries into advances for the benefit of the population and the sick faster: diagnostic tools, personalized treatments, quality of life.
- Increase the availability of biological and clinical resources for researchers
- Develop clinical trials to find effective treatments.
- Make French research an international reference

Since 2005, INCa has been working to promote the molecular genetics of cancers by deploying sequencing platforms throughout France that enable patients to be directed to targeted therapies. This has enabled France to gain a decisive advantage in terms of research and precision medicine, particularly for FCCCs.

As regards clinical trials and interventional studies, in France there were 1,641 new interventional studies authorized over the period 2010-2019, half with CHU/CH promotion and the other half with FCCC promotion. These studies, multi-center in 60% of the cases, allowed the inclusion of nearly 314,000 patients.¹²

The network of French establishments offers integrated support that ensures a continuum of research/care. This organization model offers the possibility to host early-stage or targeted clinical trials on innovative therapies, and to carry out screening of patients on very rare populations. It is attractive to pharmaceutical manufacturers who develop innovative molecules and can quickly access these sequencing platforms.

Moreover, France offers researchers, academic research teams and health-care industries a dynamic ecosystem for collaborative work. Many mechanisms exist to support public and private research players: grants, financing and tax support, among others. The tax incentive program for research and development is the most attractive of OECD countries, thanks in part to a favorable research tax credit (crédit d'impôt recherche – CIR).

The Leem 2020 survey on the attractiveness of France to clinical trials demonstrates the importance of French presence in oncology.



40% of clinical trials conducted and 46% of clinical trials initiated are in oncology.



France is ranked second in Europe and fourth in the world for clinical trials in oncology.

*2020 LEEM survey on France's attractiveness

L'INCa into figures

1 243

Millions in multiannual commitments 2007-2019*¹¹

8

Integrated Cancer Research Sites (ICARS)

7

Canceropôles

11

Certified Cooperative Intergrups

*(biologie et sciences du cancer, recherche en sciences humaines et sociales, épidémiologiques et santé publique, en recherche translationnelle et intégrée et en recherche clinique)¹²

9. Measures, indicators and bibliometrics unit – INSERM, January 2020.

10. The National Committee for Coordination of Research (CNCR) and the French Hospital Federation (FHF) announce the first key figures of the "Research and Oncology in France" study.

11. Scientific Report 2019, National Cancer Institute.

12. The National Committee for Coordination of Research (CNCR) and the French Hospital Federation (FHF), announce the first key figures of the "Research and Oncology in France" study.

13. The attractiveness of France for clinical trials, Leem, 2020.

1. ACADÉMIQUES KEY PLAYERS

Inserm



Inserm (National Institute for Health and Medical Research) is the only French public research organization devoted entirely to human health. Its mission is to improve the health of all people through the advancement of knowledge about life and disease, innovation in treatment and public health research. To conduct its research policy with the greatest efficiency, Inserm has more than 350 research structures spread throughout France and abroad.

The majority of them are mixed research units (administrative entity created by the signing of an association contract of one or more research laboratories of a higher education institution (e.g. a university) or a research organization with the Inserm). It is estimated that around 90% of the research units in France are under the supervision of the Inserm. Some of these structures are specifically dedicated to translational and clinical research (Centers for Clinical Investigations – CIC). Others offer high-level technology services and resources to the scientific community (service units).

Inserm is ninth in the world as one of the most innovative research institutes, with six European associate laboratories (EALs) and 23 international associate laboratories (LIAs). In 2019, Inserm produced 11,700 scientific publications and has 1,900 working patent families. It is the first European depositor in the pharmaceuticals sector, the third in biotech and the seventh in all sectors.

Inserm maintains a long tradition of European and international cooperation. More than 6,000 international partners with nearly 100 countries are reported annually by its research teams.

The Inserm's international cooperation covers all fields of life and health sciences research. More than half of partnerships are with European Union countries and its neighborhood, but the main partner of the Institute is the United States, with about 20%.

Inserm boasts two Nobel prizes and three Albert Lasker prizes.

Aviesan ITMO



The ITMO (Multi-Body Thematic Institute) within Cancer d'Aviesan (National Alliance for Life and Health Sciences) is responsible for bringing together all cancer research teams, regardless of their associated guardians. It is intended to propose concrete actions to improve the performance and competitiveness of French research, to ensure good coordination among all cancer research organizations and institutions, to facilitate reflection and interdisciplinary exchanges in the cancer community. It is responsible for or responsible for the implementation of 16 actions of the Third Cancer Plan (2014-2019).

The ITMO Cancer d'Aviesan is taking concrete action in three main areas:

- To develop broad strategic guidelines for cancer research, which are a roadmap for the

ITMO, contributing to the definition of the national cancer research strategy, and to reflect on the European strategy.

- To facilitate the national cancer community and enhance it internationally by organizing national conferences and international actions.
- To schedule and fund innovative, thematic, basic research, within and beyond the framework of Cancer Plans, and assess the performance of its programs.

The forces involved reflect the importance of the actions carried out, with 800 research teams, 6,000 researchers, teacher-researchers, engineers and technicians from universities, hospitals, public scientific and technical research establishments (EPSTs) and institutes.



MyPeBS



MyPeBS (My Personal Breast Screening, www.mypebs.eu) is an international clinical study promoted by Unicancer and funded by the European Union, with the objective of comparing a new breast cancer screening strategy personalized on the level of individual risk to women, with standard screening in effect. A total of 85,000 women between 40 and 70 are to be included in six countries (Belgium, Spain, France, Israel, Italy and the United Kingdom). This study will serve as a basis for issuing new recommendations to the public authorities of the various European states.



Unicancer



Unicancer is the leading academic promoter of European-wide clinical trials in the field of cancer, with more than 100 trials currently active in Europe. The Research and Development, and Data and Partnerships departments of Unicancer simultaneously develop clinical research, translational research and research on internationally recognized health data.

The only national hospital federation dedicated to oncology, Unicancer, through its departments dedicated to research, has developed numerous public and private partnerships in France and internationally, with drug manufacturers (pharmaceutical firms, biotech, medtechs), businesses specializing in artificial intelligence (Owkin, Therapanacea, Resilience Care, etc.) French and foreign academic groups (Cooperative Groups in Oncology in Europe: United Kingdom, Germany, Spain, etc.), as well as in Canada or the United States, along with other public research organizations (Inserm, Polytechnique, National Institute for Research in Agriculture, Food and Environment (INRAE), etc.). Unicancer is able to capitalize on the leadership and expertise of its research groups (10 groups specializing in organ pathologies or on transversal research themes, including six groups accredited by INCa) and on its operational capacities, positioning itself as a leader in complex international studies, requiring operational resources and innovative expertise. This is how

Unicancer coordinates certain flagship projects supported by French ("National Investment Program", National Research Agency) or European (H2020 program) institutions. Its network of correspondents amounts to more than 180 French and foreign health establishments and their privileged interactions with the public authorities enable them to have this status. The Unicancer network also has 12 reference centers for early phases in oncology (INCa's CLIP2 network), a fundamental element for the attractiveness and arrival of therapeutic innovation in the region. Unicancer is also one of the pioneering players in the creation of data warehouses in France and in Europe. As part of its ambitious and innovative research policy, Unicancer initiated in 2014 the ESME program (Epidemiologic-Medico-Economic Strategy), with a view to evaluating the effectiveness in real life of the therapeutic products and sequences used in the treatment against cancer. This program, which is unique in Europe in terms of the depth and quality of the data it collects, now brings together data from more than 60,000 patients collected in a network of 36 healthcare establishments. This is how, for example, Unicancer signed a scientific partnership in 2020 with the Bristol-Myers Squibb laboratories (BMS) aimed at better understanding the management of patients with lung cancer from their own live data platforms – ESME "bronchopulmonary cancer" and IO Optimize, an international platform for bronchial cancer.

In addition, Unicancer, in partnership with Roche laboratories, is launching in 2021 a new ODH data warehouse (OncoDataHub) aimed at becoming the reference warehouse for the drug management of cancer patients. ODH aims to

be deployed in 80 establishments in France and to represent an enriched, clean observatory for medicines, aiming, among other things, to enlighten the decisions of the health authorities.



weSHARE

Unicancer, in cooperation with Gustave Roussy, the François Baclesse Center, the Léon Bérard Center, the Polytechnic school, the Seintinelles association and the national Quality of Life and Cancer platform, will develop the weSHARE project: a national, dynamic research infrastructure, integrated and patient-centered, which will serve all cancer researchers and centers. WeSHARE will centralize, within its integrated platform the technological tools making it possible to rationalize research on cancer, which integrates a strong component of social and human sciences. Indeed, the lengthening of the

lifespan of cancer survivors raises the question of reducing the medical and social risks associated with cancer and anti-cancer treatments. WeSHARE will make it possible to integrate whole areas of research in the social and human sciences, such as psychology, sociology and economics, into classical oncology research. Submitted in June 2020 to the National Research Agency Equipex call for projects as part of future investments, weSHARE was one of the best ranked projects (A+).



CANTO

Unicancer, in association with Gustave Roussy, the Léon Bérard Center, the Georges-François Leclerc Center and the François Baclesse Center, initiated in 2012 a cohort supported by the “National Investment Program”, aimed at identifying the predictive factors of the occurrence of toxicities disabling chronic conditions linked to cancer treatment and the medium and long-term psycho-social impacts of the disease and its treatments, with a view to personalizing the therapeutic management of patients. Carried out in France at 26 investigation centers, CANTO has collected data and samples for more than 12,000 volunteer patients. This cohort is

part of one of the axes of the Cancer Plan 2 entitled “Life after Cancer” and received renewed support from the National Research Agency in 2020. More than 50 research projects have already been launched from data collected and around 10 public (French Alternative Energies and Atomic Energy Commission (CEA)/Center for the Study of Human Polymorphisms (CEPH), Inserm, Harvard, INRIA, etc.) and private (pharmaceutical firms, artificial intelligence businesses) partnerships have also been established in recent years.



Cancéropôle

The seven cancéropôles allow, on a regional or inter-regional scale, better coordination of cancer research by breaking down barriers between sectors and disciplines. They facilitate the emergence of large-scale multidisciplinary research networks, bringing together scientific, clinical and industrial communities and dedicated decision-making bodies.

They bring together teams of research organizations, University Hospitals, Cancer Control Centers and the healthcare industry and are supported by the National Cancer Institute (INCa) as well as by many local authorities.

Their main missions are:

- To strengthen the mobilization of research teams in the fight against inequalities and to define the risk factors related to the environment and behavior.
- To boost clinical research (especially early stage).
- To promote the emergence of innovative projects.
- To participate in the dynamic of European cooperation.
- To contribute to making France an international benchmark in cancer research.

The challenge is to unite in order to better understand and propose new diagnostic, prognostic or therapeutic avenues, and to allow better transfer of research and innovation to patients.



CLARA

CLARA, Cancéropôle Lyon, Auvergne, Rhône-Alpes, has set itself a CLARA 4.0 roadmap to:

- Boost cancer research through a regional strategy.
- Facilitate collaborations between researchers through scientific facilitation and support clinical research.
- Act in favor of upgrading the skills of young researchers.
- Support the emergence of innovative projects (OncoStarter).
- Strengthen the attractiveness of CLARA internationally.



Regarding this last point, the attractiveness and international influence of the region have also been consolidated thanks to strategic partnerships with China (Shanghai) and North America (Quebec), as well as a rise in European programs.

2. HEALTH ESTABLISHMENTS



The Curie Institute

The Curie Institute, the leading research center dedicated to cancer, has since its creation always maintained a perfect balance between research (including basic) and clinical research, with today 1,300 researchers and more than 2,000 patients included in more than 200 ongoing clinical trials (14.5% inclusion rate).

The Curie Institute offers national and international researchers 19 open technological platforms (CurieCoreTech) for targeted research cooperation.

The Curie Institute platforms cover areas ranging from small molecules to animal and human models, including genome, proteome, metabolome, cells and tissues. The research center welcomes internationals and more than 80 nationalities are represented. The Curie Institute participates in various European projects and is a member of EU Life and Core for Life (alliances of research centers of excellence in the human sciences).

The Curie Institute has also developed expertise and excellent research work around its pro-

ton therapy activity and is developing international partnerships around this specialty. There are more than 983 ongoing international collaborations (10 main countries), and in 2019, 91 different countries participated with the Curie Institute in publications.

The Curie Institute Research Center works in close collaboration with research institutions, universities and international or European hospitals. Since the creation in 2017 of the European Research Council (ERC), the Curie Institute Research Center has obtained more than 40 funding opportunities. Within the framework of the European program for research and innovation Horizon 2020, the research project on uveal melanoma "UM Cure 2020" has received €6 million. It is managed by the Curie Institute and involves 11 European partners.

The Curie Institute is behind the creation of 27 startups.



The Léon Bérard Center

The Léon Bérard Center is involved in basic, clinical and translational research. Doctors and researchers participate and are leaders of several international cooperative groups, particularly for the development of clinical research: European Organization for Research and Treatment of Cancer (EORTC), Gynecologic Cancer Intergroup (GCIg), Consortium Win network on personalized medicine, Breast International Group (BIG), European Intergroup for Academic Clinical Research on Breast Cancer and, in hematology, the European Society for Blood and Marrow Transplantation (EBMT).

In 2017, the Léon Bérard Center notably established collaborations with Asia. The Center participated, under the aegis of SIRIC (Integrated Cancer Research Site, accredited by INCa), in the Franco-Chinese school of oncology in Wuhan and organized a meeting with the Wuhan Union hospital. Research projects on common themes should be set up around breast, head and neck, and urological cancers.

The Léon Bérard Center also carries out research work in partnership with manufacturers: in 2019, Hitachi Healthcare, a supplier of imaging technology, and the Léon Bérard Center concluded an agreement that led to the creation of a research laboratory named Hitachi Lyon Lab. As part of this collaboration, Hitachi and the Léon Bérard Center have chosen to conduct research and development on new cancer screening and diagnostic technologies, in particular using artificial intelligence technology.

The Léon Bérard Center is currently working on a research project with Leo Cancer Care (United Kingdom) on taking radiotherapy treatment while sitting or standing or lying down.



Gustave Roussy

Research is at the center of Gustave Roussy with a team of 1,000 top researchers: in 2020, 12 of them were included in the list published by Clarivate/Web of Science among the most cited researchers in the world. Currently, 33% of Gustave Roussy's patients are enrolled in clinical trials and can be treated with experimental molecules.

Several projects are underway:

- The establishment of a Cancer Core Europe network with the National Center for Tumor Diseases (DKFZ-NCT Heidelberg). This network brings together six Cancer Control Centers to respond in a coordinated manner to calls for tenders under the Horizon 2020 program: Gustave Roussy, Cambridge Cancer Center (Cambridge, United Kingdom), Karolinska Institutet (Stockholm, Sweden), Netherlands Cancer Institute (NKI Amsterdam, The Netherlands), Vall d'Hebron Institute of Oncology (VHIO-Barcelona, Spain), DKFZ-NCT (Heidelberg, Germany). Cancer Core Europe represents a critical mass in care (60,000 new patients per year, 300,000 treatments per year) and a research infrastruc-

ture in all fields that will be able to face the challenges of the development of personalized medicine, as well as of clinical research, by creating prospective and comprehensive databases.

- The creation with MD Anderson of the WIN Consortium (Worldwide Innovation Network for Personalized Cancer Medicine), which conducts clinical trials in the field of personalized medicine in cancerology.
- The establishment of a partnership with the Deutsche Krebs Forschungs Zentrum – National Centrum für Tumoren (DKFZ-NCT) in Heidelberg to carry out joint research projects through the formation of working groups in the fields of pediatric oncology, immunotherapy, personalized medicine in oncology and the study of the mechanism of cell death, all funded by the two institutes and piloted by annual institutional leadership meetings.



AP-HP

The AP-HP has a dynamic transitional and clinical research activity for the inclusion of patients in therapeutic trials and calls for projects with structures accredited by the INCa. In 2015, as part of oncology research, 7,513 patients were included in one of the 781 trials opened in AP-HP hospitals.

Access to clinical research (oncology trials) increased between 2014 and 2015 by 45%. The international visibility of AP-HP over the period 2011-2015 is very good, as it is ranked 13th in the world, with 5,115 publications listed out of a total of 360,328 publications in oncology.

IDEA is an international study led by two AP-HP professors, the first results of which were published in 2017. A total of 12,834 patients with colon cancer and who have benefited from adjuvant treatment intended to prevent the risk of relapse have been included in 12 countries. During the congress of the American Society

of Clinical Oncology (ASCO), two axes were highlighted: the prognostic interest of Immunoscore, a tool developed by a French team in collaboration with a French firm, HalioDx, as well as the evidence of the prognostic impact of tumor deposits, located at a distance from the primary tumor and observed on anatomic pathological examination. The results constituted a significant advance in assessing the prognosis of the disease and proposing an adapted therapeutic strategy.

AP-HP is also a privileged partner of other public and private key players in health research and innovation. The Clinical Research and Innovation Department (DRCI) has entered into strategic multi-year partnerships with some of them to co-construct large-scale innovative solutions, in particular based on data use, to assess drug treatments, medical devices and new patient management methods.

Paris Saint-Joseph Hospital



Access to therapeutic innovation in oncology is one of the priorities of the oncology department of Saint-Joseph Hospital, supported by the group's dynamic in terms of research. The dynamic of clinical cancer research is being asserted today by offering patients who so wish to access early phase I clinical trials for the first therapeutic applications of innovative drugs resulting from laboratory research. This new option complements already important clinical research on the hospital, in conjunction with several academic and industrial groups.

The oncology department has adopted care procedures with a high level of quality control, as well as material and human resources for carrying out these new innovative therapeutic trials (phase I and translational research). Several international and European academic research groups have already set up early trials at the level of the Paris Saint-Joseph Hospital, which allows patients to access these innovations while remaining supported in their usual care establishment.

CHAPTER

4

TRAINING IN FRANCE





French Healthcare Association

Excellent internship and training opportunities in the most prestigious French hospitals and institutes (Curie Institute, Foch Hospital, Paris Saint-Joseph Hospital, Léon Bérard Center or the American Hospital of Paris) are offered through the website **myfrenchmedicaltraining.fr** set up by the French Healthcare Association. The site makes it possible to provide a large number of internships and training courses in French private and public hospitals. The training offered can be face-to-face training

(in France), but also distance training (live Surgery, webinars, virtual classes), or on demand (e-learning modules, interactive clinical cases, etc.)

Currently, more than 200 training offers are offered by French establishments, some dedicated or linked to oncology (radiological diagnosis, surgical practices, anesthesia, resuscitation, etc.).



Léon Bérard Center

The radiotherapy department of the Léon Bérard Center regularly receives international doctors (from Italy, Tunisia, Egypt, etc.) who come to spend a few months in the field to train in a particular pathology. The expertise shared in these training courses is, for example, supportive care, stereotaxic radiotherapy, pediatric radiotherapy, interventional radiology, immunotherapy and medico-nursing collaboration. The Léon Bérard Center offers specific training for international healthcare professionals. These

training courses concern paramedical professionals (nursing care, radiotherapy, supportive care), pharmacists (handling of cytotoxics, anti-tumor immunotherapies) or even doctors (management of ovarian cancer, molecular pathology, monitoring of treated patients under oral anticancer drugs, medical-nursing cooperation, etc.).



Gustave Roussy

Gustave Roussy has developed special relationships with the University of Paris-Sud, the future University of Paris-Saclay. An oncology department has been created within the Faculty of Medicine. As part of its establishment plan, Gustave Roussy wishes to give a prominent place to this decisive partnership for French research, oncology training and its international

profile. The training offered by Gustave Roussy in France is provided by teachers at the School of Cancer Sciences created by Gustave Roussy and the University of Paris-Saclay.



The American Hospital of Paris



The American Hospital of Paris offers training courses for international doctors. For example, Gastrotraining is an event organized at the American Hospital of Paris every two years. These training courses are part of the strategy of the American Hospital of Paris to intensify its partnerships with hospitals abroad and to develop international medical cooperation, in particular with the African continent. Doctors from 25 African countries were present during the 2019 edition, as well as doctors from Africa

practicing in France. The training takes place over three days and international doctors can attend lectures led by medical specialists from the American Hospital of Paris, with interventions filmed and broadcast live from the auditorium. The screening and treatment of colorectal cancers are at the heart of this training.



Foch Hospital



Foch Hospital is a university hospital with:

- A nursing school.
- A midwifery school.
- A continuing education institute (Foch Santé Formation), offering training in France and abroad: tailor-made training, master classes, internships, live cases, webinars, blended learning, etc.
- A 600 sq. m. simulation platform and six equipped rooms, allowing healthcare professionals to train on custom-designed scenarios and in a realistic environment using medical equipment and high-fidelity mannequins.

Among its six simulation rooms, the Foch Santé Formation simulation center offers a 25 sq. m. space, allowing the simulation of a controlled atmosphere area equipped with a rigid just-in-pressure overpressure isolator. In oncology, this space enables teams to train in chemotherapy preparations and exposure to cytotoxics. An observation room, with a two-way window and equipped with an adapted audiovisual system, allows the trainer to analyze the progress of the exercise, while not disturbing the learners' immersion in the situation.



Paris Saint-Joseph Hospital



The Saint Joseph Hospital has a very comprehensive training catalogue for medical and paramedical personnel from abroad. Spread over two sites (Saint-Joseph Hospital in Paris and Marie-Lannelongue Hospital in Plessis Robinson), expertise combined with infrastruc-

tures dedicated to learning activities (preclinical operating platform, laboratory spaces, biological resources center, simulation laboratory, conference room, etc.) form the basis of its training offer.



AP-HP

In total, the AP-HP receives around 450 international doctors (interns or qualified doctors) each year who come for training. More specifically, in the field of oncology training, the AP-HP welcomes each year between two and five physicians in clinical research internship over a whole year, in connection with a department specializing in oncology and on a research theme leading to a publication.

In addition, each year there is a call for applications within the framework of the program for the training of foreign residents of Paris hospitals. Thirty-five practitioners are selected to

benefit from one year as an intern or as an “associate trainee doctor” in the service of their choice.

The gynecological oncological surgery department of the Georges Pompidou European Hospital AP-HP received in 2018 certification from ESGO – European Society of Gynecological Oncology, awarded over a period of five years. This international accreditation underlines the excellence of this expert center in teaching gynecological cancers at AP-HP.



The Curie Institute

The Curie Institute offers an advanced training program, whose mission is to promote, organize and structure education and training activities. The institute offers an international doctoral program (PhDs), as well as interventions by the institute’s professionals in the ITN (International Training Network).

The importance of the Institute’s international doctoral program has made it possible to obtain COFUND H2020 funding entitled Curie Institute 3-i PhD Program. This will make it possible to double the capacity of hosting international doctoral students.

The doctoral program offers a portfolio of 11 international courses and additional training in advanced technologies, such as imaging and bioinformatics, and teaching to develop transversal skills, such as article writing, communication and scientific integrity.

The teaching unit of the Oncology Research Center of the Curie Institute also manages the international doctoral program EuReCa (Europe Research & Care), as well as more than 13 international courses and advanced training diplomas for researchers (Erasmus, Unipharm Graduates Project, etc.). Each year, more than 300 international doctoral and post-doctoral students are welcomed into the 86 research teams.

The Curie Institute’s expertise in oncology is recognized worldwide and many international hospitals have already called on it to train their teams in an emerging field. For example, training on pain treatment at the Papageorgiou University Hospital in Thessaloniki, Greece, on palliative care in Kenya and Tanzania, as well as on masterclasses on patient-partner or palliative care in Jordan.

CHAPTER

5

WELCOMING INTERNATIONAL PATIENTS



France is an attractive destination for international patients, offering a benchmark healthcare system in OECD countries in terms of access to healthcare, a system of certification of the quality and safety of establishments among the more demanding, as well as ethics and values in global health based on a humanist approach to care. It is ranked fifth in the world for the quality of its health infrastructures.

The management of a cancerous pathology is the leading pathology treated in France for international patients. To support patients wishing to be treated in France, the French Healthcare Association has implemented several approaches:

- The creation (and continuous enrichment) of the my-frenchhospital.com site, which describes the French offer and the administrative aspect of care in France.
- The creation of the “French Hospital Quality” accreditation, which targets the services offered by hospitals in connection with the reception of inter-

national patients. The services covered by the accreditation are mainly characterized by the reception and medical and/or surgical care of international patients. This is a voluntary process by establishments. In early 2021, several establishments, including the Paris Saint-Joseph Hospital and the American Hospital of Paris, initiated this certification process.

- The creation of a charter for medical concierge businesses, with key players contributing to the organization of international patient travel in partnership with health establishments. It promotes exemplarity and brings together the values necessary for good corporate practices.

Several establishments have organized themselves to welcome international patients:



Gustave Roussy

At Gustave Roussy, the international patient reception policy has accelerated sharply since 2008, with the opening up to the Gulf countries, then in 2010 with the structuring of a reception program for international patients. Since 2019 and its creation, the international department of Gustave Roussy has been taking care of international patients. The aim of

this new department is to optimize the quality of care provided to international patients, thanks to a specific medical and paramedical team, while streamlining their journey within the Institute. In 2018, Gustave Roussy welcomed around 1,800 international patients.



The Curie Institute

Recognized for its expertise in oncology, the Curie Institute welcomes several hundred international patients every year.

Some **408 international patients from 72 different countries** have benefited or are benefiting from this care. The center welcomes patients with complex or rare cancers, such as sarcomas and pediatric oncology, and offers access to specific technologies, such as proton therapy.

To best meet the expectations of these patients, the Curie Institute has set up a dedicated team (doctors, organizers of care pathways, accompanying persons, etc.) and has developed partnerships, a web platform and a specific service offering. These different elements

make it possible to offer patients a personalized and structured course, with their registration on the dedicated platform, the organization of multidisciplinary consultation around their file, the proposal of a dedicated and personalized course, and financial proposals (via the embassy, its insurer or any other solution).

The team of the International Relations Department of the Curie Institute is at the service of international cancer patients. Today, it responds to three types of requests: the request for a medical opinion, a sample analysis or even treatment. This offer, open to all, is a paid service. It is the subject of quotes paid by insurance companies.



Léon Bérard Center

In 2017, a service was set up at the Léon Bérard Center to welcome international patients in the best possible conditions who wish to be treated or to receive a second opinion from the center. Staff take care of

international patients through a dedicated unit, with multilingual and trained staff able to provide them with a specific welcome.



The American Hospital of Paris

The American Hospital of Paris today welcomes patients of more than 100 different nationalities, mainly from Africa, Japan and the Middle East. The hospital sees an average of 2,000 patients per year for oncology treatments. For the care of international patients, a team of sixteen people is dedicated

to their complete care. The American Hospital also plays a platform role at European level for the reception of heavy patients, in particular American soldiers who pass there to be stabilized before returning to their country.



Foch Hospital

In 2017, an International Medical Department was created dedicated at Foch Hospital for international patients. Foch Hospital has a 14-bed medical unit called the “Vanderbilt Unit” with a multilingual medico-administrative team.

disciplines and emergencies on site to manage any complications related to treatment.

Foch Hospital has centralized the management of administrative files for international patients within the international department headed by Dr. Serge Bonnetier. The files are processed within 24 to 48 hours after consultation with the medical specialists within the hospital.

Finally, Foch Hospital is developing international partnerships with embassies and insurance companies to facilitate the treatment procedures for patients, whether they come from Africa, the Gulf States, the Caucasus or even French expatriates.

The International Department of Foch Hospital makes innovative care accessible to international patients, through cutting-edge surgery, the provision of a day hospital dedicated to supportive care, the existence of all the necessary



The Curie Institute / Lacassagne Center / François Baclesse Center

Cutting-edge radiotherapy is developed and accessible to international patients at various sites, in particular around exceptional technologies, such as proton therapy. The Curie Institute, the Lacassagne Center in Nice and the

François Baclesse Center, the three French proton therapy centers, have coordinated themselves for the care of proton therapy patients.



Lacassagne Center

The Lacassagne Center (Nice Cancer Center) has a full range of radiotherapy techniques: tomotherapy, arc therapy, conformational radiotherapy, CyberKnife® and proton therapy. It has developed unique expertise in the treatment of eye tumors by low-energy proton therapy (a unique device in the world).

The Lacassagne Center has so far treated 10% of global eye tumors. The center is also recognized for its international expertise in contact therapy (intra-operative tumor treatment with a dedicated “Butterfly” device) and in Brachytherapy. International patients are taken care of from Spain, Italy, the United Kingdom, Germany. The center also trains international practitioners in these technologies.



Lacassagne Center and Léon Bérard Center

Since 2014, the Léon Bérard Center and the Lacassagne Center signed a cooperation protocol for the treatment by proton therapy of patients using this cutting-edge technique. Currently, the Léon Bérard Center is coordinating a European project to create a register of patients treated with proton therapy, which has a multiple objective: to collect the number of patients and the type of pathologies treated by

proton therapy, to collect data corresponding to the follow-up of these patients and estimate the effectiveness and toxicity of this treatment, as well as to identify avenues for improvement for treatments by combining technical and clinical information.



Paris Saint-Joseph Hospital

The Paris Saint-Joseph Hospital (GHPSJ), born from the merger in 2020 of the Marie-Lannelongue Hospital in Plessis Robinson (92) and the Paris Saint-Joseph Hospital, located in the 14th arrondissement of Paris, also offers a service dedicated to welcoming international patients. Since the merger of these establishments, both historically well established in their healthcare facilities, their Medicine – Surgery – Obstetrics offer for international patients has grown, particularly with regard to oncology. The group offers a procedure dedicated to the specialized and personalized follow-up of international patients.

Each year, the Paris Saint-Joseph Hospital Group, relying on a complete technical platform (imaging, operating room and laboratory), treats nearly 1,200 patients with cancer, whether digestive, urological, gynecological, ear, nose, throat or thoracic.

It should be noted that the thoracic oncology activity is developed in close collaboration with the pulmonology team of the GHPSJ, the thoracic oncology department at Gustave Roussy, and the thoracic surgery teams of the Marie-Lannelongue Hospital, the leading French lung cancer surgical center. This set constitutes the Institute of Thoracic Oncology (IOT).

CONCLUSION



The fight against cancer is a major issue in France shared by many key players, hospitals, manufacturers, researchers and also humanitarian key players and associations. The National Cancer Plans, translated into actions and their associated funding, have demonstrated a strong political and institutional commitment. French manufacturers demonstrate daily their willingness to provide professionals and patients with quality products to fight against this disease. They also invest themselves through quality partnerships with researchers and clinicians to advance cutting-edge solutions and technologies.

Hospitals and French Comprehensive Cancer Centers (FCCC) are committed to ensuring that treatment evolves and benefits from all research advances in increasingly short time frames. They are therefore part of the Comprehensive Cancer Center or CCC approach, which can lead to European accreditation by the OEI (Organisation of European Cancer Institute). This official designation, marking international recognition, distinguishes the high degree of integration of research into care and the overall care of the patient. It is also a real philosophy of care, which puts the patient at the center of the network of professionals and carers (oncologists, other specialists, patient environment) to provide them with the most consistent and personalized care possible.

French establishments, in particular those belonging to the Unicancer network, have

developed numerous collaborations with countries around the world for the training of health professionals, scientific partnerships and also support for the opening of on-site cancer services and centers, inspired by the Comprehensive Cancer Center (FCCC) model.

French community and humanitarian actions are also present internationally.

The Ligue Contre le Cancer is the leading non-governmental funder of cancer research. The League participates in the main cancer control programs at international level through numerous projects and grant actions, particularly in French-speaking Africa and South-East Asia. A call for projects in 2021 aims to better orient the support provided by the League to other associations fighting against cancer, particularly in low and middle-income French-speaking countries, and to be able to assess the impact of the actions supported.

The ARC Foundation for Cancer Research is 100% dedicated to research. Its aim is to help cure two out of three cancers by 2025 and allocates more than €26 million each year to research projects. It is involved in several international actions or consortia such as, for example, the call for projects "Recruiting international leaders in oncology", which aims to attract confirmed and talented researchers to settle in France and thereby contribute to the influence of French research in oncology on an international scale, or participation as a

member and strategic partner of the international consortium WIN (Worldwide Innovative Network in personalized medicine) at the origin of the WINTHER study, the results of which were published in the Nature Medicine journal.

French establishments are also invested in humanitarian actions, such as the Curie Institute for childhood cancer in Africa. Since 2011, the Curie Institute teams have been working in sub-Saharan Africa to improve the diagnosis of children with retinoblastoma. In addition, the Curie Institute supports teams from sub-Saharan Africa both by welcoming doctors and by sending experts from the Curie Institute. Today, the project welcomes and trains African doctors in partnership with the World Alliance Against Cancer (Alliance Mondiale Contre le Cancer – AMCC), the Franco-African Pediatric Oncology Group (Groupe Franco-Africain d'Oncologie Pédiatrique – GFAOP) and with the support of the Sanofi Espoir Foundation and the Rétinostop association. Experts from the Curie Institute have also visited Mali, Ivory Coast, Senegal, the Democratic Republic of Congo and Madagascar to provide assistance.

Thanks to the development of this network of retinoblastoma expert centers in Africa, the complete remission rate in Mali has increased from 33% in 2011 to 80% today for intra-ocular forms.

The GFAOP, founded 20 years ago by African and French doctors, is a medical association

that supports the creation and development of pediatric oncology care units. It brings together within its network specialists in childhood cancer in 18 countries of the Maghreb and Sub-Saharan Africa around a shared objective: "Children with cancer in Africa can and should be treated locally by trained personnel." It is a network of 260 professionals, who have treated more than 12,000 African children, provided more than 700 training courses for caregivers, carried out information and support actions, and donated anti-cancer drugs.

The French commitment to the fight against cancer is supported by all the key players involved in treating this disease, and international influence is at the heart of all the actions carried out: research, patient care, development of new drugs, technology, training and patient support.

What is **French Healthcare** ?

French Healthcare is an innovative public-private initiative aimed at bringing together under a single banner all the players in the French healthcare ecosystem (businesses, researchers, healthcare professionals, key public stakeholders, etc.) to jointly promote their activities, expertise, technology and innovations internationally. It helps to trigger a collective approach dynamic that stimulates international cooperation in the field of healthcare and to promote the vision that in order to improve social equality, healthcare must be improved for everyone, all over the world.

French Healthcare is supported by :

- **Le ministry of Europe and foreign affairs**, which promotes and relays French Healthcare both diplomatically and institutionally.
- **The French Healthcare Association**, a network of French healthcare players who have mobilized to offer collective solutions adapted to the needs of its partners abroad.
- **Business France**, the national agency supporting the international development of the French economy, responsible for fostering export growth by French businesses, as well as promoting and facilitating international investment in France. It promotes France's companies, business image and nationwide attractiveness as an investment location.

The initiative also benefits from international mobilization on the part of the [Ministry for the Economy, Finance and the Recovery](#), the [Ministry for Solidarity and Health](#), the [Ministry for Higher Education, Research and Innovation](#); of **French regions**, and of **key public and private entities involved in the healthcare sector, development and trade**, such as professional associations, business organizations, businesses, hospitals, research institutes, innovation clusters and universities.

France, a key player in global healthcare

France is a leading player in healthcare worldwide and boasts considerable advantages:

- A healthcare system that is recognized among OECD nations for access to healthcare.
- Excellent training for healthcare professionals, recognized for their high level of expertise.
- Cutting-edge, internationally renowned research across numerous fields.
- One of the highest-performing pharmaceutical industries in the world.
- A renowned capacity for innovation in all healthcare fields, including medical devices, oncology, chronic and infectious diseases, digital healthcare, the silver economy and more.
- A dynamic and innovative ecosystem that includes startups, SMEs and large corporations.

French Healthcare is a collective commitment to that ecosystem. French healthcare players are mobilized every day to improve the quality of healthcare management for patients of all ages, at home or in the hospital, and to provide solutions adapted to major contemporary public-health challenges around the world: new infectious risks, the globalization of care, demographic growth and transition, the growing impact of non-communicable diseases, digitalization and other technological revolutions, and more. French Healthcare showcases all of those dimensions internationally.

Who does **French Healthcare** reach out to?

French Healthcare reaches out to foreign partners, including businesses in the medical or pharmaceutical sectors, distributors, hospitals and nursing homes, doctors and the medical profession in the broadest sense, investors, public purchasers, financial backers, patients and their families, journalists and influencers, etc. Its goals are to:

- Introduce and promote the French healthcare ecosystem internationally through communication and influence campaigns, promotional events and our presence at major international trade shows, as well as by welcoming international delegations interested in the French healthcare model and France's expertise and technological solutions.
- Develop commercial, medical and scientific partnerships between French and international players in the healthcare field.
- Coproduce innovative solutions adapted to each country's context via partnerships with foreign players.
- To promote training for healthcare professionals and the reception of foreign patients in France.

Vision

French Healthcare contributes to promoting France's vision in terms of global healthcare, founded on a humanist approach to care and on fair and equitable access to healthcare products and services. **French Healthcare defends the idea that in order to improve social equality, healthcare must be improved for everyone, all over the world.**

"Improving healthcare for all"

Values

French healthcare players' humanist, grassroots, scientific and collective approach is guided by key values:

- Excellence
- Universalism
- Efficiency
- Science-based progress

Mission

French Healthcare is a collective brand that promotes France's attractiveness in terms of healthcare and stimulates growth for French exports and international investments in France in the healthcare field, thanks to integrated, adapted solutions to healthcare challenges in countries around the world.

Network

The French Healthcare network is made up of French healthcare players who are all contributing to showcasing French expertise abroad: businesses, institutions, municipalities, public-service providers, learned societies, Chambers of Commerce in France and abroad, and overseas trade advisors. They include:

Members of the **French Healthcare Association**

Whether they are French healthcare businesses of all sizes, professional federations, research centers, Chambers of Commerce and Industry or hospitals and clinics, members of the [French Healthcare Association](#) are all committed to promoting French players and to a collective mobilization of French healthcare expertise abroad. They are the ambassadors and representatives of French Healthcare's values and missions abroad.

French Healthcare Clubs

The French Healthcare Club is a French governmental initiative intended to unite important players in the international healthcare market with French businesses whose activities involve healthcare concepts and/or services and products. Under the supervision of the [Ministry for Europe and Foreign Affairs](#), the Club is co-run in France by [Business France](#), the national agency supporting the international development of the French economy, and by a French private-sector business.

Currently, there are 13 French Healthcare Clubs around the world, in [China](#), Russia, Brazil, Algeria, Italy, Turkey, [South Korea](#), Mexico, Saudi Arabia, Tunisia, [Vietnam](#), Morocco and Thailand.

French Healthcare Clubs' mission is to communicate about French businesses in their region and to promote high-level public relations with foreign healthcare authorities to collaborate on common issues and to establish partnerships with local players.

Innovation clusters

The Healthcare Clusters Network was established on April 11, 2018 and groups the six French innovation clusters in the healthcare sector – [Atlanpole Biotherapies](#), [Biovalley France](#), [Eurobiomed](#), [Lyonbiopôle](#), [Medicen Paris Region](#) and [Clubster NSL](#). The network has striven to enhance the results of healthcare cluster initiatives since 2005, to promote the healthcare sector both in France and abroad. Together, these clusters group more than 1,500 members, including 1,000 SMEs. Large corporations, academic institutions, regional authorities, hospitals and healthcare institutions all play a role in developing this unique and vibrant ecosystem. Projects awarded the innovation cluster accreditation are worth nearly €5 billion, with these initiatives alone bringing together close to 1,000 members. Completed projects have put 400 products or services on the market and created 54 businesses. Based on this encouraging record, the six innovation clusters are intensifying collaborative efforts to strengthen their members' innovation power and to enhance the economic weight of the healthcare sectors they represent.

Business France offices and the International diplomatic network

The [Business France network](#) abroad and the [French diplomatic network](#) are mobilized to support both French businesses exporting to foreign markets and foreign businesses with plans to invest in or open structures in France, as well as promoting France's assets and attractiveness internationally.

Follow French Healthcare

#FrenchHealthcare

Website: www.frenchhealthcare.fr

Twitter: [@FrHealthCare_EN](https://twitter.com/FrHealthCare_EN)

LinkedIn: <https://www.linkedin.com/company/frenchhealthcare-en/>

Youtube: <https://www.youtube.com/channel/UCdrw3oNFv140fOeP3SmFujg>





Choose France is a registered trademark of the French government that promotes France's economic attractiveness internationally.
#ChooseFrance



Business France

Business France is the national agency supporting the international development of the French economy, responsible for fostering export growth by French businesses, as well as promoting and facilitating international investment in France.

It promotes France's companies, business image and nationwide attractiveness as an investment location, and runs the VIE international internship program. Business France has 1,500 personnel, both in France and in 55 countries throughout the world, who work with a network of partners.

Since January 2019, as part of the reform of the state support system for exports, Business France has given private partners responsibility for supporting French SMEs and mid-size companies in the following markets: Belgium, Hungary, Morocco, Norway, the Philippines and Singapore.

For further information, please visit: www.businessfrance.fr



French Healthcare Association

The French Healthcare Association, founded in January 2018, brings together businesses, healthcare establishments and research and training institutes in France that would like to play an active role in this trend and to promote together their activities internationally.

Its members reflect the diversity of the French healthcare ecosystem, including the pharmaceutical industry, biotechnologies, medical devices, public and private healthcare establishments, construction, architecture and hospital engineering businesses, from startups to large corporations, makers of medical technologies and equipment, digital healthcare players, etc. They are the ambassadors and representatives of French Healthcare's values and missions abroad.

The diversity and quality of this network of French healthcare players enables collective solutions to be proposed in line with foreign partners' needs and to promote the spreading of French healthcare expertise and technology.

For further information, please visit: www.frenchhealthcare-association.fr



TECHNICAL FORM

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1. AB Science

Business presentation

Founded in 2001, AB Science is a French business in an advanced clinical phase that designs and develops new drugs to treat diseases with a high unmet medical need, including inflammatory diseases, diseases affecting the peripheral and central nervous system and cancers.

Contact

contact@ab-science.com

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2. Acobiom

Business presentation

Acobiom is a biotechnology firm specializing in the discovery of genomic or transcriptomic biomarkers and the development of innovative diagnostics.

Contact

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3. Adaptherapy

Business presentation

Adaptherapy has developed Predmed, an innovative solution for clinical decision support and prescription support. It is an algorithm that simultaneously predicts the effectiveness of all available targeted therapies and immunotherapies. This solution then allows oncologists to themselves select the most suitable treatment for each patient with solid tumor cancers.

Contact

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CEO

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www.adaptherapy.com

4. Adelis

Business presentation

Adelis Technologies (formerly Picometrics) is a biotechnology firm that has developed the BIABooster device for concentrating, splitting and separating circulating DNA directly from plasma samples. It has unparalleled sensitivity to meet cancer treatment applications and follow-up of relapses by liquid biopsy.

Contact

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5. Advanced BioDesign

Business history and structure

Advanced BioDesign is a biotechnology firm, founded in 2010, with the ambition of offering a new therapeutic alternative against resistant cancers through an innovative approach targeting aldehyde dehydrogenase (ALDH).

Its lead drug candidate, ABD-3001, is a first-in-class inhibitor of the ALDH family of enzymes in the early stages of clinical development. In 2022, Advanced BioDesign aims

to achieve its first-in-human trial with the first indication of acute myeloid leukemia.

Expertise in oncology

Development of a therapy targeted by inhibiting aldehyde dehydrogenase (ALDH) to fight resistant cancers:

Advanced BioDesign focuses on the development of a new therapeutic approach, based on the disruption of cancer cell metabolism and more specifically its detoxification mechanism via the ALDH family of enzymes. The activity of this family is essential for the survival of both cancer cells and cancer stem cells considered to be responsible for relapses and metastases.

Advanced BioDesign has also developed expertise in the design of inhibitors of ALDH activity (iALDH), as well as in the characterization of these molecules until proof of concept in vivo.

Products and level of development

ABD-3001, its flagship molecule, will enter clinical phase one (first-in-human – FIH) in 2022. However, Advanced BioDesign is continuing its research to develop the second generation of ALDH inhibitors, making it possible to maintain the leadership in cancer treatment.

The story of Advanced BioDesign is a success story in the making. The founders knew how to take a molecule resulting from French academic research and put it on the rails of pharmaceutical development to take it to the clinical stage in 10 years. Successive fundraising has made it possible to finance its research and development programs, consolidate its intellectual property, build its teams and develop international collaborations to move ever faster towards patients.

Key figures

- 13 employees.
- About 10 partners in Europe.
- Last fundraising in December 2020 (€2.5 million), for a total of €15 million since 2013.

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6. Alderaan Biotechnology

Business presentation

Alderaan Biotechnology's mission is to develop new therapies to treat cancer by targeting cells of the immune system. Alderaan Biotechnology's main program is related to the elimination of regulatory T cells in the tumor micro-environment via the targeting of CD25.

Contact

contact@alderaan.fr

www.alderaan-biotechnology.com

7. American Hospital of Paris

Establishment history and structure

A non-profit organization recognized as being of public utility, the American Hospital of Paris is a private multidisciplinary health establishment on a human scale, accredited by both the American Joint Commission and the French

National Authority for Health (A certification).

• First French establishment for measuring patient satisfaction among public and private establishments simultaneously providing medicine, surgery and obstetrics.

• One of the highest number of nursing staff in France to ensure personalized care.

• The American Hospital of Paris offers the best of French and American medical practices, and delivers high-quality personalized care to members of the French, American and international communities residing in France and abroad.

• It welcomes patients in the best conditions, thanks to individual, spacious and comfortable rooms and suites that can accommodate an accompanying person (without supplement: TV and Wi-Fi access), its high-end catering (in partnership with Yannick Alléno, a three-star chef) and quality hotel service (room service, valet parking, porter).

• The foundation of the American Hospital of Paris: in 1976, the American Hospital of Paris created the American Hospital of Paris Foundation. Based in New York, this foundation represents the French institution. Its mission is to support the actions of the Hospital and to find private funds in the United States. It also participates in the implementation of exchange programs between France and the United States, in the field of medical and technological practice. It promotes the image of the institution with the authorities and American citizens.

Expertise in oncology

The oncology unit provides personalized care in a human-sized structure, with a multidisciplinary approach mobilizing all specialists and technical platforms.

The high availability of its teams, the speed of treatment combined with the high technicality of the equipment ensure the highest level of quality and safety of care throughout the patient's journey.

Chemotherapy treatment is provided in a single room, in an outpatient department at the American Hospital in Paris. In the event of radiotherapy treatment, sessions will be given at the Porte de Saint-Cloud Cancer Center in Boulogne-Billancourt.

The care pathways are organized by a referring doctor and the coordinating nurse is dedicated to comprehensive and personalized care of the care pathway.

All cancers among men and women can be treated at the American Hospital of Paris, thanks to its expert medical specialists.

Products and level of development

• Acquisition in 2017 of the Porte de Saint-Cloud Cancer Center, providing comprehensive patient care, in particular for radiotherapy sessions.

• Acquisition of a latest generation MRI.

• Creation of an ultra-modern breast imaging center dedicated to the early diagnosis of breast cancer.

• Complete renewal of the angio-coronary angiography room equipment.

Key figures

- 750 employees.
- 350 independent doctors.
- 145 beds, including 18 critical beds.
- 26 outpatient places.
- Revenues: €112 million.
- 7,700 patients received per year in outpatient hospitalization, 30% of whom are international patients.

• 6,370 patients received per year in conventional hospitalization, 30% of whom are international patients.

• 178,000 outpatient consultations, including 30% caring for international patients.

• 5,350 chemotherapy sessions.

• 41,000 radiotherapy sessions.

• 6,700 dialysis sessions.

Examples of partnerships abroad

• Case of exporting the expertise of the American Hospital of Paris abroad: Prevention of breast cancer thanks to the Women's Risk Institute. Thanks to new expert artificial intelligence software, women from the age of 35, without a history of breast cancer, can benefit from individual screening to predict and prevent the occurrence of breast cancer with five years in advance. This screening was offered in Côte d'Ivoire using DNA saliva tests that can be performed alone by the patient and teleconsultations organized with the referring breast cancer oncologist.

• Case of training of international doctors: Gastrotraining is an event organized at the American Hospital of Paris every two years. Over three days, around thirty international doctors (mainly from Africa) can attend conferences led by specialist doctors and interventions filmed and broadcast live in the auditorium. The screening and treatment of colorectal cancers are at the heart of this educational event and create a strong link with the corresponding international doctors.

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<https://www.american-hospital.org/>

8. Antineo

Business presentation

Antineo specializes in preclinical services to test future anticancer agents. The business carries out proof of concept studies in vitro, ex vitro or even in vivo, allowing them to optimize the preclinical stages of drug development strategies with the choice of the indication, the relevant model and the appropriate references or combinations.

Contact

contact@antineo.fr

www.antineo.fr

9. AP-HP

Business history and structure

The leading hospital and university center (CHU) in Europe, the *Assistance Publique–Hôpitaux de Paris* (AP-HP) and its 39 hospitals are organized into six university hospital groups and are organized around five universities in the Ile de France region. Closely linked to major research organizations, AP-HP has three world-class university hospital institutes (ICM, ICAN, IMAGINE) and the largest French health data warehouse (EDS). AP-HP also created the AP-HP Research Foundation in 2015 to support biomedical and health research carried out in all of its hospitals.

Expertise in oncology

The oncology activity at AP-HP is characterized by the growing importance of multidisciplinary involving close

links between organ specialties, medical oncology and radiotherapy, as well as the development of onco-specialties (cardiology, nephrology). AP-HP also stands out for its ability to treat all types of cancer, at all stages, and at all ages. One-third of patients in Ile de France are treated there. AP-HP provides 80% of regional surgery in Ile de France for childhood cancer and covers 30% of pediatric cancer patients. The innovative treatments by CAR-T are carried out there.

Among the strengths is also the AP-HP care offering, which covers clinical services for all specialties: medical oncology, malignant hematology, radiotherapy, organ specialties, oncological surgery. Another strong point is the major place of multidisciplinary, with onco-specialties, such as cardiology, nephrology and endocrinology. AP-HP is also an expert in critical care and resuscitation, particularly for the management of complications from new therapies.

The high-performance medico-technical platforms (biology, anatomic pathology, imaging) also represent a major key strength for the teams.

The European accreditation of the Organisation of European Cancer Institutes (OECIs) as a high-level center for research, care and teaching known as the "Comprehensive Cancer Center" was launched in 2018 via two university hospital groups (GHUs), Sorbonne University and University of Paris Center. The AP-HP has obtained the European Society of Gynaecological Oncology (ESGO) accreditation for surgery at the European Hospital Georges Pompidou (HEGP), Pitié-Salpêtrière and Tenon sites and for teaching for the HEGP and Tenon.

Key figures

- 650 active patents.
- 9,000 scientific publications.
- More than 4,000 research projects are currently under development.
- Two integrated cancer research sites (SIRICs).

International ambitions

The AP-HP is committed to promoting actions internationally through

1) Its International Relations Department (DRI) in charge of:

- Developing hospital partnerships.
 - Promoting the reception and training of foreign health professionals.
 - Contributing to the international patient care policy.
- 2) Its private subsidiary dedicated to international care (AP-HPI), which aims to offer:

- Expertise on the offer of hospital care.
- Preliminary studies for the construction and/or rehabilitation of hospitals.
- Assistance with project management.
- Training programs for groups of foreign professionals.
- Examples of partnerships abroad

In the field of oncology for the year 2019, two examples can be cited:

- Tunisia: Support for the preparation of mitotic inhibitors in Sfax then in Monastir by the HEGP pharmacy.
- Vietnam: Support for the Hanoi cancer hospital by hosting trainee doctors at the Henri Mondor university hospital (CHU)

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10. Apmonia Therapeutics

Business presentation

Apmonia Therapeutics is a biotechnology firm engaged in the development of therapeutic strategies against several types of cancer.

Contact

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11. Foch Hospital Association

Establishment history and structure

Since January 1, 1996, Foch Hospital has been managed by a non-profit association. With 2,200 employees (including more than 400 doctors) and 615 beds, Foch Hospital is a reference center renowned for its offer of both qualitative and comprehensive care for adults, combining medicine, surgery and obstetrics.

As a multidisciplinary establishment, Foch Hospital has the capacity to cover 90% of patients' needs, making it possible to improve the patient journey by reducing their length of stay and the anxiety associated with moving from a hospital to another, for French but also international patients.

In addition, Foch Hospital takes care of international patients and has created an international department dedicated to them since 2018.

Expertise in oncology

Foch Hospital is a leader in several medical specialties in France, with a strong predominance of oncology, according to a ranking of the best health establishments in France drawn up by the magazine Le Point for the year 2020. Its expertise in medical oncology is transversal (all organs): chemotherapy, immunotherapy, and in particular surgery. The hospital also received an award for supportive care at the European Society for Medical Oncology (ESMO).

The multidisciplinary nature of Foch Hospital makes it possible to take care of cancer patients as a whole and transversally within the same health establishment. Also, any previous pathology or related to the patient's cancer is taken care of in parallel with the cancer treatment.

Foch Hospital has opened a day hospital, which is an out-patient oncological support care system, so as to anticipate, as much as possible, the adverse effects of treatments on patients and prevent them, thereby reducing the journey of cancer patients.

Foch Hospital puts its expertise at the service of health consulting actions (development of medical strategy, audit, recommendations and project monitoring for the creation or improvement of medical specialties/in situ centers) and provides training in France or abroad (for medical and paramedical personnel, including fellows), aiming to make its partners autonomous and more efficient in the long term. Its international medical and paramedical train-

ing center is expanding.

Key figures

- 2019: 900 stays in conventional hospitalization, including 380 stays in oncology.
- 2020: 556 stays in conventional hospitalization, including 220 stays in oncology.
- 18 beds in full hospitalization and 16 beds in day hospitalization.

International ambitions

As Foch Hospital is renowned both in France and abroad, an International Department was created in 2018, with both a dedicated administrative and medical team (five administrative staff, three doctors and one health manager coordinating a care team) and a 14-bed medical unit available to facilitate the flow of international patients, in addition to all the beds available in the various hospital departments.

The development of the Supportive Care Unit at the Foch Hospital aims to develop an international center of excellence on the theme of patient support in conjunction with the hospital's various partner teams. The objectives of the supportive care unit revolve around the patient's care path (accompanied by their relatives), namely consultations, a mobile unit in connection with the various services of Foch Hospital, day hospital treatment, a conventional hospitalization unit with nine beds and a privileged link with the city.

Examples of partnerships abroad

From November 30 to December 2, 2020, a delegation from Foch Hospital, made up of the Director of International Development, an oncologist, a pharmacist, and a manager of international projects and training, audited the Hubert Koutoukou Maga hospital (CNHU-HKM) then the Cotonou Mother and Child hospital (CHU-MEL) in Cotonou, Benin, to set up an oncology day hospital. The support provided was based on training, medical project writing, advice on equipment for the center and the structuring of the latter to ensure an optimal patient journey.

Contact

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12. Atlanthera

Business presentation

Atlanthera is a biotechnology firm specializing in the discovery of innovative molecules for the treatment of bone diseases.

Contact

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13. Atlantic Bone Screen

Business presentation

Atlantic Bone Screen is a preclinical contract research

organization (CRO) specializing in bone and joint pathologies, of tumor or non-tumor origin.

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Business Developer

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14. Betterise Health Tech

Business history and structure

Betterise Health Tech is a startup that operates in the e-health sector and offers a multitude of preventive medicine services through multi-platforms.

The business provides intelligent digital therapeutic solutions to users.

With personalized services, the young firm offers tools, such as the website and the application dedicated to mobile devices, like smartphones, tablets and connected devices.

These solutions make it possible to measure and analyze different behaviors, such as activity, nutrition, sleep, stress and addictions.

In addition, Betterise Health Tech offers daily support programs that adapt to each individual using a well-defined algorithm.

The startup is characterized by a B2B service that offers professionals and businesses solutions for employees.

Expertise in oncology

Medical software (class IIa medical devices) monitors the condition of patients through analysis of their real-life data. Certified as medical devices, they can be used routinely and allow: the detection of relapses, complications and therapeutic toxicities, thanks to the analysis of the dynamics of the patient's symptoms and their therapeutic support, remotely, to help them better understand their illness and treatments, and to feel supported.

Products and level of development

Based in Biarritz, Betterise is ISO 13 485 certified, has supported more than 500,000 patients since it was created in 2013 and provides services in 15 languages.

A few weeks ago, Oncolaxy solution detected early therapeutic toxicities in a 62-year-old patient treated for first-line metastatic non-small cell lung cancer with pembrolizumab/alimta/carboplatin.

From the first cycle, Oncolaxy detected iatrogenic effects, such as polyarthrititis and constipation, but also other events more related to quality of life, such as depression and insomnia.

The healthcare team was able to intervene very quickly, setting up a new prescription and initiating appropriate supportive care.

The patient was able to continue their treatment at full dose, without cycle lag, and thereby benefited from optimal follow-up and management.

Deployed in more than 60 establishments, Betterise's medical telemonitoring software allows complete therapeutic management of remote patients in oncology and cardiology.

Medical devices bearing the CE mark (class IIa) make it possible to detect complications or toxicities linked to therapies, and to support patients with personalized therapeutic support.

Key figures

- France revenues: €2 million.
- 20 employees.
- Oncolaxy, a medical device remote monitoring solution for all cancers, certified IIa since last January and deployed in around fifteen centers in France, and one in Germany.
- National and international pharma clients.
- An economic model centered on data and future reimbursement under common law.

Contact

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15. Brenus Pharma

Business presentation

Brenus Pharma is a biotechnology firm that develops allogeneic cell-based vaccines for solid cancer immunotherapy to fight resistance to treatments.

Contact

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16. Carcidiag

Business presentation

Carcidiag is a biotechnology firm dedicated to the development of specific diagnostic products that are rapid for cancer stem cells (CSCs) and avoid the need for biopsies.

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17. CarThera

Business presentation

CarThera is a clinical-stage medical technology firm focused on the development of innovative ultrasound-based medical devices to treat brain tumors and other serious brain disorders. CarThera has developed SonoCloud, a medical device that emits ultrasound to temporarily increase the permeability of blood vessels in the brain.

Contact

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18. Collectis

Business history and structure

Founded in 1999 by André Choulik, Collectis is a clinical-phase biopharmaceutical firm that develops the very first allogeneic immunotherapies based on CAR-T cells, inventing the concept of engineered CAR-T cells off the shelf and ready to use to treat cancer patients.

Collectis is listed on the Euronext Growth market as well as on the Nasdaq.

Products and level of development

As part of its commitment to research into curative therapies against cancer, Collectis aims to develop UCART product candidates aimed at the unmet medical needs of patients with certain types of cancer, in particular acute myeloid leukemia, Acute B-cell lymphoblastic leukemia and multiple myeloma.

Building on its 21 years of expertise in genome engineering, its TALEN® genome editing technology and the pioneering PulseAgile electroporation technology, Collectis is developing innovative product candidates, using the power of the immune system to target and eliminate cancer cells.

Key figures

Currently seven clinical trials underway in partnership and on their own for the treatment of various cancers of the blood.

Six fundraising events for a total of €500 million.

Examples of partnerships abroad

• Collectis and Cytovia Therapeutics (United States), a biopharmaceutical firm developing natural killer (NK) cells and cells carrying an allogeneic chimeric antigenic receptor (CAR)-NK, derived from genetically induced pluripotent stem cells (iPSC), modified and available on demand, announced the signing of a research and development partnership to develop iPSC-derived NK and CAR-NK cells genetically modified using TALEN® technology.

- Allogene Therapeutics (United States)
- Weill Cornell Medicine (United States)
- Moffitt Cancer Center (United States)
- Chicago Faculty of Medicine (United States)
- Hackensack Meridan Health (United States)
- Dana-Farber Cancer Institute (United States)

Contact

André Choulika

19. CELLforCURE, part of the LFB group

Business history and structure

Founded in 1994, LFB develops, manufactures and markets therapeutic proteins for diseases that are always serious and often rare.

Today, LFB is one of the leading European players in biopharmacy, offering healthcare professionals, mainly in hospitals, drugs derived from plasma, in three major therapeutic areas, namely immunology, hemostasis and intensive healthcare.

As a French biopharmaceutical laboratory, LFB initiated in 2018 a profound transformation, with a refocusing of its activities on its core business: developing, manufacturing and marketing drugs derived from plasma and recombinant proteins.

The CELLforCURE industrial platform located in Les Ulis (Ile de France) is one of the first and largest in Europe for the production of cell and gene therapy drugs.

Expertise in oncology

CELLforCURE operates as a subcontractor in the development and manufacture of drugs (CDMO – contract development and manufacturing organization).

Products and level of development

A pharmaceutical establishment since 2013, it was awarded two certificates of good manufacturing practices by the National Agency for the Security of Medicinal and Healthcare Products (ANSM) in 2016 for the production of commercial and experimental advanced therapy medicinal products (ATMPs).

Key figures

Creation of the GIP LFB pharmaceutical establishment in January 1994.

2,300 employees in France and around the world.

15 biomedicines.

Examples of partnerships abroad

Partnership with Novartis, which has announced the signing of an agreement with CELLforCURE to produce innovative anticancer treatments called CAR-T (“chimeric antigen receptor T-cells”) at the bioproduction site located in Les Ulis (Ile de France).

This new industrial platform complements the existing production sites in the United States and Europe.

Contact

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20. Antoine Lacassagne Center

Establishment history and structure

Founded in 1961, the Antoine Lacassagne Center is one of the 18 French cancer centers of the Unicancer network. As a private health establishment of collective interest (ES-PIC), it fulfills missions of care, research and teaching in oncology. The Antoine Lacassagne Center takes care of all types of cancer and treats more than 6,400 patients per year.

Innovation, expertise and benevolence drive the teams at the Antoine Lacassagne center every day.

Expertise in oncology

Ranked among the top 100 cancer hospitals in the world by a panel of 40,000 doctors and healthcare professionals (Newsweek 2021 ranking), the Antoine Lacassagne Center has one of the most comprehensive radiotherapy and imaging technical platforms in Europe. It is recognized for its expertise in proton therapy and surgery for cancers among women. Access to cutting-edge techniques and the most innovative medical treatments allow patients to benefit from the best possible care offer.

Products and level of development

Like all cancer centers, our establishment is exclusively dedicated to the treatment of cancer and offers all the treatment methods: surgery, radiotherapy and chemotherapy.

The Antoine Lacassagne Center has recognized expertise in many specialties and has one of the most complete technical platforms in Europe, including low- and high-energy proton therapy, CyberKnife®, intra-operative radiotherapy, brachytherapy, contact radiotherapy, interventional radiology, scanner, high-resolution total digital imaging MRI with air technology antenna, tomosynthesis mammography, and a 100% digital PET camera.

• Mastology with the University Institute of Breast and Gynecological Oncology

The Antoine Lacassagne Center is a leader in its health

area for managing breast and gynecological cancers. It offers a global innovation for treating small breast cancer: intra-operative one-minute radiotherapy. These patients can now be treated with a single one-minute radiotherapy session, instead of the 30 minutes previously in the operating room during the procedure to remove their tumor (pre-operative radiotherapy). They can therefore be treated in a single day, instead of three or four days of hospitalization and six weeks of radiotherapy.

• The Mediterranean Proton Therapy Institute (high- and low-energy proton therapy).

The Mediterranean Proton Therapy Institute is equipped with high-energy proton therapy equipment that is unique in the world, with pediatric oncology as a priority, and low-energy proton therapy equipment that has already treated 5% of patients with ocular tumors worldwide.

Proton therapy: Innovative radiotherapy technique to treat cancer cells while preserving neighboring healthy tissues.

Radiotherapy is frequently used in the treatment of cancer. Indeed, one in two patients will undergo radiotherapy during their treatment. Conventional radiotherapy is performed with X-rays; proton therapy is radiotherapy carried out with protons endowed with more effective physical properties that are better tolerated by patients. When they reach the tumor target, they release all their energy, cause its destruction and stop there, protecting the surrounding healthy tissue.

With the Cyclotron Medicyc in operation since June 17, 1991, the Antoine Lacassagne Center carried out the first proton radiotherapy treatment in France. The Cyclotron de Nice equipment has been specially designed and calibrated for the treatment of melanoma of the eye. To date, the Center has treated more than 6,000 patients from all over the world and has world-renowned expertise validated by numerous publications.

The activation of Proteus® One (high-energy proton therapy) in 2016 enabled it to offer both technologies – low-energy and high-energy proton therapy – thereby increasing its range of care.

Proton therapy is currently used by the radiotherapist on:

- Eye tumors.
- Tumors that are difficult to access or close to organs at risk (chordomas and chondrosarcomas, para-rachidian tumors, tumors of the base of the skull, sinus tumors), this is the case of the first patient currently treated at the Mediterranean Proton Therapy Institute.
- All pediatric tumors.

Key figures

Key figures 2020:

- 192 beds and places.
- Budget of €130 million.
- 859 employees.
- 6,131 patients treated (active queue).
- 852 patients included in clinical trials.
- Nearly 62,000 medical consultations.
- 63,520 hospital stays.

International ambitions

A platform dedicated to foreign patients responds to requests for advice, diagnostic research and requests for quotes. The reception and management team for foreign patients at the Antoine Lacassagne Center is made up of doctors, caregivers and administrative and financial managers.

Contact

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21. Caen François Baclesse Cancer Center

Establishment history and structure

The François Baclesse Cancer Center is one of the 18 French cancer centers of the Unicancer network.

It has a threefold mission – care, research and teaching in oncology – by placing Unicancer’s values at the heart of its commitments: humanism, innovation, excellence and solidarity. The Center has a recognized high-tech technical platform at national and European level, allowing patients to access a high-quality care offer throughout their journey.

Expertise in oncology

The center is endowed with human expertise and proton therapy services, which translates into the training of practitioners and the reception of international patients.

Products and level of development

The center provides services (e.g. taking charge of foreign patients).

Key figures

- 1,042 employees.
- 137 scientific doctors.
- 27,563 patients received.
- 166 open clinical trials.

International ambitions

The François Baclesse Cancer Center, the first French center to obtain European EUSOMA certification: the European Society of Breast Cancer Specialists EUSOMA has also awarded the Normandy Breast Institute within the François Baclesse Cancer Center its European certification accreditation.

The François Baclesse Cancer Center has been accredited “Comprehensive Cancer Center” by the Organisation of European Cancer Institutes (OEI), becoming the fifth French cancer center to obtain this accreditation of excellence.

Contact

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22. Léon Bérard Center

Establishment history and structure

As a non-profit private health establishment of collective interest (ESPIC), the Léon Bérard Center is affiliated to Unicancer, which brings together the 18 French Comprehensive Cancer Centers (FCCCs).

Fully dedicated to oncology, the Léon Bérard Center brings together on a single site, in Lyon, a hospital for patient care and a cancer research center.

It has three missions: care, research and teaching. The center is recognized as a regional, national and international reference center for oncology.

The Léon Bérard Center obtained Organisation of European Cancer Institutes (OEI) certification in 2017, allowing it to become a comprehensive cancer center on a European scale.

Expertise in oncology

The center treats all cancers and offers its expertise over the entire course of care, from diagnostic examinations to post-cancer follow-up. It provides cutting-edge diagnostics and treatments to cancer patients, including latest generation radiotherapy protocols and innovative treatments (interventional radiology, clinical trials, immunotherapy, etc.), and also has expertise in rare cancers (sarcomas, rare gynecological tumors, complex digestive tumors) and pediatric cancers.

Key figures

- 38,000 patients per year are admitted on average each year.
- 10,000 new patients per year.
- 89,000 chemotherapy preparations were made in 2019.
- Total revenues: €243 million.
- International patient revenues: €2.5 million.
- 1,883 jobs.
- 500 researchers.

International ambitions

To organize and structure the various international actions carried out by the teams of the Léon Bérard Center, a steering committee coordinated by Sophie Beaupère, coordinator of strategic files, was set up in 2017. The international projects of the center concern:

- Reception and care of foreign patients.
- The training of foreign health professionals.
- Cooperation with hospitals, universities and research centers.

Examples of partnerships abroad

In 2019, launch of a project between the Center Léon Bérard and the Japanese technology firm Hitachi to jointly promote research and development, with a view to improving the efficiency of cancer diagnostics and treatments through artificial intelligence.

Radiotherapy project in a sitting/standing position with a radiotherapy chair, with the firm Leo Cancer Care located in London. Major economic benefits, with the aim of exporting technological offerings to countries with fewer resources.

Contact

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23. CleveXel Pharma

Business presentation

Founded in 2013 as a spin-off from Cephalon laboratories (TEVA Group), CleveXel Pharma is a pharmaceutical firm specializing in the development of innovative treatments.

Contact

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CEO

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24. ClinGroup EuroMed

Business history and structure

ClinGroup EuroMed is a health services provider established in France since 2002, specialized in the fields of research and development, as well as digital innovation, particularly related to e-health.

ClinGroup EuroMed helps promote quality in clinical research. It is a pioneer in innovation and application development, particularly related to patient support, mobile nursing and pharmacovigilance programs. The digitalization of the clinical trial is ensured during all these phases with a range of applications: CTPM (Clinical Trial Project Management), CTMF (Clinical Trial Master File), the e_Concent (electronic consent), the EDC (Electronic Data Capture), and IWRS (Interactive Web Response Systems) for patient randomization.

Expertise in oncology

Since 2005, ClinGroup has actively contributed in more than 50 clinical cancer research programs in cancer of the breast, ovaries, lungs, prostate, colon, leukemias, and others.

During the coronavirus pandemic, cancer patients included in the studies were at risk of presenting to the site. ClinGroup has developed its services by using mobile technologies to collect data from cancer patients and it has given logistical advantages to patients and staff. This innovative development is focused on two axes: the contribution to the well-being of the quality of life of patients and the effectiveness of monitoring, with reduction of the associated risks.

Finally, some studies needed to ensure quality in the storage of chemotherapy drugs during the clinical study. ClinGroup pioneered Cold Eye, a cost-effective system for monitoring environmental parameters that meets the highest international standards for drug safety. Cold Eye helps with the monitoring of environmental parameters in the storage of chemotherapy drugs: temperature, humidity, noise, light and dust. It manages 24/7 monitoring of critical parameters.

Products and level of development

Recently, ClinGroup played a role in several cancer clinical trials, covering regions of Africa and the Middle East. Two recent controlled trials in oncology have been carried out. These tests are detailed in the paragraph “Examples of partnerships abroad”.

ClinGroup EuroMed continued its expansion to cover the Middle East and Africa, through legal presences in Egypt, Lebanon and the United Arab Emirates, as well as partnerships and joint ventures in more than 40 countries, from Morocco to Pakistan and from Turkey to South Africa.

ClinGroup is a main supplier approved by large pharmaceutical companies, including F. Hoffman-La Roche Ltd., Alexion, Lundbeck, Saja, Novo Nordisk®, and Biologix®.

Key figures

- Presence in more than 25 countries.
- More than 360 projects for different clients.
- More than 6,500 patients from more than eight therapeutic areas.
- ClinServ’s regional network includes over 500 key opinion leaders and 3,000 healthcare professionals.

International ambitions

ClinGroup plays a role in several cancer clinical trials, covering regions of Africa and the Middle East.

In addition, some examples of previously published studies conducted include:

• OSSMAR: An observational study to describe the use of sunitinib in real-life practice for the treatment of metastatic renal cell carcinoma.¹

• Frequency and clinical characteristics of HER2 over-expressed breast cancer in Saudi Arabia: a retrospective study.²

Examples of partnerships abroad

Two trials were recently controlled in oncology:

An open-label, randomized phase three trial of X, or X plus Y, or X plus platinum doublet, with chemotherapy, versus platinum doublet with chemotherapy in subjects with non-small cell lung cancer, is being conducted in 37 countries, to include 1,980 patients.

A prospective observational study in the management of first-line metastatic colorectal cancer with Z, is being carried out in 51 centers distributed in the Asia-Pacific, Indian subcontinent and Oceania regions, including 520 patients in Malaysia, Singapore, Taiwan, South Korea, Russia, Saudi Arabia, Lebanon, Vietnam, Jordan, Iraq and Australia.

Contacts

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25. Cureety

Business history and structure

Cureety is an SME that started its activity in February 2018.

It is developing a remote monitoring solution for cancer patients in the form of a web and mobile application, accessible to the patient and the medical team. Created in 2018, the firm is based in Dinan, Bretagne (Brittany).

Expertise in oncology

Cureety has developed a telemonitoring platform that is offered to healthcare establishments to improve the care pathway for cancer patients. It has been designed to bring immediate benefits for patients and caregivers by solving concrete problems, which have so far not been taken into account, all thanks to an innovative digital approach. The attractiveness of this product encourages regular use and strong involvement of patients and caregivers. This platform is already deployed in around twenty healthcare establishments and is certified as a class I medical device.

Products and level of development

February 2020: Cureety raises €1.2 million in seed money to accelerate the deployment of its medical device for remote monitoring of patients. Cureety also obtains the “French Tech Seed” label awarded by the FTS committee led by SATT Ouest Valorisation.

March 2020: Cureety and MédecinDirect (Teladoc Health France) form a partnership for the remote monitoring of patients suspected of a Covid-19 infection.

May 2020: Cureety and AstraZeneca France form a partnership to transform the care pathway for patients with lung and ovarian cancer. As part of the Health Innovation Coalition, Cureety obtains institutional support from the Servier and Ipsen laboratories to accelerate the deployment of its solution to ensure the continuity of care for cancer patients.

August 2020: Cureety and AstraZeneca Spain form a part-

1 <https://pubmed.ncbi.nlm.nih.gov/31657977>

2 <https://pubmed.ncbi.nlm.nih.gov/33407382>

nership to transform the care pathway for patients with lung cancer, ovarian cancer and chronic lymphoid leukemia in Spain.

November 2020: AstraZeneca France and Curety strengthen their alliance to launch HAYA by Curety, an innovative integrated remote care management pathway for patients with lung or ovarian cancer.

Key figures

- Total revenues 2020/21/22: €2 million.
- About twenty partner healthcare establishments in France: 1,000 patients, 60,000 questionnaires.
- Deployment of the solution in Spain: the entire Andalusia region, i.e. 10 hospitals.

Examples of partnerships abroad

The abstract of the Connect Patient To Doctor study conducted by Dr. Helissey from the Bégin Army Instruction Hospital, whose publication in poster form has been accepted at ASCO, held on June 4 to 8, 2021.

This study showed the benefits provided by the Curety platform, both in terms of optimizing the care pathway in a context of health crisis and the high level of patient satisfaction (72% assigning a score of 9/10 or 10/10 to the platform).

Contact

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26. Damae Medical

Business history and structure

Winner of the 2015 national i-Lab competition, the startup is revolutionizing the detection of skin tumors through optical imaging.

Expertise in oncology

Damae Medical is developing the deepLive™ medical device, which provides dermatologists with cell-resolution images down to the dermis, thereby providing access to optical biopsies. Diagnoses are earlier and promote the implementation of appropriate and effective treatments.

Prof. Mariano Suppa recently shared the concrete use of deepLive™ in the dermatology department of Erasmus Hospital, with the demo accessible via the link: youtu.be/NLRrIBSd6Y4.

Products and level of development

2014: Business created by Anaïs Barut (CEO), David Siret (CTO), Arnaud Dubois (CSO), who filed the patent for the protection of the Line-Field Confocal Optical Coherence Tomography (LC-OCT) technology, proof of concept of the LC-OCT vertical imaging.

2015: First LC-OCT images taken on fresh biopsies of suspected skin cancer, validation of the potential of vertical LC-OCT imaging for the two main types of skin cancer: carcinoma and melanoma.

2016: First clinical demonstrator installed at Saint-Étienne University Hospital, winner of the Digital Innovation Competition organized by Bpifrance and signature of the exclusive license agreement for LC-OCT technology.

2017: Closing of an investment round of €2 million, with Kurma Partners, Idivest Partners, News Invest, Paris-Saclay Seed Fund, co-managed by Partech Ventures, and private investors, obtaining of the ISO 13485 certificate and first proof of concept of LC-OCT 3D.

2018: Winner of the World Innovation Competition organized by Bpifrance, 2D LC-OCT miniaturized in a portable probe, obtaining the LC-OCT 2D CE mark, installation of 2D LC-OCT devices in hospitals, first scientific publication: A Dubois et al., "Line-field confocal optical coherence tomography for high-resolution noninvasive imaging of skin tumors", JBO 23, 106007.

2019: Miniaturized 3D LC-OCT in a portable probe, leading to obtaining the LC-OCT 3D CE marking, manufacturing of 10 3D LC-OCT devices, launch of the clinical validation of 3D LC-OCT.

2020: Integration of the live dermoscopic camera inside the portable probe, obtaining CE marking for deepLive™, first descriptive clinical publications, commercial launch of deepLive™ in Europe.

Key figures

- 20 employees.
- 50% of international revenues in Europe.
- More than 10 renowned hospital centers equipped.
- Fundraising underway – will be announced by the end of 2021.

Contact

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27. Deeplink Medical

Business history and structure

Formerly Imalink Medical, Deeplink Medical was created in 2014 by five radiologists, an operational director and an IT manager. Medical expertise is therefore a component of its DNA.

Expertise in oncology

It is a platform for oncological monitoring and assessment of the therapeutic response.

The workflow platform supports healthcare professionals and industry in monitoring patient solid tumor assessments by providing real-time structured imaging data for clinical trials and routine.

Products and level of development

In collaboration with the Léon Bérard Center (a French Comprehensive Cancer Center – FCCC) in Lyon:

MIRIO®, which is the first collaborative oncology platform to obtain the CE medical device marking, assesses the tumor response to anticancer treatments: it gives an efficacy signal for phase one trials, allowing a comparison of effectiveness in phase two (new drugs or strategies), and it determines the secondary criteria in phase three.

In current clinical practice, MIRIO® makes it possible to guide the clinician in decisions concerning a treatment and to assess the response of the tumor: an element taken into account when deciding what to do next with a treatment, with the clinical benefits and improvement of biological parameters.

MIRIO® is also a standardization and security of prescriptions and imaging reports.

Finally, MIRIO® allows the constitution of a patient database, allowing the correlation and exploitation of data (clinical, biological, genomic).

Key figures

- Revenues of €2 million.

- 50 employees.

Contact

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28. Deuxiemeavis.fr (Carians)

Business history and structure

Carians is a startup that created the first 100% online platform that will allow patients and healthcare providers to communicate around relatively complex clinical cases.

Expertise in oncology

The platform is deployed for oncology follow-up. It is not only possible for the patient to download several files on their case, but also allows the doctors to have a good understanding of the situation and to discuss it with other colleagues around the world. This approach increases communication and therefore the quality of care for patients worldwide.

Products and level of development

Deuxiemeavis.fr allows each patient facing a serious health problem to obtain an expert opinion in less than seven days via a telemedicine platform, bringing together more than 200 expert doctors on more than 600 pathologies. International patients can obtain a treatment proposal with an associated quote via the partner establishments.

Key figures

- A pioneer in providing access to French medical expertise for all via the deuxiemeavis.fr service.
- 16 million patients covered.
- deuxiemeavis.fr becomes the first firm with a health mission in France.

International ambitions

Carians's internationalization policy has already been launched, through partnerships with major French health establishments, including the Curie Institute (Paris) and the Antoine Lacassagne Center (Nice) in oncology for international patients.

Examples of partnerships abroad

For three years, all requests from foreign patients sent to Curie Institute for advice or treatment for cancer have been handled via the solution, i.e. more than 2,500 patients have been able to access expertise quickly and easily, in a secure space that protects their data.

The solution makes it possible to share a personalized and structured medical file according to the needs of the healthcare establishment, thereby providing qualified, traced and centralized responses.

Contact

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29. Dyameo

Business presentation

Dyameo is developing single-use endoscopic probes for the instant detection of cancer cells. Dyameo's technology is based on a platform of innovative patented biosensors, allowing ultra-rapid detection of biomarkers or other mol-

ecules. The first intended application is the delimitation of the resection margins during oncological surgeries.

Contact

contact@dyameo.com

www.dyameo.com

30. EDAP TMS

Business history and structure

Present in the market for 40 years, EDAP TMS is a high-tech medical firm listed on the Nasdaq that develops, manufactures and markets minimally invasive medical devices using ultrasound.

Today the head office and production site are based in France, and the business also has subsidiaries in Italy, Germany, the United States, Japan, South Korea and Malaysia.

Expertise in oncology

EDAP TMS specializes in prostate cancer and urinary tract stones. The devices offered by EDAP TMS are alternatives to traditional surgical procedures.

Products and level of development

In April 2021, EDAP TMS finalized a fundraising round of more than US\$28 million (approximately €22.8 million) to accelerate its access to the American market. The firm's Focal One HIFU medical device, for the minimally invasive treatment of localized prostate cancer, received Food and Drug Administration (FDA) approval for marketing in the United States in 2018, followed by a universal reimbursement code (CPT code Category 1) in 2020.

EDAP TMS is the market leader in extracorporeal lithotripsy, as well as High Intensity Focused Ultrasound (HIFU).

International ambition

EDAP TMS now operates worldwide, via a network of offices, subsidiaries and distributors, with its aims being to accelerate penetration of the American market, to support the firm's international marketing actions, particularly in Europe and Asia, as well as to develop new applications of HIFU medical devices, such as the treatment of endometriosis with digestive impairment.

Examples of partnerships abroad

EDAP TMS has developed a large portfolio of patents based on its innovative technologies by continuously investing in research and development, as well as by collaborating with INSERM (French National Institute for Health and Medical Research) and internationally recognized research centers.

Contact

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Investor Relations

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31. Enterome

Business presentation

Enterome is a pioneer in the discovery and development of new pharmaceuticals based on its understanding of the interplay between the gut microbiome and the immune system – the microbiome-immuno-inflammation axis.

Contact

Pierre Belichard

CEO

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www.enterome.com

32. Epigene

Business presentation

Epigene Labs is developing a data science platform for the analysis of molecular and clinical data, leading to drug discovery and translational research in oncology.

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www.epigenelabs.com

33. French Blood Establishment

Business presentation

The sole civilian operator of blood transfusion in France, the main mission of the French Blood Establishment (Établissement français du sang – EFS) is national self-sufficiency in blood products. It is also involved in many activities, such as medical biology analyses, cell and tissue therapy and research.

Contact

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34. EuroBioConcept

Business history and structure

EuroBioConcept is a French manufacturer of isolators, bio-decontamination systems and aseptic transfers, which designs, markets and maintains its equipment. Founded in 2006, EuroBioConcept is now present in the largest French centers, such as the Curie Institute and the Georges Pompidou European Hospital.

Expertise in oncology

In the field of the reconstitution of anticancer drugs, the isolator constitutes an absolute physical barrier between the manipulator and the drug, offering maximum protection that results in the following main advantages:

- For the patient: the guarantee of a product prepared in a sterile environment.
- For personnel and the environment: less risk of exposure to toxic products.
- For the hospital: better use of the different dosages of the specialties, therefore savings.

Thanks to its team specializing in ISO technology for more than 20 years, representatives and customers around the world, and through the responsible commitment of all its employees, EuroBioConcept helps protect the lives of users and patients.

All stages of development and assembly are carried out internally by their teams: design and conception (designers, programmers, etc.), manufacturing (assembly in our workshops), installation, etc. Our specialist engineers and technicians carry out the qualification stages, operational validation, and provide product training.

35. Products and level of development

Chemosafe® and Sterisafe® isolators offer several types of operation: lean manufacturing, internal storage or integration of robotic systems. The many working configurations possible associated with short bio-decontamination cycle times ensure a high production rate.

Chemosafe® and Sterisafe® isolators are compatible with different medication management solutions, by gravimetric or digital control.

Key figures

- 20 years of experience in the field of ISO technology.
- More than 300 pieces of equipment installed around the world.

International ambitions

Export represents an important part of EuroBioConcept's activity and is one of its areas of development. EuroBioConcept has already completed numerous installations in Western Europe, Asia, Oceania and the United States.

Examples of partnerships abroad

In 2019, thanks to the in-depth work of its distributor Hospital Plus, EuroBioConcept was able to equip several hospital pharmacies in South-East Europe with its isolators.

Contact

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CEO

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35. EverImmune

Business presentation

EverImmune, spin-off of Gustave Roussy Transfert, is a biotechnology firm dedicated to the treatment of cancer patients with live biotherapeutic products (LBP).

Contact

Valérie Zitvogel

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36. ExactCure

Business history and structure

ExactCure is a microbusiness founded in 2018 by Frédéric Dayan, Fabien Astic and Sylvain Bénito. ExactCure is developing a solution for personalized medication intake.

The startup offers a tool that simulates the effects of drugs on patients according to their personal characteristics and co-medications.

Expertise in Oncology

ExactCure is developing a personalized digital health solution that helps in the proper use of medication.

The digital twin, "Jumeau Digital", simulates the pharmacokinetics of the drug in silico according to the patient's personal characteristics (weight, renal status, genotype, etc.). The healthcare professional has a disruptive simulator to adapt the dosages as much as possible to each patient. The patient also gains autonomy to avoid under-doses, overdoses and drug interactions.

This technology is particularly useful for cancer patients.

Products and level of development

The Internal Use Pharmacy and Oncology Department of Cochin Hospital (AP-HP) is testing the solution on sarcomas and kidney cancer. For example, ExactCure simulates the impact of co-administered lapatinib, or a mutation in the CYP3A4 gene, on the pharmacokinetics of pazopanib. The aim is to help the healthcare professional to be more precise about the initiation dose of the treatment.

Key figures

- 25 employees.
- 40% of international revenues.

Contact

Fabien Astic

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37. Explicyte

Business presentation

Explicyte immuno-oncology provides preclinical contract research services in drug discovery for cancer immunotherapy.

Contact

contact@explicyte.com

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38. Flash Therapeutics

Business presentation

Flash Therapeutics develops and produces DNA and RNA transfer technologies for the development of innovative therapies. Through its scalable bioproduction processes, the firm offers a manufacturing continuum (from research to clinical) to accelerate clinical proof of concept for new drugs.

Contact

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www.flashtherapeutics.com

39. Fluoptics

Business history and structure

Founded in 2009, Fluoptics® is an innovative firm in the field of fluorescence imaging for surgery. Fluoptics provides solutions to guide the surgeon in real time during surgery.

Expertise in oncology

Fluoptics develops and markets Fluobeam®, a fluorescence imaging system with unique ergonomics and high sensitivity. The new product Fluobeam®LX is the first product to obtain Food and Drug Administration (FDA) approval and CE medical device marking for parathyroid autofluorescence in thyroid surgery. This technology reduces the risk of postoperative complications.

Key figures

- €2.8 million in revenues for 2020, showing strong growth.
- 24 employees.
- One subsidiary in Boston, United States.
- 300 international customers.

International ambitions

The internationalization policy has already been launched and is growing.

Examples of partnerships abroad

First business to obtain Food and Drug Administration (FDA) approval for parathyroid autofluorescence during thyroid surgery.

Fluoptics' technology is already used in 22 countries, in particular in:

Europe, including Germany, United Kingdom, Switzerland, Belgium, Italy, Spain, Denmark, Finland, Greece, Netherlands, Poland.

Asia, including Singapore, Thailand, Taiwan, Hong Kong, Japan, South Korea, India.

North America, including the United States.

the Middle East, including Kuwait, Saudi Arabia, United Arab Emirates.

North Africa, including Morocco.

Contact

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<https://fluoptics.com/>

40. Genemarin

• Business presentation

Genemarin is a contract research organization (CRO) specializing in molecular and cellular biology.

Contact

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41. Genoscience Pharma

Business presentation

Genoscience Pharma is a clinical-stage biotechnology firm developing novel lysosomotropic therapies to set a new standard of care for cancer, auto-immune and infectious diseases.

Contact

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www.genosciencepharma.com

42. GlioCure

Business presentation

GlioCure is a preclinical drug development firm specializing in neuro-oncology.

Contact

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www.gliocure.com

43. Guerbet

Business history and structure

Guerbet is a French healthcare firm that has been supporting diagnostic and interventional medical imaging professionals since 1926.

Expertise in oncology

Guerbet develops and markets contrast products, injection systems, medical devices and associated solutions, tailored to their needs. Guerbet recently developed a new activity based on digital technologies and artificial intelligence with two aims: firstly, improving the productivity of radiologists, for example with diagnostic tools, and secondly, obtaining a tissue characterization of the tumors by imaging, so as to better orient the treatments or even to replace a biopsy in the long term.

Products and level of development

In interventional imaging, with the product Lipiodol®: In 1980, the first chemo-embolizations were carried out in Japan with Lipiodol® (the pioneer of iodinated contrast products, invented by Marcel Guerbet in 1901) to treat patients with hepatocellular carcinoma. Lipiodol, initially developed for diagnostic imaging, is now also used in interventional imaging for transcatheter arterial chemo-embolization (TACE) as part of treatment for hepatocellular carcinoma (HCC) where it acts as a visualizer (contrast agent), carrier of the active principle (the anticancer drug) and as an embolic agent.

An extension of its range of microcatheters for minimally invasive imaging-guided procedures in interventional oncology is also in development.

In diagnostic imaging, contrast products used for scanner and MRI modalities, as well as medical devices (injectors, consumables). A new contrast agent used in MRI has been developed by Guerbet, for which phase three clinical studies were completed in early 2021.

Digital and artificial intelligence solutions to help diagnose cancers (liver, prostate, pancreas, etc.).

Key figures

- €712 million in revenues for 2020.
- More than 2,600 employees worldwide.
- More than 60,000 customers, 85% of revenues achieved outside France.
- 10% of revenues spent on research and development.
- Every second in the world, a patient benefits from an imaging procedure with a Guerbet product.

Contact

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www.guerbet.com

44. Gustave Roussy

Establishment history and structure

First European center and fifth center in the world in the fight against cancer, Gustave Roussy is a center for care, research and education, which admits patients with all types of cancer. Gustave Roussy is affiliated with the Unicancer federation.

Gustave Roussy received Organisation of European Cancer Institutes (OECI) accreditation in 2012 from the European Cancer Institutes, which is reserved for multidisciplinary

oncological care institutions integrating care, research and training. This enabled Gustave Roussy to become a Comprehensive Cancer Center on a European scale.

Expertise in oncology

Special expertise in rare cancers and complex tumors.

The center integrates basic research, translational research and clinical research activities. Gustave Roussy focuses its research mainly on personalized medicine, immunotherapy and DNA repair.

Key figures

- Number of patients treated per year: 50,000.
- 277,000 consultations per year.
- 30 teams and 10 research units.
- 21% of patients are included in clinical trials.
- 260 high-impact journals (impact factor IF > 10), including 64 in very high-impact journals (IF > 30).

International ambitions

Gustave Roussy has been the leading French center for foreign patients for 10 years.

In 2014, Gustave Roussy participated in the creation of the Cancer Core Europe network.

Examples of partnerships abroad

Internationally, Gustave Roussy is developing a policy of promoting its model of care and extending beyond its borders its mission of caring for patients and training professionals, so as to promote access to care for all patients.

This international development policy, steered by its subsidiary Gustave Roussy International, results in one-off or multi-year hospital projects abroad, with partner countries including Kazakhstan, Kuwait, the United Arab Emirates, the Egyptian Armed Health Service and the National Oncology Center of Armenia.

Contact

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International Advisor to the CEO, Gustave Roussy

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45. HalioDx

Business history and structure

HalioDx is a laboratory specializing in immuno-oncology, which provides oncologists and biopharmas with immunological diagnostic products and services to measure the immune response at the level of the tumor and in its environment, guide the management of cancer patients and contribute to precision medicine in the age of immuno-oncology and combination therapies.

Products and level of development

Immunoscore® technology, created by Jérôme Galon at the Cordeliers Research Center in Paris, integrates immunohistochemistry, combined with sophisticated algorithms and advanced image analysis, allowing the extraction of molecular information organized in space.

Immunoscore® is available internationally – as a CE-IVD marked test or performed in our CLIA-certified labs – to guide the day-to-day decisions of oncologists. Immunoscore® is an important advance in the understanding of many cancers, however the immune response to the tu-

mor is an essential characteristic of the progression of the disease.

Key figures

- 170 employees.
- 40 biopharma partners.
- 27 scientific publications.

International ambitions

HalioDx has an experienced team of over 165 employees, CLIA-certified laboratories, and facilities in Europe and the United States to develop, manufacture, register and market in vitro diagnostic (IVD) products.

Examples of partnerships abroad

HalioDx is involved in major international research projects. In this context, a partnership was signed with the Dasar laboratory in Brazil.

Contact

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www.halioldx.com

46. Harmonic Pharma

Business presentation

Harmonic Pharma develops IT solutions that combine predictive toxicology, the study of the mechanism of action and the modeling of small molecule data.

Contact

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47. HCS Pharma

Business presentation

HCS Pharma is a biotechnology startup focused on cell imaging, high content analysis and high content screening.

Contact

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48. Hephaistos Pharma

Business presentation

Hephaistos Pharma is a preclinical biotechnology firm developing the next generation of cancer treatments that will strengthen the immune system to treat incurable cancers.

Contact

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49. Hera-MI

Business history and structure

Hera-MI is a French business based in Nantes and created

in April 2017 by Ms. Sylvie Davila. The firm is engaged in the development and commercialization of imaging software solutions for breast cancer in the field of e-Health. These solutions will improve the quality and accuracy of breast cancer diagnoses, while reducing the radiologist's interpretation time.

The aim of Hera-MI is therefore to put artificial intelligence at the service of the early detection of breast cancer, so as to optimize the therapeutic management of patients.

Products and level of development

Hera-MI has developed Breast-SlimView, a patented decision support solution, based on machine learning and 2D/3D image processing for the radiological diagnosis of breast cancer. The aim is to improve the early detection of breast cancer.

Artificial intelligence will allow radiologists to reduce the time they spend on cases deemed non-problematic and allow them to spend extra time on more complicated cases.

In the near future, Hera-MI plans to develop and fine-tune Breast-SlimView so that it can be used for other types of cancer, such as lung, prostate and colorectal cancer.

Hera-MI's software solution has obtained CE medical device marking authorization. Hera-MI started installations in February 2020. As the product is CE Medical Device certified, it can be sold in Europe, North Africa and the Middle East without any additional regulatory adaptation work.

In addition, Hera-MI filed for Food and Drug Administration (FDA) certification earlier this year and expects to obtain certification by September 2021. Upon receipt, Hera-MI will begin sales in the US market.

Key figures

- Hema-MI is one of the 100 startups in the Challenges "Where to invest in 2021?" ranking.
- 2021: Open Innovation winner of the Tremplin Startups competition of the Assises de la Parité 2021.
- 2020: Creation of the subsidiary in the United States.

International ambition

Breast-SlimView is sold directly to radiologists, as well as via their partner Fujifilm, in France and in French overseas departments and territories. Breast-SlimView is also available for sale all over the world.

Hera-MI's goal is to quickly put in place an export development strategy in Europe, the United States and the Middle East.

Examples of partnerships abroad

Hera-MI will attend the RNSA (Radiological Society of North America) congress in November 2021 to present their innovations in the early diagnosis of breast cancer.

Collaborations with leading American imaging centers in breast cancer diagnosis, so as to collect American 2D/3D mammograms and thereby take into account the diversity of populations.

In 2021, Hera-MI aims to set up collaborative scientific projects with Texas breast imaging centers.

Contacts

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50. Honing Biosciences

Business presentation

Honing Biosciences is a pioneer in next-generation cell therapies to control the dynamic delivery of proteins in patients.

Contact

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www.honing-biosciences.com

51. Hybrigenics Services

Business presentation

Hybrigenics Services is a provider of cutting-edge technology solutions dedicated to the study of protein interactions and the identification of targets for drugs.

Contact

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Chemistry Director

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www.hybrigenics-services.com

52. IASO Biotech

Business history and structure

Based in Nantes, this young business created in October 2020 is developing a platform for the bioproduction of recombinant proteins from micro-algae. It includes a technological package made up of its own cell lines, specific and optimized "upstream" and "downstream" processes, all respecting the good manufacturing practices of the pharmaceutical industry.

After validation of proofs of concept with target molecules, IASO Biotech's ambition is to become the first "CDMO" (pharmaceutical subcontractor) using micro-algae for the production of biopharmaceutical proteins. Free from animal pathogens, easier to cultivate than higher plants and significantly more productive, able to comply with regulations, edible for some, micro-algae are produced by photosynthesis in artificial light or with an organic carbon source in fermenters.

Expertise in oncology

IASO Biotech has expertise in CDMO production of biotherapeutics and innovative vectorization.

Products and level of development

Production of recombinant immunotoxins (fusion proteins), by overexpression in the cell and vectorization by the cell of eukaryotic micro-algae.

This is a startup moving from TLR 3-4 priming to TLR 5-6 prototyping if this is successful, the cost of producing a 'hostile' molecule like RITs can be divided by 100 versus current cellular systems.

Key figures

- Founded in 2020.

- Four employees.

Contact

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53. ICANS | Strasbourg Europe Cancer Institute

Establishment history and structure

The Strasbourg Europe Cancer Institute is a health-professional establishment. In 2010, the University Hospitals of Strasbourg and the Paul Strauss Cancer Control Center (FCCC Paul Strauss) baptized their alliance in oncology, temporarily, the Regional Cancer Institute (IRC).

Today, the project, which has become a reality, takes the name of ICANS, Strasbourg Europe Cancer Institute.

The ICANS brand illustrates:

- The shared ambition of the FCCC Paul Strauss and the University Hospital Strasbourg in the service of cancer patients.

- Its attachment to the territory.

- The desire to fit into today's world.

- The logo created by the Voituriez-Obringer VO communications consulting agency is made up of the element "Alliance FCCC-CHU" which recalls the innovative model in oncology created by the two partner structures.

Expertise in oncology

Since their creation, the Paul Strauss Cancer Control Center and the Strasbourg University Hospitals have always forged links in the form of formalized medical co-operation and the acquisition of heavy equipment in joint ownership. These are all examples of the collaborative relationships naturally established between the two establishments.

Driven by the will of the Ministry of Health and the Cancer Plan 1 and under the impetus of the Regional Hospitalization Agency of Alsace then the Regional Health Agency (ARS), the two establishments, FCCC & CHU, have come together to form the regional benchmark entity in oncology which has today led to ICANS.

The solid and visionary partnership between the two leading establishments in the treatment of cancer makes it possible to endow Alsace with an offer of excellent care in public oncology, accessible to all patients, and to raise ICANS to rank of the best expertise in oncology, in France and in Europe, in care, research and teaching.

For patients from all over the country, ICANS brings together the best of oncology in terms of people, technical resources and research.

For professionals, ICANS offers a supportive, collaborative work environment that demonstrates a spirit of initiative. The supervision led by high-level professionals allows the development of modern practical education in oncology, in connection with the University, as well as the continuing education of medical, nursing and administrative staff.

For Alsace and the Eurometropolis of Strasbourg, ICANS is developing a center of attractiveness in the fields of care and research with a European influence. A synergy of skills at local, national and international level, favoring cross-border actions.

Products and level of development

ICANS brings together all the current activities of the FCCC Paul Strauss and the oncology, hematology and nuclear medicine departments of the University Hospitals of Strasbourg.

It works in conjunction with the new HautePierre 2 building, which will house the ICANS pooled operating theaters and radiology. Breast and thyroid imaging will continue at the ICANS premises.

The institute is developing cancer research, thanks to

a new dynamic of exchanges between clinicians and researchers from structures, such as the Institute of Genetics and Molecular and Cellular Biology (IGBMC), the French National Center for Scientific Research (CNRS), Inserm and Cancéropôle. Clinical and translational research is developing and makes it possible to respond as best as possible to the legitimate expectations of patients.

Main activities

- Radiotherapy-brachytherapy department: Six treatment rooms | One HD treatment room | One dosimetric scanner | One intervention sector.

- Department of nuclear medicine and molecular imaging: Two PET scans | Four GAMMA cameras.

- Breast and thyroid imaging service: Two mammograms | Two breast ultrasound machines | One thyroid ultrasound machine.

- Medical radio physics unit.

- Medical oncology department: 42 places in day hospitals | 49 hospital beds.

- Hematology department: 29 places in day hospitals | 47 hospital beds.

- Surgery department: 12 inpatient beds.

- Clinical oncogenetics unit.

- Supportive care and support: Dedicated mobile team | Consultation | Day hospital | Adapted sports room, socio-estheticians, social workers, dieticians, psychologists, sex therapists, doctors specializing in pain management and palliative care | Expertise in oncogeriatrics.

- Pharmacy for internal use.

- Clinical and translational research platform.

Key figures

- €130 million, 900 professionals.

- PET-MRI acquisition in 2021, start of Car-T Cells activities, recognized expertise in radiotherapy

- 900 healthcare professionals.

- More than 30,000 sq. m. spread over seven levels.

- 58 consultation rooms.

- 124 hospital beds: 49 medical oncology beds | 12 surgical beds | Six beds in a protected room (brachytherapy and metabolic radiotherapy) | 47 hematology beds | 10 beds for continuous monitoring and clinical research.

- 90 places in day hospitalization: 42 places in oncology | 29 places in hematology (including 10 post-transplant and five hemaphereses) | Five places in outpatient surgery | 12 places in supportive care | Two places in nuclear medicine.

Examples of partnerships abroad

Favorable discussions with Freiburg, Basel and Saarland on a project to install proton therapy equipment.

Contact

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www.icans.eu

54. ID-Solutions

Business history and structure

ID-Solutions is an SME made up of a team of specialists

with more than 20 years of expertise in nucleic acid extraction, molecular biology and oncology.

Thanks to its expertise, ID-Solutions offers comprehensive, pre-analytical, analytical and interpretation solutions for reliable, rapid and standardized molecular typing results. In addition to standardized operating procedures, ID-Solutions offers tailor-made development of medical diagnostics and the optimization of operating procedures in oncology from liquid and solid biopsies.

Expertise in oncology

The main activity of the firm is oncology. Its mission is to provide innovative, reliable and standardized tools for research and routine analysis in oncological diagnosis by digital PCR on tumor DNA from solid biopsies and free DNA circulating from liquid biopsies. Consequently, the SME offers a unique and complete molecular typing solution for liquid biopsies, including patented standard operating procedures that improve the follow-up of cancer patients (patent Fr3061720B1).

ID-Solutions is the only business to date to develop and market multiplex digital PCR (dPCR) panels operating on all machines available on the market. These in vitro diagnostic medical devices (DM-DIVs) allow the molecular characterization of numerous mutants at a limited number of analysis points. It offers multiplex dPCR panels for brain tumors, colon cancer, melanoma, non-small cell lung cancer, so as to detect, diagnose, make a prognosis and predict responses to treatments.

Products and level of development

As part of a scientific partnership with the Assistance Publique des Hôpitaux de Marseille and in particular Prof. D Figarella, ID-Solutions has developed and validated from clinical samples a multiplex dPCR panel, allowing the classification of brain tumors in adults but also in children, according to the WHO histo-molecular classification recommendations (2016).

This panel of kits includes the digital PCR kits ID1DH1-2, IDTERT, IDH3F3A, IDBRAF-CNS and IDFGFR1-CNS, which allow detection in a single well by genes, IDH1 and IDH2 mutations, promoter mutations HTERT, H3F3A mutations, BRAF mutations and its fusion with the KIAA1549 gene, FGFR1 mutations and the duplication of its domain of tyrosine kinase activity. This work has allowed the publication of numerous research works, and to place the dPCR as a privileged tool for the routine diagnosis from FFPE samples of biopsies of tumors of the central nervous system, reducing the budgetary impact and analysis time to one day, extraction included.

In response to the SARS-CoV-2 pandemic, ID-Solutions has marketed QPCR and dPCR kits to detect the virus and its variants. The firm grew from 10 employees in April 2020 to 45 employees in April 2021 and has taken advantage of its accelerated development processes usually used in personalized medicine to meet the demand for screening for virus variants. The business was the first to offer a multiplexed QPCR to detect the English, South African and Brazilian variants in second intention, then in first intention to limit the costs incurred with the General Directorate of Health. The firm's response to the SARS-CoV-2 pandemic can be seen as a major fundraiser, with no reimbursement conditions.

Key figures

- Global 2020 revenues: €50 million, 70% in France, 30% for export.

- Products distributed in around 25 countries.

- From eight to 45 employees between April 2020 and May 2021.

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55. Imescia

Business presentation

Imescia is developing a new polymeric pro-drug technology that promotes tumor accumulation of anticancer drugs and their preferential release into the tumor micro-environment. This technology improves the effectiveness of anti-cancer drugs and decreases toxicity.

Contact
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www.imescia.com

56. INCa

Establishment history and structure

The National Cancer Institute (INCa) is the state agency for health and scientific expertise in oncology responsible for coordinating actions to fight cancer. Created by the Public Health Act of August 9, 2004, it is placed under the joint supervision of the Ministry of Solidarity and Health on the one hand, and the Ministry of Higher Education, Research and Innovation.

The National Cancer Institute is set up in the form of a public interest group (GIP), which brings together the State, the major associations in the fight against cancer, health insurance funds, health organizations, research and hospital federations. Norbert Ifrah is Chairman of the Board of Directors of the National Cancer Institute and Thierry Breton, Managing Director.

Expertise in oncology

The Institute acts in partnership with the main associative and institutional players in the fight against cancer.

- It coordinates networks of regional players (regional cancer networks, *cancéropôles*).
- It articulates its action with the regional health agencies (ARS).
- It develops international collaborations.
- It monitors the Cancer Plan.

Examples of partnerships abroad

As part of its activity, INCa collaborates with various international partners. Below is the list of European and international INCa-NCI projects.

- ERA-NET TRANSCAN
- iPAAC
- Rare cancers
- CHRODIS +
- Global Alliance
- ICGC
- FLAG-ERA ITFoC
- Fight against cervical cancer
- CSA PerMed
- ICRP
- CanCon

For example, since 2010, the Institute has been leading

and coordinating the participation of early phase INCa labeled centers (CLIP) in calls for early-phase clinical research projects launched by the American National Cancer Institute (NCI), through its CTEP (Cancer Therapy Evaluation Program).

The INCa and the DCTD (Division for the treatment and diagnosis of cancer) of the NCI have signed an agreement to support the conduct of phase two clinical trials in France. This unprecedented partnership was set up to promote and improve access for French patients to innovative molecules in the treatment of cancer. It also aims to increase the visibility and attractiveness of French clinical research at the international level.

The collaboration between the Institute and the NCI has several objectives, including that of offering private laboratories, through INCa, a network of accredited early-phase clinical trial investigator centers. The Institute coordinates the access of French investigators to the CTEP, finances clinical studies carried out in France and assists in their implementation.

Contact

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57. Innate Pharma

Business history and structure

Innate Pharma was founded in 1999 by scientists and managers from the pharmaceutical industries. It is a clinical-stage biotechnology firm, specializing in immuno-oncology and dedicated to improving cancer treatment through innovative therapeutic antibodies that harness the immune system. Based in Marseille, Innate Pharma is listed on the Euronext Paris stock exchange.

Expertise in oncology

Innate Pharma is developing a portfolio of antibody-based therapies that harness the body's immune system to improve the outlook for patients with cancer and other life-threatening diseases.

Products and level of development

Innate Pharma's commercial product, Lumoxiti, licensed from AstraZeneca, was approved by the Food and Drug Administration (FDA) in September 2018. Lumoxiti is a first-in-class oncology product for the treatment of hairy cell leukemia. Innate Pharma's large antibody portfolio includes several potentially "first-in-class" clinical and pre-clinical candidates in cancers of high medical need. A pioneer in natural killer (NK) cell biology, Innate Pharma has broadened its expertise to the tumor micro-environment and targeting of tumor antigens, as well as antibody engineering. Innate Pharma's approach has enabled it to forge alliances with leading biopharmaceutical firms, such as Bristol-Myers Squibb, Novo Nordisk A/S or Sanofi, as well as a multi-product partnership with AstraZeneca.

Key figures

- €33.6 million for the 2020 financial year.
- Research and development expenses represented 65% of operating costs in tax year 2020.

Examples of partnerships abroad

Innate Pharma is a pioneer in understanding the biology of NK cells and has developed its expertise in the tumor micro-environment and tumor antigens, as well as in antibody engineering. Its innovative approach has enabled it to build a diversified proprietary portfolio and forge alliances with leading biopharmaceutical firms, such as Bristol-Myers Squibb, Novo Nordisk A/S or Sanofi, as well as a

multi-product partnership with AstraZeneca.

Contact

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58. Bergonié Institute

Establishment history and structure

The Bergonié Institute has been a private health establishment of collective interest since May 20, 2010 and is also one of the 18 regional centers for the fight against cancer. It is located in the city of Bordeaux in the Nouvelle-Aquitaine region.

The first oncology center created in the provinces in the 1920s, the Bergonié Institute owes its name to an eminent scientific figure who was one of the founders of cancer centers in France: Prof. Bergonié.

The visionary Prof. Jean-Alban Bergonié has played a pioneering role in many areas of oncology in terms of medical treatment, technological innovation and the organization of the healthcare system.

In 90 years of existence, the Bergonié Institute has contributed to medical progress and to the international influence of research in the prevention, detection and treatment of cancer, a chronic disease that has become the second leading cause of death in the world (nearly one in six deaths in 2015, i.e. over eight million deaths).

Expertise in oncology

Since 2016, together with the Bordeaux University Hospital, it has been the regional benchmark for oncology in Nouvelle Aquitaine.

The operation of the Bergonié Institute, like that of the 17 other cancer centers, is based on the "Curie model". This is defined by the continuity between basic research and care. Based on bringing researchers, caregivers and patients together, it accelerates the availability of new diagnoses and treatments. Its professionals are experts in their fields with, in particular, national and international recognition in the care of the breast, gynecology and sarcomas.

Products and level of development

- Reading of anatomic pathology slides with the firm *Terascop*.
- Anatomic pathology laboratory with iso15189 accreditation.
- Anatomic pathology diagnostic expertise in breast cancer pathology, gynecologic sarcomas (second reading opinion).
- Reception and training center for foreign doctors.
- Reference laboratory for immunohistochemistry (IHC) examinations for therapeutic trials.

Key figures

- Budget of around €130 million.
- 1,100 employees in 2020.

Examples of partnerships abroad

Excellent positioning in clinical research and particularly in early-phase trials. Two solutions already deployed for digital reading in anatomical pathology, making it possible to provide expertise to many foreign countries (Monaco, Switzerland, Maghreb countries, etc.). The institute is already welcoming foreign patients.

Contact

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59. Curie Institute

Establishment history and structure

The Curie Institute, a benchmark player in the fight against cancer, combines an internationally renowned research center and a state-of-the-art hospital complex, which treats all cancers, including the rarest.

Founded in 1909 by Marie Curie, the Curie Institute brings together on three sites (Paris, Saint-Cloud, Orsay) more than 3,500 researchers, doctors and caregivers around three missions: research, care and teaching with conservation and the transmission of knowledge.

A private foundation recognized as being of public utility, authorized to receive donations and bequests, thanks to the support of its donors, the Curie Institute can promote discoveries and thereby improve the treatment and quality of life of patients.

Expertise in oncology

Human expertise (organization, training, expertise).

Products and level of development

Organization of trainings (congresses, masterclasses, seminars, webinars, preceptorships [financed by manufacturers]) for international institutions.

Organization, management of the reception of international students and doctors in training.

Organization and management of European and non-European fellowship programs.

Organization and management of training via the *Invivox* platform (masterclass, webinars, etc.).

Key figures

- Nine research units.
- Department of translational research.
- Cancer immunotherapy center.
- SIREDO, center dedicated to cancers in patients under 25 years old.
- Curie-Montsouris thorax institute.
- Several university and hospital partners: AP-HP, Pierre and Marie Curie University, etc.

International ambition

The Curie Institute has already launched international activities, notably with the reception of foreign patients and doctors, research and care activities, co-operation in the education sectors and humanitarian commitment. Internationally, the Curie Institute concretizes and extends the foundations of the spirit of the Curie Foundation by remaining focused on the patient and improving their care.

Examples of partnerships abroad

The Curie Institute has partnerships with several hospitals and institutions in Europe and outside the European Union:

- Since 2018, the Curie Institute has provided the French Development Agency (AFD) with technical assistance for the use of a €10 million grant that it planned to release as part of its Tanzania Comprehensive Cancer Project (TCCP), a public-private partnership to improve cancer control in Tanzania.

- The Curie Fellowship is an ambitious welcome program, which will allow six young Lebanese doctors to come to the Curie Institute (all expenses paid) for 12 months to

complete their training in oncology with expert teams (surgery, radiotherapy, oncology medical, diagnostic, etc.). This program will be funded to the tune of €500,000 by the Curie Institute.

Contact

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60. Intrasense

Business history and structure

Created in 2004, Intrasense develops and markets a unique medical device, Myrian®, a software platform that facilitates and secures diagnosis, decision-making and therapeutic monitoring. Thanks to Myrian®, more than 1,000 healthcare establishments in 40 countries benefit from a single, integrated platform to read all types of images (MRI, scanner, etc.).

Products and level of development

Intrasense develops and markets Myrian®, a software solution allowing the visualization and analysis of medical images for improved productivity and better patient care. This new vendor-independent viewer includes a multimodal platform and a comprehensive set of clinical modules, fully integrable into any healthcare system.

Enriched with expert clinical applications for specific pathologies, in particular oncology, Myrian® offers a universal image processing solution that can be integrated into all health information systems.

Key figures

- €3.4 million (global revenues).
- €0.7 million (revenues for France).
- 45 employees (France and China).
- More than 1,000 customers around the world.

Examples of partnerships abroad

Radboud UMC Hospital (Radboud University Medical Center) in the Netherlands is a global specialist in prostate cancer care and research. This organization uses the Myrian® XP-Prostate solution both in the context of clinical examinations and research, as well as in training based on its clinical expertise in prostate MRI. These training courses are provided within the Prostate MRI Reference Center (PMRC) as well as in the network of associated expert centers, which are deployed internationally.

Contact

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61. Invivox

Business history and structure

Founded in 2015 by Julien Delpech and Patxi Ospital, the Bordeaux startup was created to meet an unfulfilled need on the part of doctors and healthcare staff: face-to-face training after graduation. To meet this need for learning and knowledge sharing, the two co-founders have developed a platform for connecting healthcare professionals from all over the world.

Invivox is a face-to-face medical training platform, which connects doctors from all over the world. After developing

its activity in the United States, the firm closed a fundraising round of €2.8 million in June 2018 led by Bpifrance via the Autonomous Patient Fund.

Products and level of development

To offer training or choose one, professionals must create an account on the online platform by entering the area of competence, the place and the date. The time and price of these training courses are determined by the doctors who provide them.

The Platform (invivox.com) allows healthcare professionals to search and find all the details related to their events to register with ease.

SaaS software developed in-house is used to administer training programs, manage participants and report data from these users.

An Airbnb-type platform to offer experts the opportunity to post their availability online to receive their colleagues, their prices, their techniques. The exchanges took place internationally very quickly.

Key figures

- Founded in 2015.
- Fundraising of €2.8 million in 2018.
- 30 employees.

International ambitions

Its ambition: to make France the largest hub for medical training.

Examples of partnerships abroad

Invivox maintains numerous partnerships with hospitals and specialized centers in France and the United States. Always on the lookout for new partners, the firm uses its digital campaigns to publicize its training courses, thereby allowing doctors around the world to benefit from the knowledge of their colleagues.

Contact

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62. Keen Eye

Business presentation

Keen Eye is developing an image analysis platform as well as artificial intelligence algorithms for preclinical and clinical research. Keen Eye enables physicians and biologists to replicate and extend their visual expertise, identifying signals with high predictive value that are difficult to detect. They save precious time in decision-making, whether to diagnose, screen for a disease or assess the effectiveness of a drug, in a more precise and standardized way.

Contact

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63. Latoxan Laboratory

Business presentation

Latoxan is the leading producer of snake, scorpion and amphibian venoms, with over 300 different venoms available worldwide. Latoxan supplies the pharmaceutical industry, academic and pharmaceutical research centers and global

distributors of reagents for the life sciences.

Contact

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64. Lightcore Technologies

Business presentation

Lightcore Technologies has developed an unmarked microscope and endoscope for instant identification of cancerous tissue and virtual histology.

Contact

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65. LXRepair

Business presentation

LXRepair is developing DNA repair biomarkers based on a unique functional multiplex approach on DNA chips. Today the firm offers three different tests that cover 90% of DNA repair pathways. These assays are used to identify predictive biomarkers of response to cancer therapies and to help the pharmaceutical industry develop more specific and effective DNA repair inhibitors.

Contacts

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www.lxrepair.com

66. MaaT Pharma

Business presentation

MaaT Pharma's goal is to develop a series of biotherapeutic products aimed at improving blood cancer survival outcomes.

Contact

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67. Mablink Bioscience

Business presentation

Mablink Bioscience is a biotechnology firm specializing in the development of a new class of anticancer drugs called Antibody Drug Conjugates (ADCs).

Contact

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68. MAbSilico

Business presentation

Founded in 2017, MAbSilico is a software publisher, based on artificial intelligence, for the discovery and development of therapeutic antibodies and biomedicines used in a growing number of pathologies, including oncology.

Contact

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69. MImAbs

Business presentation

MImAbs is a research and development platform specializing in antibody-based immunotherapy. It develops monoclonal antibodies against cancer and inflammatory diseases for third parties (academics, pharmaceutical companies, biotechnologies, etc.).

Contact

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70. Mitologics

Business presentation

Mitologics is an innovative biotechnology firm specializing in the detection of mitochondrial alterations for toxicology and pharmacology applications.

Contact

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71. Nanobiose

Business history and structure

Nanobiose is a specialized firm founded in July 2016 near Chambéry (France), at the Alpine crossroads of Europe.

Nanobiose develops innovative lab-on-a-chip solutions for a better in vitro evaluation of the efficacy and/or safety of new molecular entities at the early stages of development ranging from:

- Pharmaceuticals, biopharmaceuticals.
- Nanomedicines, nanovectors, vaccines.
- Innovative dermocosmetics.
- Active ingredients.
- Implants.

Expertise in oncology

Nanobiose offers single-use solutions to increase the predictive power of in vitro cell models based on a versatile 'lab-on-a-chip' platform, allowing the collection and analysis of biomarkers secreted by various biological samples (biopsies, organoids, 3D cell cultures etc.) in response to controlled exposure to drug candidates.

Products and level of development

The product is in its launch phase in prototype mode for pilot customers.

Key figures

- Developing revenues
- Three employees

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72. Nanobiotix

Business history and structure

The biotechnology firm Nanobiotix, created in 2003, is based in Paris and today has three subsidiaries: in Germany, Spain and the United States. It was floated on the stock exchange in 2012 on the Euronext Paris market and in 2020 in the United States.

In 2017, the business had its IND application approved by the Food and Drug Administration (FDA) for the first immuno-oncology trial in the United States.

In 2020, Nanobiotix raised approximately €20 million in an offering of common shares to investors in the United States and Europe.

Expertise in oncology

Nanobiotix's therapeutic innovations are based on nanotechnologies and physics; they challenge conventional approaches that generally use biology or chemistry. The firm is responsible for the design, manufacture and development of nanoparticles to treat cancer.

The aim is to improve the efficiency of radiation in tumor cells, without increasing the dose received by the healthy tissues surrounding the tumors.

In 2019, the business obtained marketing authorization in Europe (CE mark) for its product in the treatment of locally advanced soft tissue sarcomas.

Key figures

- 14 clinical trials in seven types of cancer.
- 19 patent families.
- 15 countries involved in clinical trials.
- 250 patients recruited into the studies.
- €195 million raised since its creation.

Examples of partnerships abroad

• In 2012, signature of a license agreement for the development and commercialization of our nanoparticles in Asia-Pacific with the Taiwanese firm PharmaEngine.

• In 2019, new collaboration with MD Anderson Cancer Center at the University of Texas, nine new phase one clinical trials with our product, in six different cancer types involving approximately 340 patients.

• In 2019, launch of the Curadigm platform.

Contact

<https://www.nanobiotix.com/>

73. NeoMedLight

Business presentation

NeoMedLight develops innovative medical devices designed for phototherapy and photobiomodulation. They are part of the anatomical medical devices for supportive cancer care.

Contact

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74. NovaGray

Business presentation

NovaGray is a firm developing a new generation of companion tests to aid in radiation therapy planning. Its aim is to allow the practitioner to precisely adapt the dose and the sequence of sessions according to the patient's profile, to personalize their management and limit the appearance of side effects. Currently, the large-scale prospectively validated test is for breast cancer, while tests for prostate and lung cancer are in development.

Contact

<http://www.nova-gray.com/>

75. OCR

Business presentation

OCR's mission is to accelerate the development of treatments aimed at humans and animals for serious chronic pathologies, particularly in oncology.

Contact

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www.oncovet-clinical-research.com

76. Odimma

Business presentation

Odimma is a biotechnology firm developing a powerful and innovative personalized oncology vaccine composed of neo-antigens specific to the patient's tumor.

Contact

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CEO

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77. Oncodesign

Business history and structure

The biopharmaceutical firm Oncodesign, specializing in precision medicine, was created in 1995 and is chaired by Dr. Philippe Genne.

Oncodesign inaugurated its new head office in Dijon on May 21, 2021, which notably brings together its teams specializing in artificial intelligence. At the same time, the business officially launched its new development strategy based on artificial intelligence approaches.

Expertise in oncology

Oncodesign specializes in researching new cancer therapies. It is experimenting with new cancer treatments and drug and biomarker discovery programs conducted in partnership with the pharmaceutical industry.

Key figures

- Revenues of €26.7 million in 2019 (+3% compared with 2018).

Examples of partnerships abroad

In 2021, InterSystems and Oncodesign signed a strategic partnership to optimize the exploitation of data so as to increase reliability and speed up the process of discovery of treatments in oncology. Oncodesign will more specifically combine with OncoSniper, its platform for the identification and validation of new therapeutic targets, and the unified health data management platform InterSystems IRIS for Health to accelerate the search for new treatments in oncology using artificial intelligence.

InterSystems will allow Oncodesign to benefit from its international network of strategic academic partners that generate health data (hospitals and universities), particularly in North America.

For Oncodesign, this partnership represents the second step in its strategic development focused on artificial intelligence, after the launch in 2017 of the OncoSniper project, with a clinical trial conducted with 600 patients in three oncology indications and with 16 partners.

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Christa Vitrouil

Business Operation

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78. OncoDiag

Business presentation

OncoDiag is a French biotechnology firm focused on the development of non-invasive diagnostic tests for the early detection of cancers.

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79. Oncomeca

Business history and structure

Oncomeca is a biotechnology firm that designs an eponymous non-invasive medical device (MD) for the in vivo diagnosis of skin lesions of all types, including melanoma and all stages, including very early.

Products and level of development

The medical device under development (pre-industrial phase) is a simple tool for early diagnosis of skin cancer by palpation of the lesion and sending data to artificial intelligence. The first test on explants gave a reliability rate of 88%.

Key figures

- One employee.
- Created in February 2020.
- Without revenues (cash burn model on equity).

Contact

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80. Oncomedics

Business presentation

Oncomedics has created an in vitro medical device to identify the most appropriate drug or drug combination to target the patient's cancer cells.

Contact

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www.oncomedics.com

81. OSE Immunotherapeutics

Business history and structure

OSE Immunotherapeutics is an integrated biotechnology firm that develops innovative immunotherapies, directly or through partnerships, for immune activation and regulation in immuno-oncology and in autoimmune diseases.

Based in Nantes (head office) and in Paris, OSE Immunotherapeutics has 50 employees. The firm is listed on Euronext Paris.

Expertise in oncology

OSE Immunotherapeutics' research and development expertise in immunology has led to the development of several first-in-class products for activating and regulating the immune system. These products are under development in different clinical indications and, for some, have led to pharmaceutical and academic agreements.

Three areas of expertise have been developed within the immunology research platform: T cell-based vaccination, immuno-oncology (focus on myeloid cells) and auto-immunity & inflammation.

The OSE Immunotherapeutics research and development team focuses on key aspects of the immune response and delivers monoclonal antibodies that target receptors in myeloid cells and macrophages.

Products and level of development

The firm has several technological and scientific platforms: neo-epitopes, agonist or antagonist monoclonal antibodies, ideally positioned to fight cancer and autoimmune diseases. Its first-in-class product portfolio has a diversified risk profile, ranging from the registration phase to the research and development phase.

These new generation products are optimized to better target the key receptors of the activating or regulatory immune response, allowing the therapeutic effect to be sustained over time.

Examples of partnerships abroad

Pharmaceutical partnerships concluded with Boehringer Ingelheim (Germany), Veloxis Pharmaceuticals (United States) and Chong Kun Dang Pharmaceutical Corporation (South Korea).

Academic and public partnerships in Europe with the Children's Cancer Research Institute in Vienna in Austria, the Biomedical Primate Research Center in the Netherlands, and the University of Oxford in the United Kingdom; in the United States with the University of Maryland in Baltimore, and the Ben Towne Center for Childhood Cancer Research in Seattle.

OSE Immunotherapeutics and the Italian Oncology Foundation (FoRT) have announced the start of a phase two clinical study in non-small cell lung cancer. The clinical trial will be conducted by the Italian oncology foundation, FoRT, and with support from Bristol Myers Squibb and OSE Immunotherapeutics.

Contact

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82. Owkin

Business presentation

The mission of Owkin, a firm specializing in artificial intelligence, is to empower researchers in hospitals, universities and pharmaceutical firms to understand why the effectiveness of drugs varies from patient to patient, to improve the drug development process, and identifying the best drug for the right patient to improve treatment outcomes. Therefore, Owkin has created a unique research platform and a portfolio of artificial intelligence models and solutions.

Contact

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www.owkin.com

83. PDC*line Pharma

Business presentation

PDC*line Pharma is a biotechnology firm developing a new class of ready-to-use cancer immunotherapies.

Contact

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www.pdc-line-pharma.com

84. Phost'in Therapeutics

Business presentation

Biopharmaceutical firm Phost'in Therapeutics discovers and develops glycoalkaloid modifiers for the selective treatment of cancer and other serious diseases.

Contact

Karine Chorro

CEO

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www.phostin.com

85. Predilife

Business history and structure

Created in 2004 by Stéphane Ragusa, Predilife is a start-up specializing in statistics and data mining applied to predictive and preventive medicine. It is a pioneer in the development and marketing of innovative risk prediction solutions, in particular for breast cancer with its MammoRisk® solution.

Developed in collaboration with Gustave Roussy and the Breast Cancer Screening Consortium in the United States, MammoRisk® is the first commercial test integrating clinical, imaging and genetic data. It makes it possible to assess the probability of developing invasive breast cancer within five years in women from the age of 40 and to offer a screening and follow-up program.

The firm claims to have more than 30 prescribing centers, notably in France, Italy and more recently in the United Arab Emirates, and intends to accelerate the penetration of large metropolises in Europe.

Products and level of development

Predilife offers a B2C offer corresponding to "personalized multi-pathology prevention assessments". This solution will allow anyone wishing to learn about their propensity to develop a serious pathology (cancer or cardiovascular disease), to carry out online and under the supervision of a doctor a complete assessment, including a collection of personal information, a genetic test and a teleconsultation.

Developed to be prescribed by doctors, MammoRisk® is a complementary test to mammography and integrates five factors: the woman's age, breast density, the number of family history, a history (or not) of breast biopsy and a polygenic score, calculated from the latest scientific publications.

Key figures

- €2.5 million raised in 2021 to launch its personalized online multi-pathology assessments.

International ambition

Predilife's ambition is to continue the commercial deployment in Europe and internationally of its MammoRisk® breast cancer risk prediction tests.

Examples of partnerships abroad

In 2020, Predilife announced its collaboration with the Italian League for the Fight against Breast Cancer – LILT – Milano Monza e Brianza (Italy), as part of the establishment of a breast cancer risk consultation with MammoRisk®.

Predilife is one of the partners of the European study MyPEBS, in charge of the breast cancer risk assessment platform. The main aim of the MyPEBS (My Personal Breast Screening) randomized study is to compare the current organized screening system – based on the sole criterion of age (except in the case of women identified at very high risk) – with a new screening strategy, offering a type and frequency of examinations based on the risk level of each woman.

Contact

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86. Quantum Surgical

Business history and structure

Founded in 2017, Quantum Surgical is an innovative medical robotics firm.

This Montpellier-based SME designs and develops a surgical robotics solution dedicated to the minimally invasive treatment of liver cancer.

Expertise in oncology

The Epione® platform assists practitioners by securing and making percutaneous liver tumor ablation procedures more reliable, a minimally invasive treatment in which a needle is inserted through the skin to the lesion to destroy it.

As part of a clinical trial carried out at the Montpellier University Hospital (Montpellier, France) and Gustave Roussy (Villejuif, France), Prof. Boris Guiu, Prof. Thierry De Baere and their respective teams successfully treated 21 patients with the assistance of Epione®.

During these procedures, 24 liver tumors, either primary (from liver cancer) or metastatic (from another cancer) were targeted and successfully destroyed. No complications were observed during post-operative examinations.

Products and level of development

The startup is in hyper-growth (75 employees, 30 recruitments are planned in 2021).

It has developed a medical robot to treat inoperable liver tumors. A few days before the CE marking of its first gener-

ation of product, it is actively preparing for the commercial launch throughout Europe.

In 2020, the SME achieved two world firsts: the treatment of an inoperable primary liver tumor by the Montpellier University Hospital, as well as the treatment of inoperable metastases by the Gustave Roussy Institute.

Key figures

- 75 employees, financed by investment funds.

- No revenues to date.

- More than twenty hospital partners, clients being prospected.

- After a first successful clinical trial at the Gustave Roussy Institute and at the Montpellier University Hospital, the robotic platform combining image analysis and artificial intelligence, aimed at treating inoperable tumors of the abdomen will receive its CE marking in the coming days.

International ambitions

In 2020, the SME achieved two world firsts: the treatment of an inoperable primary liver tumor by the Montpellier University Hospital, as well as the treatment of inoperable metastases by the Gustave Roussy Institute.

Contact

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87. Sanofi

Business history and structure

Sanofi is a global biopharmaceutical firm specializing in human health, with over a century of experience in the healthcare field. It operates worldwide and transforms scientific innovation into healthcare solutions. Sanofi prevents diseases with its vaccines and offers innovative treatments.

Sanofi is structured into three large global business entities: Specialty Medicine (immunology, rare diseases, rare hematological diseases, neurology and oncology), Vaccines and General Medicine, and Consumer Healthcare, which will become an autonomous commercial entity, with integrated manufacturing and R&D business activities.

Over 100,000 employees in 100 countries with healthcare solutions available in 170 countries.

Expertise in oncology

- Human expertise (organization, training, expertise).

- Partnerships with various organizations to improve access to care and innovation.

Oncology is one of Sanofi's four strategic lines of research. Significant resources have been brought there in recent years. In France, two sites are experts in this field: Vitry-sur-Seine, the flagship of oncology research, and more recently Strasbourg. Eleven molecules are currently in clinical development, in immuno-oncology and in molecular oncology, while fifteen others are at the gates of clinical research.

While Sanofi's research budget allocated to oncology was only 15% four years ago, it is now around 40%. In this perspective, the oncology research teams have been strengthened, in particular at the Strasbourg site, some of whose teams have been mobilized for this activity. The site in Grand Est thereby completes the workforce at the Cambridge (United States) and Vitry-sur-Seine sites.

Thanks to these three sites, and in particular the Ile de France site, the spearhead of oncology research, Sanofi

is able to explore a wide range of therapeutic modalities, from small synthetic molecules to monoclonal, bi-specific, tri-specific, or antibody-drug conjugates and, more recently, nanobodies and optimized proteins (synthorins), thanks to new technologies acquired with ablynx and synthorx.

Sanofi invests considerably in the development of new generations of anti-cancer drugs. With clear goals, strong internal expertise and leading partners, its researchers are working to design new drugs that could change the lives of many cancer patients around the world.

Products and level of development

Of the eleven molecules currently in clinical development in Sanofi's oncology portfolio, four are in advanced development in Sanofi's four strategic areas in oncology: multiple myeloma, lung, breast and skin cancers. Among these molecules, a PD-1 inhibitor in skin cancer, which is also studied with regard to lung cancer, a selective estrogen receptor degrader (SERD) in breast cancer, an antibody-conjugate aimed in particular at lung cancer and a monoclonal antibody in myeloma.

Sanofi presents a development portfolio in oncology based on a long tradition of research in four main therapeutic areas:

- Multiple myeloma and other cancers of the blood
- Skin cancer
- Lung cancers
- Breast cancer
- As well as other hormone-dependent cancers

Key figures

- 100,000 employees worldwide.

- Presence in more than 100 countries.

- More than 16,000 employees involved in research and development.

- 81 industrial sites in 36 countries.

- €33.8 billion in revenues.

International ambitions

With its positioning as a pioneer in its sector, Sanofi affirms its marked global presence, with more than 100,000 employees worldwide, a presence in more than 100 countries and 81 industrial sites in 36 countries.

Examples of partnerships abroad

Sanofi has signed partnerships with various organizations, particularly with regard to improving access to healthcare and innovation.

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88. Scipio Bioscience

Business presentation

Scipio Bioscience uses proprietary technology that enables the preparation of samples for the profiling of individual cells. Based on an innovative combination of established biochemical and biophysical approaches, Scipio's technology enables the labeling of single cells in microtube.

Contact

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89. SeqOne

Business presentation

SeqOne is a startup that develops cutting-edge genomic analysis tools for clinical applications in the fields of cancer and rare diseases. Its flagship product, SeqOne | Platform, is a cloud-based end-to-end solution that dramatically reduces the time and costs required to deliver accurate genetic analyses for use in traditional medicine.

Contact

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90. Servier

Business history and structure

Servier is an international pharmaceutical group. Founded in 1954, it is present in 150 countries and has nearly 22,500 employees.

Expertise in oncology

Servier wishes to become a recognized and innovative player in cancer treatments by initiating therapeutic progress where the needs are the most important.

A healthcare player committed to patients, Servier has chosen to focus on the development of treatment of cancers for which the therapeutic needs are, for the most part, not yet covered and difficult to treat, such as gastro-intestinal and hematological cancers, pancreatic or pediatric.

Key figures

- The Servier group employs 4,800 people in France:
- 2,200 in research and development, located in Suresnes and Croissy-sur-Seine (Ile de France).
- 1,680 in industry, spread over two production sites in Bolbec (Normandie) and Gidy (Centre-Val de Loire).
- 1,020 in the Group's global activities, mainly in Suresnes.
- 80 dedicated to the activities of the group's French subsidiary.

Examples of partnerships abroad

Launch outside North America and Asia of a drug administered orally (trifluridine/tipiracil) as a monotherapy for the treatment of adult patients with metastatic colorectal (mCRC) and gastric (mGC) cancers, including adenocarcinoma of gastro-esophageal junction, previously treated for advanced stage disease.

It is the result of a partnership with the Japanese Taiho Laboratory, which is now available in more than 90 countries around the world. Lonsurf is today a reference drug in the third-line treatment and more of patients suffering from metastatic colorectal cancer.

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91. SideRos

Business presentation

SideRos specializes in the development of innovative chemical molecules targeting iron metabolism in persistent cancer cells responsible for recurrence and metastasis.

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92. SinapTec

Business presentation

SinapTec designs, develops, manufactures and markets ultrasound technology modules to meet the needs of industry and healthcare. Power ultrasound has multiple effects or applications in the field of biology, microbiology, drug production or therapeutic ultrasound treatment, which paves the way for the non-invasive treatment of diseases.

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93. Stimunity

Business presentation

Stimunity is a preclinical startup developing biopharmaceuticals to treat patients who do not respond to conventional immunotherapy.

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94. Sublimed

Business history and structure

Sublimed was founded in October 2015 by two engineers from the French Atomic Energy and Alternative Energy Commission (CEA), Nicolas Karst and Simon Perraud, and Dr. Jean-Pierre Alibeu, former Head of Department of the Pain Center of the University Hospital of Grenoble.

This is an SME that develops innovative and connected medical devices for the management of chronic pain. Sublimed products are based on a non-drug therapy widely used in France and internationally, transcutaneous electrical nerve stimulation (TENS). Thanks to patented technologies, Sublimed products significantly increase the compliance and effectiveness of treatments.

Expertise in oncology

A non-drug solution for the treatment of pain by transcutaneous neurostimulation.

Products and level of development

The technology used has been the subject of several studies demonstrating its usefulness in the non-drug treatment of pain (bone cancer, post-operative, tumor putting pressure on nerves ...), as well as to help better acceptance and tolerance of chemotherapy treatments.

Key figures

- 10,000 patient users in France.
- Obtained Food and Drug Administration (FDA) 510 (k) approval in December 2020.

International ambition

Sublimed has put in place a clear and defined internationalization strategy. The international launch of ActiTENS, a transcutaneous electrical neurostimulator was carried out (OARSI and EULAR congresses, Arab Health, FIME Miami, Pain Week Las Vegas and MEDICA Düsseldorf.)

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95. Synapse Medicine

Business history and structure

The three founders of Synapse Medicine identified a major problem in the health system linked to the misuse of drugs during their medical activities. Some 10,000 to 30,000 deaths per year are attributed to drug misuse, while 85,000 to 1,800,000 hospitalizations could be avoided each year in France.³

It is in this context that after two years of research and development, Synapse Medicine (from the French National Institute for Health and Medical Research INSERM and Bordeaux University Hospital) has developed its Medication Intelligence platform dedicated to the proper use of drugs. Synapse Medicine's technology is therefore used by healthcare professionals, such as doctors and pharmacists, to help them in their daily lives, but also by telemedicine businesses, pharmacy groups, insurance and mutual societies, as well as hospitals and health centers.

Expertise in oncology

Synapse Medicine's mission is to provide everyone with easy access to reliable and up-to-date drug information.

Synapse Medicine collaborates with some of the largest French university hospitals and has developed the Synapse platform, based on Medication Intelligence technology, dedicated to the proper use of medication. A benchmark in this category, the Synapse platform is 100% independent and is now used by tens of thousands of healthcare professionals and patients.

With the Bergonié Institute, French Comprehensive Cancer Center (FCCC) of the Nouvelle Aquitaine region, Synapse Medicine has decided to combine its expertise to put artificial intelligence technology at the service of clinical pharmacy, and in particular at the service of article 51 oral therapies for the home follow-up of patients on oral cancer drugs.⁴

Products and level of development

In response to the specifications of Article 51 oral therapies, Synapse Medicine offers a complete platform. The modules of this platform, currently undergoing clinical validation, meet quality requirements (compliance with GDPR criteria and hosting with a European health data host) and are integrated into the different phases of the experimentation process.

Synapse's desire is to demonstrate adaptability and flexibility to offer a platform adapted to the needs of the players involved in the follow-up of patients under oral chemotherapy and interoperable with the tools already used on a daily basis by healthcare professionals.

Also, as part of the partnership with the Bergonié Institute, the development of a conciliation tool specific to clinical trials is underway. The aim is to save time for healthcare professionals, furthering reliability and reproducibility of the analysis by securing inclusions in early-phase studies.

³ Bégaud-Costagliola – Report on the surveillance and the promotion of correct usage of drugs in France – 2013

⁴ Article 51: mechanism enabling new healthcare organizations to be experimented, coming from the Social Security Financing Act for 2018.

During the Covid-19 health crisis, Synapse Medicine invested in deploying its Medication Shield technology throughout France (31 regional pharmacovigilance centers) to facilitate the management of adverse reaction reports, particularly in the context of Covid-19 vaccines.

It was developed in collaboration with the National Agency for the Security of Medicinal and Healthcare Products (ANSM) and the national network of regional pharmacovigilance centers, and is the result of an 18-month research project. This technology is the subject of a scientific publication available in an international scientific journal (Clinical Pharmacology & Therapeutics).

Key figures

- 46 employees.
- Seven health professionals (doctors and pharmacists).
- First Medication Intelligence technology.
- Five ongoing clinical studies.
- Three Covid-19 initiatives.
- Around 10,000 users of the Synapse platform.
- Leading provider of prescription assistance solutions for telemedicine companies.
- About 10 public/private collaborations.

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96. Syndivia

Business presentation

Syndivia is a biotechnology firm working on antibody-based therapies for oncology and gene therapy.

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97. Telomium

Business presentation

Telomium is a biotechnology firm developing a therapeutic vaccine for cancer immunotherapy, based on an innovative ribonucleoprotein telomerase.

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98. TheraPanacea

Business history and structure

TheraPanacea, a French startup, has developed ART-Plan™, the first radiotherapy planning software entirely based on artificial intelligence and the web. It makes innovative and proven technology accessible to professionals who wish to streamline and standardize their cancer treatment planning. Tübingen University Hospital (Germany) is a partner of TheraPanacea.

Products and level of development

TheraPanacea received Food and Drug Administration (FDA) clearance in January 2021 to serve the US market. Since September 2020, based in the Paris Santé Cochin nursery, TheraPanacea develops software for radiation oncology based on artificial intelligence and magnetic resonance imaging.

TheraPanacea seeks to introduce cutting-edge artificial intelligence technology to approach cancer treatment with radiation therapy in a new way. The ART-Plan™ solution is designed to improve the efficiency and quality of radiotherapy centers, regardless of the resources and expertise available.

Through its solutions, the startup wishes to make possible so-called “adaptive on-the-fly” radiotherapy, i.e. the possibility of adjusting the dose delivered to the patient in real time according to anatomical changes or organ movements during treatment sessions.

TheraPanacea has received several national and international awards recognizing the innovation and scientific excellence of its products and projects, including the European Research Council grant in 2016 and First Prize in the Paris Region AI Challenge in 2018.

Key figures

- Seven prizes won, including the Paris Region AI Challenge 2018.
- €3.5 million obtained through fundraising.
- €2.5 million in funding received under the European Horizon 2020 program.

International ambition

TheraPanacea's aim is to speed up the marketing of its solution in France and abroad. It has signed an agreement with Acibadem Healthcare Group, a Turkish healthcare institution, the aim of which is to work together to “reinvent” radiation therapy.

Examples of partnerships abroad

Partnerships on the clinical side: With the University Hospital and the Faculty of Medicine of Tübingen (Germany).

Partnership with industrial players: GE Healthcare

In May 2021, TheraPanacea signed an exclusive distribution agreement for its ART-Plan™ solution with Oncology Systems Limited (OSL), a radiotherapy equipment distributor with more than 75 customers in the United Kingdom and Ireland.

In September 2020, TheraPanacea signed an agreement with Acibadem Healthcare Group, a Turkish healthcare institution, which represents the second largest healthcare chain in the world following its contract with IHH Healthcare Berhad. Acibadem Healthcare Group is very active in Asia, Middle East and the Caucasus region, and has 11 dedicated oncology centers with advanced equipment. The aim of the agreement is to work together to “reinvent” radiation therapy.

In November 2020, TheraPanacea signed an agreement with the Egyptian Ministry of Technology, Information and Communication to help them integrate artificial intelligence into cancer care.

Contact

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99. Therapixel

Business history and structure

Therapixel is one of the main French publishers of software specializing in artificial intelligence applied to medical imaging.

Created in 2013 by Olivier Clatz (INRIA Sophia Antipolis-Méditerranée) and Pierre Fillard (INRIA Saclay-Ile de France), Therapixel has established itself as one of the first startups specializing in artificial intelligence applied to medical imaging.

The firm began its life by developing Fluid, a medical imaging software for non-contact medical image navigation in operating theaters. This tool allows surgeons to view medical imaging exams (X-ray, CT scan, MRI, etc.) and to navigate the interface remotely using gestures. This prevents contamination of the sterile gloves by computer equipment and saves time in accessing the medical images needed during the procedure. The product, marketed since 2015, enabled the firm to raise €600,000 in seed capital in 2015.

In 2019, Therapixel raised €5 million to accelerate the development of its new product, MammoScreen™, software to help detect breast cancer.

Expertise in oncology

The artificial intelligence-based MammoScreen™ product analyzes screening mammograms to detect and characterize suspicious lesions in images. Like a second pair of eyes, it helps radiologists detect cancer earlier, reducing unnecessary additional exams and improving workflow for greater productivity.

Products and level of development

With MammoScreen™, radiologists feel more reassured in their diagnosis. In particular, the use of the software has enabled some radiologists to detect certain cancers earlier, which has increased the chances of survival for these patients.

In 2017, Therapixel won the DREAM Digital Mammography Challenge, an international competition that pitted nearly 1,200 participants against each other, as they attempted to design algorithms to help detect breast cancer using mammography. What made this competition so difficult was the large amount of data to process (640,000 anonymous digital mammography images, taken from over 86,000 patients) coupled with extremely limited IT resources (14 days in the Amazon cloud).

Since then, the algorithm has been refined for the interpretation of mammograms, allowing very reliable detection of breast cancer. A user interface has also been designed and developed, with senologist radiologists, so as to provide simple information and clear recommendations for use.

In June 2020, Therapixel decided to sell its Therapixel Suite surgical product unit (including Fluid) to Videomed so as to focus entirely on the field of radiology. The same year, MammoScreen™ was Food and Drug Administration (FDA) approved and CE marked.

Therapixel's research teams operate from Paris, while the software development part is based in Nice.

Key figures

- Number of sites installed: approximately 15 (in France and abroad).

International ambitions

The internationalization policy has already been launched. The process to obtain CE marking and Food and Drug Administration (FDA) clearance was obtained in December and May 2020 respectively.

Contact

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100. Tollys

Business presentation

Tollys is a biopharmaceutical firm specializing in innate immunity and the TLR3 receptor.

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101. Toutenkamion

Business history and structure

Toutenkamion, a mobility manufacturer, is an SME created in 1961. It is the European leader in design, manufacture, transformation of heavy-duty cabins and custom-made mobile units (on carriers, trailers, semi-trailers or shelters).

Key figures

- Revenues of €23 million.
- 50% of its revenues from exports.
- 230 employees.

Examples of partnerships abroad

In July 2020, delivery of 10 mobile breast cancer screening units equipped with mammography equipment for the Saudi Arabian Ministry of Health.

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102. TransCure BioServices

Business presentation

TransCure BioServices is accredited by the French Ministry of Higher Education, Research and Innovation and the High Council of Biotechnologies to perform in vivo pharmacological studies for international clients around the world.

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103. Transgene

Business history and structure

Founded in 1979, Transgene is a French biopharmaceutical firm headquartered near Strasbourg (Grand Est). It specializes in the design and development of innovative immunotherapies, including a personalized therapeutic vaccine and multifunctional oncolytic viruses. The business carries out research, preclinical trials, clinical trials and the production of its clinical batches.

In early January 2021, Transgene treated the first patients with its myvac® individualized immunotherapy in two international phase one trials.

At the end of June 2021, a first patient was included in a randomized phase two trial targeting cancers induced by the papillomavirus.

Expertise in oncology

- Immunotherapies based on viral vectors (therapeutic vac-

cines and oncolytic viruses).

- Treatment of the first patients with myvac® individualized immunotherapy (two clinical trials in progress).

- Collaboration agreement with AstraZeneca aiming to develop five innovative oncolytic viruses integrating targets identified by them.

Products and level of development

A pioneer in the engineering of viral genomes, Transgene's ambition is to create innovative treatments to fight cancer. Transgene's portfolio consists of four immunotherapies in clinical development:

- Two therapeutic vaccines (TG4001, developed in HPV positive cancers, and TG4050, the first individualized treatment resulting from the myvac® platform).

Transgene's myvac® platform combines a set of extremely innovative technologies, including viral genome engineering and artificial intelligence, so as to design and produce tailor-made immunotherapy for each patient, in a short timeframe.

- Two oncolytic viruses (TG6002, an oncolytic virus evaluated in solid tumors and BT-001, the first oncolytic from the Invir.IO™ platform).

The Invir.IO™ platform makes it possible to design a new generation of multifunctional oncolytic viruses, capable of modulating the tumor micro-environment and therefore of showing improved anti-tumor activity.

Key figures

- 150 employees.
- 160 registered patents.
- Four clinical candidates in oncology.
- First patients treated with the individualized therapeutic cancer vaccine.

Examples of partnerships abroad

Transgene has clinical collaboration agreements with Alliance of Merck KGaA (Germany) and Pfizer (United States) aimed at making avelumab available for a clinical trial.

Transgene has collaborative research agreements with AstraZeneca (Swedish-British group), BioInvent (Sweden) and Randox (Northern Ireland).

Transgene also works with many reference clinical centers in France, Europe and around the world, such as the Mayo Clinic (United States), the University of Leeds (United Kingdom) and the Clatterbridge Cancer Care Center (United Kingdom).

In 2020, Transgene, NEC (Japan) and BostonGene Corporation (United States) announced a strategic collaboration involving the two phase one clinical trials of TG4050, an individualized therapeutic vaccine derived from Transgene's myvac® platform, which integrates the advanced artificial intelligence technologies from NEC. The aim is to identify factors in the tumor, in its immediate environment, or in the patient's genome, which predict a positive response to treatment with TG4050.

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104. Vect-Horus

Business presentation

Vect-Horus is a biotechnology firm that designs and develops vectors that facilitate the transport of therapeutic or imaging agents to organs, including the brain and tumors.

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105. Voluntis

Business history and structure

Voluntis is a manufacturer of medical software that helps patients manage their chronic illnesses. This software is part of the digital therapy approach, consisting of mobile applications for the patient and corresponding web applications for healthcare professionals.

In 2015, Voluntis announced a partnership with Roche France to develop a first connected monitoring solution to help patients with breast cancer. Voluntis has also signed a partnership with AstraZeneca to test a digital support service for women with ovarian cancer.

Expertise in oncology

Voluntis is a specialist in digital therapies, particularly in the field of oncology. Voluntis software medical devices help cancer patients manage symptoms associated with their treatment. Voluntis notably designed Oleena, the first digital therapy for cancer authorized in Europe and by the Food and Drug Administration (FDA). On the basis of its platform, Voluntis also creates digital therapies specifically adapted to certain anti-cancer treatments, in partnership with the pharmaceutical companies that manufacture them.

Key figures

- 2020 commercial invoices: €10.2 million.
- 75 employees.
- Six partnerships with global pharmaceutical companies: AbbVie, Biocon Biologics, Bristol-Myers Squibb, Eisai, Novartis, Sanofi.

International ambitions

Voluntis succeeded in obtaining CE marking and Food and Drug Administration (FDA) clearance for the first digital therapy in oncology. It is on this basis that the firm then forged strategic partnerships with European (Novartis), American (BMS) and Japanese (Eisai) laboratories, thereby constituting the largest portfolio of biopharmaceutical agreements worldwide in the field of digital therapies.

Examples of partnerships abroad

First partnership with a Japanese laboratory: Voluntis has entered into a collaboration agreement with Eisai, whose head office is located in Tokyo, to design and develop innovative digital therapies (DTx) to support cancer patients. This partnership agreement is accompanied by a strategic investment by Eisai in Voluntis, for 1.1% of the capital placed at €4.15 per share.

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106. Voxcan

Business presentation

Voxcan is a preclinical contract research organization (CRO) specializing in in-vivo studies in three therapeutic areas:

- Oncology and immuno-oncology (small molecules, biological products, cell therapies).
- Infectious diseases (antivirals, antibacterials).
- Osteo-articular pathologies and regenerative medicine (biopolymer implants, dermal fillers).

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107. Wefight

Business presentation

Wefight is a digital health startup developing a virtual companion for cancer patients.

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108. XenTech

Business presentation

XenTech is a biotechnology firm and a contract research organization (CRO) dedicated to translational oncology research, offering preclinical services to assess the anti-cancer potential of drug candidates. In addition, XenTech is developing internal research and development programs to correlate drug responses to the molecular characteristics of tumors, as well as to identify cancer biomarkers and therapeutic targets.

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